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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Biociencias y biotecnología
Nombre: PONS SALORT, MARGARITA
Referencia: RYC2024-050216-I
Correo Electrónico: margapons@gmail.com
Título: Mathematical and statistical modelling of infectious diseases dynamics

Resumen de la Memoria:

After completing my PhD at Institut Pasteur, in Paris, in 2013, I moved to Imperial College London. As a Research Associate in the Vaccine Epidemiology Research Group, I studied the conditions for the emergence and spread of vaccine-derived polioviruses to guide decisions regarding the global withdrawal of the trivalent oral poliovirus vaccine, called the switch. This intervention of unprecedented scale took place in 155 countries in a synchronized manner in 2016. We showed that in places with low population immunity the risk of emergence of vaccine-derived polioviruses (VDPVs) would increase with only a small number of immunization campaigns, and that a geographically-focused approach with multiple, high-coverage campaigns in areas historically at risk of VDPVs was needed to counterbalance that risk. We also produced subnational estimates of serotype-2 population immunity in a series of countries at high risk of VDPV2 outbreaks. This work was presented at the polio working group of the WHO Strategic Advisory Group of Experts (SAGE) in immunization and guided the immunization campaigns prior to the switch.

Since March 2015, I have led my own research programme on the epidemiology of non-polio enteroviruses, first supported by a Sir Henry Wellcome Fellowship and currently by a Sir Henry Dale Fellowship. The focus of my current project is on understanding the emergence and global spread of enteroviruses (which are a major cause of neurological and other illnesses) as new causes of disease outbreaks. This typically occurs after years or decades of silent circulation of the ancestral virus. We are particularly interested in: 1) Enterovirus D68 (EV-D68), which causes severe respiratory infections; and 2) the subset of enterovirus serotypes that cause hand, foot and mouth disease. A key focus of this work is on the analysis of serological and viral sequence data to reconstruct viral circulation during the years preceding the emergence of disease outbreaks and identify potential differences (e.g. in terms of transmissibility, antigenic scape or pathogenicity) among variants of the same virus.

Between March 2020 and May 2021, I worked on COVID-19 response. I worked with colleagues at the Christian Medical College, in Vellore (India) to understand the COVID-19 epidemic in India and provide advice to the National Disaster Management Authority. At the beginning of the pandemic, we developed a SARS-CoV-2 transmission model that simulated the impact that an unmitigated or mitigated COVID-19 epidemic would have in each Indian state, including projecting the timing that bed capacity within hospitals would be reached, and potential number of deaths. We provided two reports and an interactive web app that were used to guide decisions on the duration and extensions of the lockdown. Later, we estimated death under-reporting in Delhi, providing one of the first estimates of COVID-19 death under-reporting in India. At the beginning of the pandemic, we also quantified the potential effectiveness of different testing strategies as a way to reduce SARS-CoV-2 transmission.

Resumen del Currículum Vitae:

I currently lead a group at Imperial College London comprising 2 postdocs and 2 PhD students. My group works at the intersection of infectious disease epidemiology, data science and mathematical and statistical modelling.

I conduct interdisciplinary research that has led to the publication of 25 peer-reviewed articles, of which 12 are first-author papers and 3 are senior-author papers. I have published several articles in high-impact journals such as Science, Science Translational Medicine, Lancet Infectious Diseases, The New England Journal of Medicine, PNAS, and PLoS Medicine.

I have been invited to present my work at academic seminars on more than 13 occasions, and I gave a keynote lecture at the main international conference on Enteroviruses (EUROPIC) in 2022.

I have secured funding to lead my independent research programme and establish my group, with a total amount of £1,200,000 for up to 9 years.

I have supervised 4 PhD students (2 have finished) and 8 master students. I have also acted as a role model and mentor to postdocs who looked to apply for independent Fellowships.

I have been external examiner for 3 PhD candidates, one in the UK and two in France.

I have been involved in teaching activities since 2009. I have designed and delivered both, lectures and practicals, at different levels (undergraduate, postgraduate and professional courses), and I currently lead a module at the MSc in Epidemiology at Imperial College London. I have taught on a range of topics, from Mathematics to Biostatistics and Infectious Diseases Modelling.

I have reviewed >30 manuscripts for peer-reviewed journals.



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Turno General

Área Temática: Biociencias y biotecnología
Nombre: DE ANDA TORRES, VALERIE YSELLE
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Título: Environmental Microbial Informatician

Resumen de la Memoria:

Research Background and Trajectory: My research program is driven by a fascination with the remarkable metabolic versatility of the microbial world. My research program is centered on the fundamental role of microbial metabolism in driving the chemical dynamics of living cells and ecosystems. My research focuses on the metabolic versatility of microorganisms and their role in the chemical dynamics of living cells and ecosystems. I have more than a decade of experience studying microbial communities across diverse environments, including marine ecosystems (surface oceans, sediments, and the deep subsurface) and extreme habitats such as stromatolites, hot springs, and hydrothermal vent systems. My work integrates field studies, molecular biology, and computational approaches to uncover how microbial metabolism shapes ecosystem functioning and influences Earth's biogeochemistry and evolution. By implementing computational tools like I have provided scalable methods to analyze large genomic and metagenomic datasets, enabling discoveries such as novel metabolic processes.

Research vision: The Ramón y Cajal fellowship offers an unparalleled opportunity to establish my research program in Spain, fostering collaborations across Europe while leveraging my leadership and international network. My vision is to develop a predictive and mechanistic understanding of microbial metabolism's evolution, bridging microbial ecology and data science to address critical gaps in metabolic diversity. By focusing on three aims: (1) advancing physiological inference from genomic data, (2) establishing a metabolic classification of life, and (3) uncovering novel metabolic processes critical to ecosystem functioning. I aim to redefine our understanding of microbial metabolism and its role in Earth's biogeochemistry and evolution.

Research Strategy: My research will tackle fundamental challenges in microbial ecology and biogeochemistry by developing tools and frameworks that integrate genomic data with functional and ecological insights. By moving beyond traditional phylogenetic classifications, I will establish a metabolic-based framework that groups organisms by shared functional traits, revealing patterns of metabolic convergence and adaptation. This approach will redefine microbial diversity and elucidate the ecological roles of uncultured taxa, offering new perspectives on ecosystem resilience and nutrient cycling.

Expected Impact: The integration of computational, experimental, and ecological approaches will transform our understanding of microbial metabolism and its role in Earth's biogeochemistry and evolution. By developing open-source tools and fostering international collaborations, my research will enhance the ability to predict ecosystem responses to environmental change, uncover novel metabolic pathways, and drive innovative applications in biotechnology, environmental management, and astrobiology. Through the Ramón y Cajal fellowship, I aim to establish a leading research program in Spain, leveraging my leadership and global network to advance microbial ecology and biogeochemistry on a multidisciplinary scale.

Resumen del Currículum Vitae:

Professional Career

I obtained my bachelor's degree in Biology and PhD in Natural Sciences, both summa cum laude, from the National Autonomous University of Mexico (UNAM). During my undergraduate studies, gained experience in molecular biology since my first year at the Biomedical Research Institute (for one year) and I was awarded a prestigious "Abroad Excellence International Exchange Scholarship" from UNAM to study at the University of Valencia for one semester, where I conducted research at the Instituto Cavanilles de Biodiversidad y Biología Evolutiva. My PhD research, supervised by Prof. Valeria Souza (UNAM) and Prof. Bruno Contreras Moreira (EEAD-CSIC, Spain), was fully funded by the National Council of Science and Technology (CONACyT). I also received scholarships to conduct research at the Estación Experimental Aula Dei (CSIC) in Zaragoza, Spain. During my doctoral research I combined fieldwork in Cuatro Ciénegas national park, Mexico, with molecular biology and bioinformatics to study microbial bioindicators of ecosystem change. I developed open-source tools like NetAn (Network Analyzer) and MEBS (Multigenomic Entropy-Based Score) to assess biogeochemical cycle enrichment in large datasets. MEBS earned international recognition, including an honorary mention as a finalist for the Gigascience Prize at ICG-12 in Shenzhen, China, and won The Bioinformatics Peer Prize II from the University of Melbourne.

As a postdoctoral researcher at the University of Texas at Austin Marine Science Institute (UTMSI), I advanced to Research Scientist with Principal investigator status (PI), where I led projects investigating the deep-sea hydrothermal vent systems and microbial evolution under Prof. Brett Baker. I received the "Provost Fellow Award" for leadership by the University of Texas and worked on NSF-funded projects, including oceanographic expeditions aboard the RV/Atlantis and dive to depths of 2 and 4 thousand meters at the Gulf of California in the Alvin deep-sea submersible. Currently, I am a tenure-track Assistant Professor at the University of Florida, leading a computational and experimental lab on microbial metabolism in extreme environments. My lab integrates fieldwork, experiments, and computational modeling to study microbial ecology and biogeochemistry. I have secured over \$847,000 in research funding, including a \$560,000 startup grant. My scientific contributions include 20 peer-reviewed publications in journals like Nature and ISME Journal, with 996 citations and an h-index of 12. I have mentored over 30 scientists, taught courses such as Biology of Prokaryotes and Microbial Ecology, and led international workshops. I am committed to promoting diversity in STEM and have contributed to initiatives that support underrepresented groups in science.

Research Lines

My lab investigates the evolution of microbial metabolism in extreme environments through an integrative approach combining lab work, fieldwork, and computational methods. By bridging data science and microbial ecology, we uncover the metabolic principles governing microbial life across ecological and evolutionary scales. Through the development of computational algorithms and interdisciplinary research, we use microbial metabolism to predict the past, present, and future outcomes of life on Earth and their implications in a changing environment.



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Turno General

Área Temática: Biociencias y biotecnología
Nombre: RUIZ ORERA, JORGE
Referencia: RYC2024-050209-I
Correo Electrónico: jorge_ruiz_orera@hotmail.com
Título: Evolution, annotation, and characterization of open reading frames

Resumen de la Memoria:

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 28 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 three 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 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.

Resumen del Currículum Vitae:

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.



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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 transcriptomes. 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 with pathogenic variants in Dilated Cardiomyopathy (DCM) genes or idiopathic disease.



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Turno General

Área Temática: Biociencias y biotecnología
Nombre: TAFUR PETROZZI, LUCAS
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Título: Lucas Tafur Petrozzi

Resumen de la Memoria:

During my PhD in the group of Dr. Christoph Müller (EMBL, Heidelberg, Germany), I determined several cryo-electron microscopy (cryo-EM) structures of yeast RNA polymerase I, including initiation and elongation complexes. This work elucidated, at unprecedented molecular detail, the transitions occurring from pre-initiation complex formation to transcription elongation of the ribosomal RNA. Afterwards, as a postdoctoral researcher in the laboratory of Prof. Robbie Loewith (University of Geneva, Switzerland), I determined the cryo-EM structure of the endogenous Seh1-associated complex (SEAC), an important amino-acid sensing regulator of the highly conserved Target of Rapamycin Complex 1 (TORC1). Combined with cell biology experiments, I comprehensively described the function of this complex and proposed a novel model of regulation. During these years, I consolidated my expertise in cryo-EM and related biochemistry, and expanded my knowledge in genetics and cell biology, which allowed me to conduct and supervise different lines of research.

In my recently established independent group, the Structural Mechanisms of Cell Growth group at the Spanish National Cancer Research Center (CNIO; Madrid, Spain), I want to continue and expand the study of cell growth regulation by nutrients and other cues in yeast and humans. For this, we will structurally and functionally characterize endogenous nutrient-sensing megacomplexes that are located on the lysosomal membrane by cryo-EM, cryo-electron tomography and time-resolved cryo-EM. Furthermore, we will identify novel non-lysosomal interactors of these proteins by native protein purification and proximity-labeling coupled to Mass Spectrometry. Finally, we will aim to elucidate the molecular basis of the crosstalk between cell growth signaling pathways. While cryo-EM will play a central role, we will also use cell biology approaches to comprehensively understand the molecular basis of cell growth. This research thus has the potential to answer several important questions in basic cell and cancer biology and provide new ways of targeting cancer for clinical gain. At this stage of my career, obtaining the Ramón y Cajal fellowship will be valuable for starting and establishing my independent group.

Resumen del Currículum Vitae:

In late 2014, under an EMBL predoctoral fellowship, I joined the group of Dr. Christoph Müller in EMBL, Heidelberg (Germany), where I worked on the structural elucidation of RNA polymerase I transcription in yeast using cryo-electron microscopy (cryo-EM). This work resulted in two first-author publications in Molecular Cell and eLife, as well as publications as a co-author in EMBO journal and Nature Communications.

In 2019, I moved to the laboratory of Prof. Robbie Loewith in the University of Geneva (Switzerland) where I obtained an EMBO Long-term postdoctoral fellowship. Here, I developed my own line of research and determined the cryo-EM structure of the yeast Seh1-associated complex (SEAC), work which I published as a first author in Nature. Currently, I have one first author manuscript in revision (available as a preprint) and one co-first author manuscript in preparation, both in which I am a corresponding author.

During my time in the laboratory of Prof. Loewith, I not only provided the expertise in cryo-EM and structural biology in the lab but also expanded my research toolkit to cell biology and genetics. In addition to my direct supervision work of one master and three PhD students, I also actively participated in the development of the cryo-EM community in the University of Geneva. To further improve my professional skills, I completed the EMBO [Lab Leadership](#) course (2020) and [Applying Design Principles to Schematic Figures](#) workshop (2022). Moreover, I have actively participated in research dissemination activities in and out of academia.

Recently, in late 2024, I started my own independent research group in the Spanish National Cancer Research Center (CNIO; Madrid, Spain), where I will comprehensively study the molecular basis of cell growth regulation by nutrients and other cues in yeast and humans. For this, I have obtained funding from the Agencia Estatal de Investigación (AEI), for which I also participate as an expert reviewer.



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Turno General

Área Temática: Biociencias y biotecnología
Nombre: FORTES LIMA, CÉSAR AUGUSTO
Referencia: RYC2024-048273-I
Correo Electrónico: cfortes2@jh.edu
Título: Population history and genomic variation in human populations from Africa and the Americas
Resumen de la Memoria:

My main research achievements centred on leveraging genomic variation to dissect the evolutionary forces involved with admixed populations. For the last ten years, I specialised in analysing the genomic diversity of African and African-descendant populations, the most genetically diverse populations in the world. These populations are also notably underrepresented in genomics, limiting our knowledge of human diversity and evolutionary history. To address their lack of representation, I have generated and analysed genomic data from modern and ancient individuals from Africa and the Americas by using whole-genome sequencing and genome-wide genotype methods. To make inferences about large-scale migrations and complex admixture events in numerous populations, I have used and developed population genetics methods for demographic inference.

My research has yielded 32 peer-reviewed publications (17 in the last 5 years; 2020–2024), including co-authored publications in Science, Nature Genetics, Science Advances, eLife, and Nature Communications. I am the first, co-first or last author of 16 publications, 5 book chapters and 2 books, including in well-recognized journals in the fields of human genetics, genomics and evolutionary biology such as Nature, MBE, and the AJHG.

My research generated whole-genome sequencing data and genome-wide genotype data of modern and ancient individuals from Africa and the Americas. These data were deposited by me in ArrayExpress and EGA repositories (e.g., studies: E-MTAB-12243, EGAS00000000451, EGAS0000000006, EGAS00001007519, and EGAS00001002535). These datasets are a useful resource for the scientific community interested in human diversity, population genomics, and evolution. I also generate computational tools and frameworks for demographic inference that are available on GitHub (<https://github.com/cesarforteslima>).

For my independent career as a group leader, my main research lines will focus on developing novel computational methods for demographic inference and population genomics to provide the most comprehensive view of admixture events in human and non-human populations, as well as to tackle unresolved questions about demographic events shaped the genomic diversity of human populations, in particular African and American populations that had experienced mass migrations. Therefore, my ongoing and future research will greatly benefit the fields of evolutionary biology, population genetics, computational sciences, biodiversity conservation, biological anthropology, bioinformatics, and biomedical research. In particular, the expected new findings will investigate deep human history in Africa, reconstruct the putative ancestral origins and the complex admixture and selection histories of populations impacted by the trans-Atlantic slave trade, and unravel the evolution of their diseases.

Resumen del Currículum Vitae:

In Spain, I earned my bachelor's degree in Biology from the University Complutense of Madrid and two official master's degrees (in Physical Anthropology and in Tropical Parasitic Diseases). Both Master's projects were published in peer-reviewed publications. During my three-year PhD project at Paul Sabatier University (Toulouse, France), I was an Early-Stage Researcher (ESR) Fellow at the EU-funded Marie Curie Initial Training Network called EUROTAST (Exploring the history, archaeology, and new genetics of the transatlantic slave trade; MC-ITN FP7-290344). Through this international project, I investigated the genetic history and genetic diversity of human populations in African and African-descendant populations.

For my first postdoctoral training, I secured a French-funded postdoc position at the CNRS-MNHN (Paris, France), where I developed computational methods for demographic inference of admixed populations. My position was supported by the French-funded grant entitled "Influence of admixture histories on the genetic evolution of hybrid populations" (ANR-15-METHIS). Later, my postdoc at the Human Evolution Program at Uppsala University (Uppsala, Sweden) was funded by the Swedish Sven & Lilly Lawski Foundation. From 2020 to 2023, I secured a researcher position supported by the EU-funded project entitled "The African Neolithic: A genetic perspective" (ERC-2017-STG AfricanNeo). During those positions, I investigated the genomic history of numerous populations across Africa in multidisciplinary projects, and by doing so, I have increased the number of comparative genomic datasets of reference African populations to address the lack of representation of African populations in genomic research. Also, I collaborated with the H3Africa Consortium to participate in a large-scale genomic study of human populations (n=5,268 participants) from Southern Africa.

In Sweden, I was awarded 19 research grants (over 1,660,000 SEK in total). Grants were awarded to me as the sole principal investigator from different Foundations. I also secured two conference grants to co-organise an international conference and published a proceedings book and a news article. To participate in international conferences, I secured six travel grants, including travel grants from SMCB, EMBO|EMBL, and Swedish Foundations. I am a well-known expert in the field of population genetics and evolutionary biology. I have been invited to write reviews for special journal issues. Furthermore, I have been invited to chair sessions or been involved in scientific committees of international conferences such as the 2024 ASHG (in the USA), the 14th ICHG (in South Africa), and the 10th ISBA (in Estonia).

At Johns Hopkins University (JHU, Maryland, USA), I previously secured a postdoc position last academic year. Since 2024, I have obtained a faculty position as an Instructor in Population and Evolutionary Genomics at the Department of Genetic Medicine (JHU), and my main duties involve teaching and research. At JHU, I am developing my independent research lines. My experience in multidisciplinary research, my international training in Spain, France, Sweden, and the USA, and my broad network of collaborations with leading researchers from European-, American-, and African-based institutions will contribute to my skills as a group leader.



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Turno General

Área Temática: Biociencias y biotecnología
Nombre: CARRAVILLA PALOMANES, PABLO
Referencia: RYC2024-049507-I
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Título: Bridging Microscopy and Biology through Biophysical Imaging
Resumen de la Memoria:

Research career

My career has been dedicated to bridging microscopy and biology. I performed my PhD studies on molecular biology and biomedicine at the University of the Basque Country (Bilbao, Spain), under the supervision of Prof. JL Nieva and Dr. N Huarte, where I investigated the biophysical properties of the HIV lipid envelope and its interaction with antibodies using advanced imaging techniques. During this period, I performed several stays at the University of Oxford.

In 2019 I began my postdoc at the Leibniz Institute of Photonic Technology (Jena, Germany). I joined the group of Prof. Christian Eggeling, a renowned scientist in the fields of super-resolution and biophysics. There, I obtained a prestigious Marie Curie grant from the European Commission. The goal of my project was to apply advanced technologies to the study of HIV infection. In Jena, I developed a strong expertise in microscopy development, optics and programming. As a result, I devised methodologies to prevent photodamage, increasing the compatibility of super-resolution microscopy with biophysical imaging of living cells. This allowed me to apply novel super-resolution methods to characterise HIV virus formation in living cells.

In 2023, I started a new postdoctoral position at the Karolinska Institute (Stockholm, Sweden) in the groups of Prof. Erdinç Sezgin and Dr. Claudia Kutter. My project aims at revealing the mechanisms of lipid storage diseases by combining multi-omics and biophysics, for which I apply my microscopy expertise in combination with the latest next-generation sequencing technologies and bioinformatics approaches.

During my career, I gained international recognition through my contributions to the fields of membrane biophysics, microscopy and cell biology. I have published numerous peer-reviewed articles and attended multiple international conferences, where I have been an invited speaker. I have also supervised early-career researchers, participated in outreach events and been part of industry partnerships.

Research proposal

Lipid trafficking, a tightly regulated process in all living organisms, is disrupted in lysosomal storage diseases. Cells adapt by rearranging transport to direct lipids according to metabolic requirements. Still, lysosomal accumulation leads neural death and neurodegeneration. This project aims to determine transport adaptation mechanisms and to identify factors preventing their efficacy in neurons. To overcome current technological limitations, I will develop a single-molecule biophysical imaging approach to visualise lipid trafficking in real time. This interdisciplinary project will unveil adaptation mechanisms in neurodegeneration, the efficacy of potential treatments, and will provide a new methodology to measure trafficking in real time.

Resumen del Currículum Vitae:

*Selected Publications

§Corresponding author: 3; First author: 9; Peer-reviewed: 23; Preprints: 7

Citations: 560; h-index: 13

Dasgupta et al and Carravilla§ Effects and avoidance of photoconversion-induced artefacts in confocal and STED microscopy. Nat Methods (2024) 10.1038/s41592-024-02297-4

Carravilla et al. Measuring plasma membrane fluidity using confocal microscopy. Nat Protoc (2025) In press

Carravilla§ et al. Long-term STED imaging of membrane packing and dynamics by exchangeable polarity-sensitive dyes. Biophys Rep 10.1016/j.bpr.2021.100023

Carravilla et al. Molecular recognition of the native HIV-1 MPER revealed by STED microscopy of single virions. Nat Commun (2019) 10.1038/s41467-018-07962-9

Chojnacki et al. Envelope glycoprotein mobility on HIV-1 particles depends on the virus maturation state. Nat Commun (2017) 10.1038/s41467-017-00515-6

*Funding as the principal investigator/main applicant (Total: €8764,676,000)

Ikerbasque Research Fellowship (2025-2030, Ikerbasque, €8764,235,000)

KI Research Foundation Grant (2024-2025, Karolinska Institute, 132,300 SEK)

Marie Curie Individual Fellowship (2021-2022, European Commission, 162,806.40 €)

Postdoctoral contract (2019-2020, Basque Government, 113,864.00 €)

Postdoctoral contract (2018, University of the Basque Country, 33,006.12 €)

PhD contract (2014-2017, Basque Government, 82,863.08 €)

*Awards and peer recognition

SBE-33 Prize to Outstanding Young Biophysicists for his significant studies bridging microscopy and biology Spanish Biophysical Society (2024)

Maximum score of Marie Skłodowska-Curie Actions proposal (100%, top 0.19%, 2022)

Extraordinary Doctoral Thesis Award University of the Basque Country (2020)

Best short talk FEBS Sphingolipid Biology meeting (Portugal, 2023)

Best contribution Liposomes, Exosomes, and Virosomes (Switzerland, 2016)

Reviewer for Nat Methods, Nat Commun, Adv Sci, Comms Biol, Angew Chem...

Grant reviewer for Biotechnology and Biological Sciences Research Council (UK)



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*Leadership

Student supervision

Karolinska Institute (Sweden, 2023-2024) ☐ Student co-supervision

-Y Balim Urem, currently PhD student International Max Plank School (Berlin)

Highest master thesis grade: pass with distinction

-L Gomez Lucas ☐ Visiting PhD student, currently postdoc at Uppsala University
EMBO Scientific Exchange Grant awardee

Leibniz IPHT (Germany) ☐ PhD student co-supervision:

-A Koerfer, currently at last year of PhD studies

-A Dasgupta, currently application specialist at Leica

Highest PhD defence distinction (Suma cum laude)

University of the Basque Country ☐ Bachelor thesis (TFG) co-supervision:

-MI Ruiz Oar-Arteta 8/7/2016, qualification: 9/10

-I Martin Ugarte 13/7/2017, qualification: 8.7/10

-I Uriarte Arrazola 10/7/2018, qualification: 9/10

Training

Laboratory Leadership course (EMBO Heidelberg, 2022)

Leadership Skills in Academia workshop (Friedrich-Schiller University Jena, 2020)

How to Apply for Research Funding workshop (Friedrich-Schiller University Jena, 2019)

*Outreach

Summer School for high school students (Karolinska Institute Stockholm, 2023)

Moderation of Science and SciLifeLab Award/high school students Q&A (Stockholm, 2023)

Long Night of Science (Friedrich-Schiller University Jena, 2019)

Café Científico Eureka outreach talk (Bilbao, 2018)

*Software

Carravilla. Fluidity Calculator for ImageJ/Fiji. (2024) github.com/pcarravilla



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Biociencias y biotecnología
Nombre: DUFLOO, JÉRÉMY
Referencia: RYC2024-050335-I
Correo Electrónico: jeremy.dufloo@uv.es
Título: Virus-host interactions during entry of emerging viruses

Resumen de la Memoria:

During my career, I have studied virus-encoded receptor-binding proteins (RBPs) and how they mediate entry, which is the first and a critical stage of viral infection. I have investigated how antibodies recognize viral RBPs to induce antiviral activities, how host proteins influence the conformation and fusogenicity of RBPs, how different selective pressures affect RBP function and evolution, how entry influences viral emergence, and the mechanisms of viral entry into host cells. I have applied these questions to several emerging viruses, such as HIV-1 and SARS-CoV-2, and lately I have approached viral emergence more globally by studying animal viruses at risk of emerging in humans.

I now want to combine this diverse expertise with new experimental approaches to characterize the molecular factors involved in the entry of animal and emerging viruses into human cells and to design entry-targeting antivirals. This works towards epidemic preparedness and will therefore have a strong socio-economic impact as viral pandemics pose an enormous threat to human health and economy.

First, I will perform an in-depth cross-family characterization of the entry mechanisms of animal viruses. I will use a collection of >100 viral pseudotypes that I constructed in previous work to characterize their dependence on several known viral entry factors and restriction factors. This will allow an unprecedented characterization of the entry factors of viruses from 14 different families and will identify common entry mechanisms within specific viral clades.

Second, I will try to identify new host entry factors of animal viruses using genome-wide CRISPR screens and recombinant vesicular stomatitis virus (rVSV) expressing the RBP of a virus of interest.

Third, I will investigate how viral evolution influences the use of human host entry factors by animal viruses. By passaging and sequencing a rVSV expressing a viral envelope of interest onto cells stably expressing specific entry factors, I will identify adaptive mutations that affect viral entry and that may enhance human transmissibility.

Finally, I will develop novel entry-targeting antivirals. We will screen >5,000 chemical compounds for their ability to inhibit the entry of representative viruses from 12 viral families. The most potent antiviral compounds will be screened against additional viruses from the same family to identify entry inhibitors that are effective against all members of a given clade or family. This will allow to shift the usual "one bug, one drug" paradigm of antiviral drug development to a "one clade, one drug" strategy by identifying entry inhibitors that are effective against all species of a given group of viruses.

Overall, I plan to become a group leader studying host-virus interactions at different scales, especially those taking place during entry. I believe that my expertise, the tools at my disposal and my research environment put me in an ideal and unique position in Spain to tackle these questions. I will apply to competitive European funding such as the ERC Starting Grant. Moreover, I will contribute to promoting virology to young Spanish scientists by teaching in the Virology Master of the Universitat de València. Finally, I will promote collaborations between the academic and private sectors by working with companies for the development of new antivirals.

Resumen del Currículum Vitae:

I am a virologist interested in virus-host interactions, especially those taking place during the entry of emerging viruses. During my undergraduate studies, I performed three internships in France and abroad (Australia, USA). I studied several aspects of HIV-host interactions, which allowed me to co-author two publications.

I was then awarded a personal PhD fellowship from the French Ministry of Higher Education and Research to perform my PhD in Pr. Olivier Schwartz's lab at the Institut Pasteur (Paris, France). I first identified novel antiviral activities of anti-HIV broadly neutralizing antibodies, whose induction is the aim of most HIV vaccination strategies. I then applied my expertise in antiviral antibodies and virus-host interactions to SARS-CoV-2. I first showed that both symptomatic and asymptomatic infected patients develop a functional antibody response. I also characterized the fusogenic activity of the SARS-CoV-2 spike protein, providing fundamental insights into SARS-CoV-2 cell-to-cell spread and its inhibition by host factors. During my PhD, I collaborated with several teams in France and abroad (USA, Switzerland), which resulted in several co-authored publications. In collaboration with Dr. Sanjuán (Valencia, Spain) and Dr. Padrón Peña (Tenerife, Spain), I screened the anti-SARS-CoV-2 activity of potential antiviral compounds, which led to a patent application. My PhD work was rewarded with 2 thesis prizes.

In 2021, I was awarded a postdoctoral fellowship from the European Molecular Biology Organization (EMBO) to start my postdoctoral training on viral emergence with Dr. Sanjuán (University of Valencia). I characterized the role of viral entry in zoonosis, the molecular mechanisms at play and studied the human adaptation of coronaviruses under different selective pressures.

In 2023, I was awarded a Marie Skłodowska-Curie Actions (MSCA) postdoctoral fellowship to fund my project aiming at studying the role of viral entry in viral cross-species transmission and its molecular determinants. We showed that viral entry was a weak barrier to zoonosis and identified molecular interactions underlying viral cross-species transmission at the entry stage of infection. I also identified a new coronavirus receptor. I have initiated and been involved in many national and international collaborations (France, Switzerland, USA).

I have published 22 publications, including 7 as first or co-first author, one as first and corresponding author, and one as co-last and co-corresponding author. Most were published in high-impact journals, including Nature Microbiology and Nature Communications. In total, my work has been cited 1778 times (Google Scholar). In addition, three are under review in Nature Microbiology (first author), PLOS Pathogens (co-corresponding), and Heliyon (last and co-corresponding). I also presented my work at several international conferences, including 3 invited lectures.

During my postdoc, I co-directed one master's thesis. I am now co-advising the doctoral thesis of two students. During my PhD, I worked as an assistant teacher in the faculty of pharmacy. During my postdoc, I have been giving lectures in the Virology Master of the University of Valencia.

I have reviewed articles independently or jointly with my PhD supervisor for multiple high-impact journals.



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Turno General

Área Temática: Biociencias y biotecnología
Nombre: EL MOUALI BENOMAR, YOUSSEF
Referencia: RYC2024-048170-I
Correo Electrónico: youssef.elmouali.benomar@gmail.com
Título: Genetic Control of Human Gut Commensals: A Gateway to Microbiome Intervention Specificity

Resumen de la Memoria:

My research focuses on understanding the molecular mechanisms of commensal bacterial colonization in the human gut during health and disease. I have worked in four labs across three countries, gaining extensive experience in molecular microbiology, RNA biology, and microbiome research. My work has established a unique focus on RNA-mediated mechanisms in gut commensals, facilitating the design of targeted microbiome interventions. I am a trained microbiologist with a Bachelor's degree in Biotechnology and a Master's degree in Biomedicine from the University of Barcelona. In 2014, I was awarded a competitive APIF scholarship to pursue a PhD at the University of Barcelona, focusing on RNA-mediated regulation of Salmonella pathogenicity in Prof. Balsalobre's lab. My research uncovered a novel RNA-based mechanism for virulence regulation, leading to two first-author publications (El Mouali et al., PLoS Genetics, 2018; El Mouali (CA) et al., Frontiers in Microbiology, 2020), a review article, and co-authorship on three additional papers in journals such as PLoS Pathogens. During my PhD, I was awarded an EMBO short-term fellowship. In 2017, I joined Prof. Jörg Vogel's lab as a postdoctoral researcher, where I led projects on RNA-mediated regulation in pathogenic bacteria. I identified structural RNA features influencing the conjugation and replication of horizontally transferred elements in Salmonella, which are critical for understanding virulence and antibiotic resistance. My work in Prof. Vogel's lab resulted in two first-author publications (El Mouali et al., Nucleic Acids Research, 2021, IF: 19.2; El Mouali et al., RNA, 2021, IF: 5.6) and co-authorship on additional papers in RNA and Molecular Cell. During this time, I also supervised two students who made significant contributions to these projects. In 2022, I joined Prof. Till Strowig's lab as a senior postdoctoral researcher, transitioning to microbiome research while integrating my expertise in molecular microbiology and RNA biology. My current research focuses on gut colonization by commensal bacteria, with a particular emphasis on Segatella copri (formerly Prevotella copri). I secured a DFG Walter Benjamin grant (2023-2025; €107K) as principal investigator to identify RNA regulators of gut colonization, which led to a recent publication in a major journal (El Mouali (CA) et al., Cell Host & Microbe, 2024, IF: 20.6), where I am the corresponding author. Another ongoing project investigates how gut bacteria adapt to oxygen for gut colonization and transmission. In 2023, I received a second principal investigator grant from the Klaus Tschira Foundation (KTF) (2023-2025; €80K) that selected me as KTF Fellow, an annual recognition awarded to 15 promising young scientists in the natural sciences in Germany (success rate <5%), to support the development of independent researchers. In the Strowig lab, I have supervised a Master's thesis, currently co-supervise a PhD student, and oversee a technical assistant funded by my acquired grants. Overall, my goal is to integrate microbiome research with molecular microbiology and RNA biology to advance our understanding of gut bacteria and their impact on human health. At this stage of my career, I have gained the expertise and independence necessary to establish my research group as a Ramón y Cajal fellow.

Resumen del Currículum Vitae:

I am a trained microbiologist with a Bachelor's in Biotechnology and a Master's in Biomedicine from the University of Barcelona. During my studies, I gained international experience by completing my Bachelor's thesis in Germany and my Master's thesis at Karolinska Institutet in Stockholm through a competitive Eurolife scholarship. My master's work in Prof. Ute Römling's lab resulted in one first author publication (El Mouali et al., Journal of Bacteriology 2017) and a coauthorship. In 2014, I secured a competitive APIF scholarship to pursue a PhD at the University of Barcelona, focusing on RNA-mediated regulation of Salmonella pathogenicity at the lab of Pro. Balsalobre. My research uncovered a novel RNA-based control mechanism for virulence and led to two first-author publications (El Mouali et al., PLoS Genetics 2018; El Mouali (CA) et al., Frontiers in Microbiology 2020), a review article, and co-authorship on three additional papers in journals as PLoS pathogens. During my PhD I was awarded an EMBO short-term fellowship to visit Prof. Jörg Vogel's lab, initiating a valuable collaboration in RNA biology. In 2017, I was recruited to Prof. Vogel's lab as a postdoctoral researcher, leading projects on RNA-mediated regulation in pathogenic bacteria. I identified structural RNA features influencing the conjugation and replication of horizontally transferred elements in Salmonella, crucial for understanding virulence and antibiotic resistance. On a second project we collaborated with Prof. Jay Hinton's lab to investigate RNA-binding protein regulation in Salmonella. My work at the Vogel lab yielded two first-author publications (El Mouali et al., Nucleic Acids Research 2021, IF: 19.2; El Mouali et al., RNA 2021, IF: 5.6) and co-authorship on additional papers in RNA and Molecular Cell. During this time, I also supervised two students who contributed to these projects. In 2022, I joined Prof. Till Strowig's lab as a senior postdoc, transitioning to microbiome research while integrating my expertise in molecular microbiology and RNA biology. My work focuses on gut colonization by commensal bacteria, with an emphasis on Segatella copri (formerly Prevotella copri). I secured a DFG Walter Benjamin grant (2023-2025; €107K) as principal investigator to identify RNA regulators of gut colonization, resulting in a recent publication at major journal (El Mouali (CA) et al., Cell Host & Microbe 2024, IF: 20.6) where I am the corresponding author. A second project investigates how gut bacteria adapt to oxygen for colonization and transmission and it is under preparation. In 2023, I received a second principal investigator grant from the Klaus Tschira Foundation (KTF) (2023-2025; €80K) that selected me as KTF Fellow, an annual recognition awarded to 15 promising young scientists in the natural sciences in Germany (success rate <5%), to support the development of independent researchers. In the Strowig lab, I have supervised a Master's thesis and currently co-supervise a PhD student. I also supervise a technical assistant funded by my acquired funding.



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Turno General

My research has established a unique focus on RNA-mediated mechanisms in gut commensals to design targeted microbiome interventions. By integrating microbiome research with molecular microbiology and RNA biology, I aim to advance our understanding of gut bacteria and their impact on human health.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Biociencias y biotecnología
Nombre: RAMONEDA MASSAGUÉ, JOSEP
Referencia: RYC2024-049086-I
Correo Electrónico: ramoneda.massague@gmail.com
Título: Integrative microbiology: from ecosystem-level research to microbiome design
Resumen de la Memoria:

My research trajectory has been characterized by cross-talk between fundamental and applied science. Trained as a microbial ecologist, through the incorporation of a diverse skillset covering metagenomics, sythetic biology, predictive modelling, and plant-based experiments, I have transitioned to the field of integrative microbiology. My scientific interest lies in understanding the features that rule microbial survival and growth in natural settings, to then use that information to leverage microbial functions in applied contexts. I have brought such fundamental knowledge into application for the management of symbiotic crop microbiomes, and through my Technical Lead position at USA-based start-up Terra Cognita Labs Ltd., I apply the predictive models of bacterial growth developed in my research to the management of microbial biostimulants in organic agriculture. My small group at CEAB-CSIC is composed of bioinformaticians and biotechnologists focusing on the development of genome-based predictive approaches of microbial growth to a diverse range of environmental conditions.

At Imperial College London I worked on the concept of invasion predictability, investigating the factors that determine the survival of bacteria when these reach novel environments. This work shaped my trajectory by orienting my focus towards understanding microbial environmental adaptation. At ETH Zurich I was able to implement these ideas to the management of nitrogen-fixing symbiotic crop microbiomes. I then moved to EAWAG Aquatic Research where I exposed myself to the field of synthetic biology. Through competitive funding I led a project on understanding the mechanisms of antibiotic resistace spread in bacterial biofilms. Those works allowed me to control more precisely the bacterial consortia of interest, producing a number of influential publications (2 Nat Comm, 1 Curr Biol). Via competitive funding from the Swiss National Science Foundation I moved to the Noah Fierer lab at the University of Colorado, where I was able to take my ideas on microbial invasion predictability to a more impactful level. The work there trained me in genomics and machine learning, which I applied to the development of genome-based predictive approaches to understand the metabolic and growth preferences of bacteria. Through this work, we revealed the genetic underpinnings of pH preference (Sci Adv), and the amino acid biosynthesis capabilities for most bacterial taxa that have a sequenced genome (Nat Comm).

This combination of disciplines shapes my current research proposition: the goal is to improve the management of microbial consortia of applied interest by bringing in novel information on the environmental preferences of microbial taxa that can be generated by combining genome-based prediction and strain cultivation. Integrative biology approaches have enabled the design of stable microbial consortia, but a big question mark is whether these consortia are profficient at growing under the local environments where these are deployed. By combining the predictive framework of growth preferences I recently developed with my expertise in synthetic ecology, my research line focuses on investigating environmental adaptation in both single strains and complex consortia for their effective deployment in agriculture and biotechnology.

Resumen del Currículum Vitae:

I am a microbiologist interested in bringing fundamental knowledge about microbial phenotypes and interactions into application in agriculture and biotechnology. My integrative approach combines metagenomics, synthetic ecology approaches, and predictive models to aid in the development of functionally stable microbial consortia. I obtained my BSc Biology from the Universitat Autònoma de Barcelona (2015), MSc from Imperial College London (2016), and PhD from ETH Zurich (2019). I have a strong international background, with >8 years in prestigious institutions abroad and a network of >60 international collaborators. After a postdoc at EAWAG Aquatic research (2020-2021) and another at the University of Colorado (2022-2024), I am currently settling for a research career in Spain through a Beatriu de Pinós fellowship at the Center for Advanced Studies of Blanes (CEAB-CSIC).

In my career I have published 20 SCI indexed papers, being first or co-first author in 55% of them (45% as corresponding author), plus 1 currently in press, 1 preprint, 1 protocol, and 1 proceeding. Many of these publications are in interdisciplinary journals such as Nature Communications (4), Science Advances (1), or Current Biology (1). I have 18 first author contributions in conferences (5 contributed talks, 3 invited), chaired one session, and given >20 invited lectures across diverse universities. Passionate about teaching, I have >100h of certified teaching at BSc and MSc level from ETH Zurich. Review Editor of Frontiers in Microbiomes, I have served as individual reviewer for >20 publications, and I am part of the Banco de expertos evaluadores (AEI-BECA). Strong commitment to open science (90% of my publications are open access, all sequencing data is freely available, including a protocol in the Open Science Framework). Member of the Spanish and Swiss societies for microbiology and individual signee of the DORA declaration.

Through the years I have worked to develop a strong leadership capacity by 1) leading projects as PI; 2) supervising BSc, MSc and PhD students; 3) taking corresponding authorship for most of my first author works and leading perspective articles; 4) funding all my postdoctoral work through competitive funding; and 5) by actively seeking ways to transfer scientific knowledge to society. Specifically, I have been involved in 11 projects, being PI in 3 of them (>350k€ total funding), taking work package duties in 7 more, and being involved with a COST Action, and currently 2 submitted large international projects (ERC Synergy and MSCA Doctoral Network). I currently lead as sole PI a project from the Plan Nacional de Generación de Conocimiento (MICINN I+D), which is allowing me to start building a small research team (1 hired PhD student, 1 MSc student, 1 BSc student and intern). I have supervised 2 additional MSc theses at ETH Zurich and 1 BSc thesis, and provided extensive support to 2 more PhD theses. I hold the Technical Lead position at USA-based start-up Terra Cognita Labs Ltd., where I apply predictive models of microbial growth traits developed in my research to the improvement of microbial biostimulants in organic agriculture. In this topic, I have engaged in diverse outreach activities for the management of crop-beneficial microbiomes in rural areas of South Africa, and given inspirational lectures in Swiss high schools.



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Turno General

Área Temática: Biociencias y biotecnología
Nombre: TYRKALSKA, SYLWIA DOMINIKA
Referencia: RYC2024-049487-I
Correo Electrónico: tyrkalska.sylwia@gmail.com
Título: Role of the Inflammasome in Infection, Inflammation and Hematopoiesis

Resumen de la Memoria:

From 2012 to 2016 my research line was related to modelling human diseases in zebrafish. During my PhD (2012-2015) at the University of Murcia (UMU) funded by the FishForPharma (ITN, EC), I focused on using zebrafish to identify new inflammasome components and characterize their roles in response to infection (Nat Com and Front Immunol). These discoveries were extremely relevant to the field of biomedicine since they established new ground-breaking therapeutic targets for the treatment of intracellular bacterial infections showing that transient activation of the inflammasome promotes infection clearing. Later, I continued working as a Postdoctoral Researcher in Mulero Lab (2015-2016), funded by a research fellowship from UMU, achieving at this stage the most relevant finding of my research career: the involvement of the inflammasome in the regulation of hematopoiesis through processing of GATA1 (Immunity). These results led to the registration of an international patent for the use of caspase-1 inhibitor to treat anemias. This was of extremely high relevance to the field of biomedicine since it has paved the way to treat hematologic disorders such as neutrophilic inflammation and anemia of chronic diseases with drugs that inhibit the inflammasome. In addition, I collaborate in the identification and characterization of Wdr90 as another inflammasome component (DCI). The quality of the studies published brought me to be awarded with two prestigious grants funded by the Guarantors of Brain (210,000€) and European Commission (183,454.8€) as a PI to continue my research at the University of Cambridge. From 2017 to 2020, I worked at University of Cambridge (UK) where I continued modelling human diseases in zebrafish, although I branched out from infectious diseases to neurodegeneration. There, I focused on developing zebrafish models of Huntington's Disease and the role of proteasome and autophagy in neurodegeneration (PNAS and Autophagy). I showed that the agents that raise cGMP may combat the progression of neurodegenerative diseases. Moreover, I developed an autophagy inducible expression system in vivo, which shows how the autophagic flux affects processes as aging, inflammation and neurodegeneration in vivo. In 2021, I came back to UMU with JdC-Incorporación fellowship. Due to my extensive experience in the field of innate immunity and the knowledge acquired about the modelling human diseases in zebrafish, I have established new zebrafish models to study COVID-19 and silicosis, with the results being published in 3 original research papers (Sci Adv and 2 DCI), and an invited reviews in FEMS Microbiol Rev and ERR. I also collaborated in the characterization of the nasopharyngeal microbiome of COVID-19 patients, which led to 4 publications in IJMS and EMI. I also lead 2 other lines of research describing the role of the inflammasome in hematopoietic disorders and chronic inflammation and infections resulting in a publication in EMBO Mol Med. All the studies have strong clinical relevance, as they revealed new prognosis biomarkers and therapeutic targets for these diseases and have established zebrafish models for high throughput drug screening. In 2023, I was awarded R3 certificate and Miguel Servet Contract to start my own group in Instituto Murciano de Investigación Biosanitaria as an independent PI.

Resumen del Currículum Vitae:

I successfully completed my PhD under the supervision of Prof. Mulero at the University of Murcia with 7 publications, 22 posters and 2 oral presentations. My PhD Thesis titled "Molecular and functional characterization of zebrafish Gbp4: a new inflammasome component" received the Cum Laude and International Mention distinctions. My predoctoral stage was funded by the prestigious European ITN FishForPharma Project, where I had the opportunity to attend many valuable courses and workshops and I was able to do 2 international internships at Leiden and Sheffield Universities. At that early stage, I had formed a very strong network of international collaborations. During that time, I also mentored 2 internal students. The UMU research grant gave me the opportunity to continue my work on innate immunity but, also, I opened a new research line connecting inflammasomes with hematopoiesis. I was awarded the Aquagenomics Network Fellowship to do the internship at Harvard University and a travel grant from ZDMS to participate in ZDM10 Conference in San Diego, USA. Within these lines, I mentored 1 pre-doctoral student and the results generated were published in high IF journals in form of 2 publications. Additionally, the results were presented in 4 international conferences. I also published 1 article as corresponding author, indicating my ability to work without close supervision and act and think independently. In 2017, I joined Dr Rubinsztein's lab at the University of Cambridge, UK. I grew into many fruitful collaborations with many of the world leaders of protein degradation mechanisms. Thanks to hard work, I was awarded two of the most prestigious postdoctoral grants: The Brain Fellowship from Guarantors of Brain and a Postdoctoral Marie Skłodowska-Curie Individual Fellowship from EC. These grants resulted in 2 publications, plus two under review, and 2 poster presentations in international conferences. I also mentored several students, established permanent international collaborations and acquired a background in neurodegeneration and autophagy/proteasome biology. All these led me to be awarded a JdC-Incorporación Fellowship to return to UMU, to continue the use of zebrafish to model human diseases: COVID-19, Silicosis, hematopoietic and chronic inflammatory disorders and infections. During this period, I have published 14 high IF articles and attended 4 international conferences. I have been supervising 7 bachelors, 2 master and 5 doctoral theses. I will continue working on my ground-breaking research lines to generate new results and apply for an ERC Consolidator grant in 2025. I have participated in 13 research projects (PI in 6) which resulted in 27 peer-reviewed papers (H index=11; 1st author in 14, corresponding/last author in 7). I have also attended 18 conferences (15 international). I have been designated by EC to be an International Expert Evaluator for Individual Postdoctoral Marie Skłodowska-Curie proposals in the 2021-2024 calls. I have participated in many dissemination activities (Pint of Science, Semana de Biología, IDIES project and social media). From 2022, I belong to the Editorial Board of Comparative Immunology (Frontiers in Immunology) and, since 2016, I am a scientific reviewer of several international journals. All these have allowed me to obtain R3 certification and Miguel Servet contract to start my own group.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Biociencias y biotecnología
Nombre: YAHYA ABD EL RAHIM, GALAL
Referencia: RYC2024-051009-I
Correo Electrónico: galal2020m@yahoo.com
Título: Cell Proliferation and Network Channeling

Resumen de la Memoria:

I hold a Bachelor's degree in Pharmacy, graduating with an Excellent grade from the Faculty of Pharmacy, Zagazig University, Egypt. In 2009, I received a fellowship from Spain's Ministry of Science and Innovation under the FPI program. This allowed me to join the laboratory of Prof. Martí Aldea at the University of Lleida, where I enrolled in the PhD program in Biomedical Sciences. My research focused on the spatial control mechanisms of the cell cycle regulator cyclin-CDK complexes during G1 phase. I successfully defended my dissertation in 2016, graduating cum laude, and was honored with the Best PhD Thesis award from the University of Barcelona.

Following my PhD, I pursued a postdoctoral fellowship at the Technical University of Kaiserslautern, Germany. I joined the lab of Prof. Zuzana Storchova. Supported by the prestigious Alexander von Humboldt Foundation, my research addressed a fundamental question in cancer biology: the molecular mechanisms enabling cancer cells to tolerate aneuploidy (the gain or loss of chromosomes), a hallmark of tumor cells.

In 2020, I returned to Prof. Martí Aldea's lab with the support of a Juan de la Cierva fellowship from the Spanish Ministry of Science and Innovation. We are testing the hypothesis that functional channeling in protein networks could be driven by very transient interactions within protein flocks, well beyond those of membrane-less organelles.

The proposed research aims to advance our understanding of network channeling in metabolic pathways, leveraging innovative methodologies to elucidate fundamental principles of cellular organization and metabolic regulation. Specifically, we will investigate the structural basis of these ultradynamic protein assemblies, that we call protein flocks, for coordinating channeling and enhancing pathway efficiency. This will be achieved using cutting-edge microscopy techniques for live-cell imaging, proximity labeling to map protein-protein interactions, and advanced proteomics to characterize protein assembly dynamics. Additionally, we will employ AI-based computational tools to assess whether protein surface (quinary) determinants correlate with network membership. At present, I am co-leading this project with Prof. Martí Aldea (who is retiring this year).

General Objectives

- Decipher protein flock organization: Characterize the formation and dynamics of protein flocks involved in key metabolic pathways.
- Analyze quinary structural determinants associated to protein flock formation and functional channeling.
- Understand channeling mechanisms: Investigate how protein flocks mediate substrate channeling and improve pathway flux.
- Develop AI-based models: Uncover hidden relationships between protein quinary structure, biological process and subcellular microenvironment.

Resumen del Currículum Vitae:

JCR articles, h Index, citations

Database: Scopus (16.01.2025) h-index: 22 i10-index: 46

Total number of articles: 70 Total number of citations: 1,380

Total number of Q1 articles or equivalent in other databases: 45

Major Publications

- Yehia FA A, Yahya G*, Elsayed EM, Serrania J, Becker A, Gomaa SE* (2025) From isolation to application: utilising phage-antibiotic synergy in murine bacteremia model to combat multidrug-resistant *Enterococcus faecalis*. *Microbial Biotechnology*, 18(1):e70075, doi.org/10.1111/1751-7915.70075 (*co CA)
- Vidal PJ, Pérez AP, Yahya G*, Aldea M* (2024) Transcriptomic balance and optimal growth are determined by cell size. *Molecular Cell* 84(17):3288-3301 doi: 10.1016/j.molcel.2024.07.005 (*co CA)
- Yahya G, Menges P, Amponsah PS, Ngandiri DA, Schulz D, Wallek A, Kulak N, Mann M, Cramer P, Savage V, Räsche M, Storchova Z (2022) Sublinear scaling of the cellular proteome with ploidy. *Nature Communications*, 13(1):6182. doi.org/10.1038/s41467-022-33904-7
- Amponsah PS, Yahya G, Zimmermann J, Mai M, Mergel S, Mühlhaus T, Storchova Z, Morgan B (2021). Peroxiredoxins couple metabolism and cell division in an ultradian cycle. *Nature Chemical Biology*, 17(4):477-484, doi.org/10.1038/s41589-020-00728-9
- Yahya G, Pérez AP, Mendoza MB, Parisi E, Moreno DF, Artés MH, Gallego C, Aldea M (2021) Stress granules display bistable dynamics modulated by Cdk. *Journal of Cell Biology* 220(3):e202005102, doi: 10.1083/jcb.202005102
- Yahya G*, Wu Y*, Peplowska K, Röhl J, Soh YM, Bürmann F, Gruber S, Storchova Z (2020) Phospho-regulation of the Shugoshin-Condensin interaction at the centromere in budding yeast. *PLoS Genetics*, 16(8):e1008569, doi.org/10.1371/journal.pgen.1008569 (*contributing equally)
- Moreno DF*, Parisi E*, Yahya G*, Vaggi F, Csikász-Nagy A, Aldea M (2019). Competition in the chaperone-client network subordinates cell-cycle entry to growth and stress. *Life Science Alliance*, 2(2):e201800277, doi.org/10.26508/lsa.201800277 (*contributing equally)
- Parisi E, Yahya G, Flores A, Aldea M (2018) Cdc48/p97 segregase is modulated by Cdk to determine cyclin fate during G1 progression. *The EMBO Journal* 37(16):e98724, doi: 10.15252/embj.201798724
- Georgieva MV*, Yahya G*, Codó L, Ortiz R, Teixidó L, Gelpi JL, Gallego C, Orozco M, Aldea M (2015) InnTags: small self-structured epitopes for innocuous protein tagging. *Nature Methods* 12(10):955-958, doi: 10.1038/nmeth.3556 (*contributing equally)
- Yahya G, Parisi E, Flores A, Gallego C, Aldea M (2014) A Whi7-anchored loop controls de G1 Cdk-cyclin complex at Start. *Molecular Cell* 53(1):115-126, doi: 10.1016/j.molcel.2013.11.015

Congresses and presentations (last 10 years)

- Genomic instability (INESGEN) 2024, Córdoba, Spain (oral presentation)



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

2. IBMB seminar 2024, Barcelona, Spain (oral presentation)
3. IBMB seminar 2023, Barcelona, Spain (oral presentation)
4. Africa Health ExCon 2022, Cairo, Egypt (invited conference)
5. Alexander Von Humboldt Network meeting 2019, Berlin, Germany (poster presentation)
6. Alexander Von Humboldt Network meeting 2018, Bonn, Germany (poster presentation)
7. XXII Jornades de Biologia Molecular 2014, Barcelona, Spain (oral presentation)



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Turno General

Área Temática: Biociencias y biotecnología
Nombre: ARES ARROYO, MANUEL
Referencia: RYC2024-050538-I
Correo Electrónico: manuelaesarroyo@gmail.com
Título: Ecology and evolution of plasmids and other mobile genetic elements

Resumen de la Memoria:

The general goal of my research is to unveil how interactions between mobile genetic elements (MGEs) shape bacterial populations. During my PhD at the Complutense University of Madrid, my works focused on the family of ColE1 plasmids. Despite being one of the earliest families of plasmids described and largely used in bioengineering, these plasmids have been often overlooked in natural populations. My works combined the development of in vitro tools for plasmid detection, genomic analysis to explore their evolutionary history, and experimental studies on their compensatory evolution. Additionally, through national and international collaborations since early in my career, I explored interactions between plasmids and other MGEs, such as insertion sequences, bacteriophages and inter-plasmid interactions. After completing my PhD, I focused my postdoctoral research at Institut Pasteur in a long-standing enigma in plasmid biology: can plasmids considered non-conjugative transfer between cells, and if so, how? The results of this project represented a milestone in the field, showing that we have been underestimating the capacity of plasmids to horizontally transfer between bacteria. We also uncovered ecological relationships between plasmids due to functional dependencies for their co-transfer. In parallel, I participated in collaborations that demonstrated how many plasmid-encoded CRISPR-Cas systems not only defend their bacterial host from phages, but also protects the plasmid itself from other plasmids, shedding light on inter-plasmid conflicts. These projects throughout my career have shaped the central goal of my line of research: my projects will combine both large-scale computational analysis and experimental approaches to unveil how the interactions between plasmids, phages and other MGEs shape the ecology and evolution of bacteria. Following this aim, I am currently leading two research projects: one exploring functional dependencies between plasmids and Integrative Conjugative and Mobilizable Elements during conjugation; and another studying the interplay between some plasmid families with specific bacteriophages during their co-transfer. In case I was awarded with the RYC2025, the line of research I propose will continue exploring conflicts and synergies between plasmids and phages, particularly during the phage infection cycle. Indeed, while interactions between MGEs are known to occur, they have often been studied by separated research communities. Hence, my works and line of research aim to bridge these gaps, providing a holistic point of view of MGEs and their role in the complexity of microbial genetics.

Resumen del Currículum Vitae:

After studying Veterinary Medicine at the Complutense University of Madrid (UCM), I did a PhD in Plasmid Biology in the Antimicrobial Resistance Unit (UCM), supervised by Dr. Bruno González Zorn. My PhD entitled "The importance of small multicopy ColE1 plasmids and their role in the spread of antimicrobial resistance" studied new insights of ColE1 plasmids, a family of replicons whose role in natural populations has been often neglected. My PhD resulted in 4 JCR-Q1 scientific publications (3 first-author). Almost every publication was achieved through international and national collaborations, which let me join different side-projects resulting in 3 additional publications (third-author) and 1 preprint. After defending my PhD (2021, Cum Laude, International Distinction), I started my postdoctoral contract at the Microbial Evolutionary Genomics Unit of Institut Pasteur (France) with Dr. Eduardo Rocha. Soon after joining the group, I was awarded a competitive Marie Curie Postdoctoral Fellowship to lead the project EvoPlas. The aim of this project was to unveil the mobility mechanisms of those plasmids whose transfer could not be explained. The results of this project have given large scientific repercussions, with four high impact publications and awards by international societies. Now, I have been awarded a competitive fellowship to explore the interactions between plasmids and integrative conjugative elements, and I have received funding to study the interactions between some families of plasmids with specific phages. Overall, my research has led to 11 scientific publications and 1 available in bioRxiv. Among them, I am 2 times co-corresponding, 6 first-author, 1 second-author, and 3 third-author. My scientific contribution has been cited 256 times with an h-index and h10-index of 8 (Google Scholar, January 2025). Notably, all my publications are Open Access and/or have been submitted to public repositories. Regarding my participation in scientific projects, I have been proactively applying for funding since the PhD, and being awarded by highly competitive calls like the Marie Curie Postdoctoral Fellowship or Pasteur-Roux-Cantarini Fellowship. As part of my scientific activity, I participated in national and international conferences (2 times awarded), and different scientific meetings and seminars (other 2 times awarded). Indeed, I have been organizer of different activities focused on science dissemination, such as regular meetings for international societies and institutions, among others. I have been in projects with a direct impact on the society, such as the UCM Laboratory Network for COVID-19 Diagnosis or participating in the XVI UCM Calls for Cooperation Projects. I have also organized outreach activities in both Spain and France, and participated in different events with outreach talks, scientific workshops, and outreach publications. Lastly, during the PhD I participated in the teaching activity of the Dept Animal Health (UCM), imparting 90 teaching hours. I have also given workshops for Grant Applications in the MSc Microbiology and Parasitology (UCM, Spain) and in Colegio de España (France). These activities have made me been qualified as Profesor Ayudante Doctor by ANECA.



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Turno General

Área Temática: Biociencias y biotecnología
Nombre: RODRIGUEZ PÉREZ, JUAN ANTONIO
Referencia: RYC2024-049120-I
Correo Electrónico: juan.rodriguezevo@gmail.com
Título: Exploring molecular ageing at the 3D genome level

Resumen de la Memoria:

My research career, mainly focused on evolutionary genomics, genome 3D structure and (recently) metagenomics, began at Universitat Pompeu Fabra (UPF) in Barcelona, after completing two MSc degrees in Santiago and Madrid, with a research stay in Valencia. I then moved to Barcelona for doing my PhD under Dr. Arcadi Navarro supervision, where I studied evolutionary genomics of aging. Derived from it, I got 14 Q1 papers (5 as first author), including publications in Nature Ecology & Evolution, Trends in Genetics and a collaboration in Nature.

After completing my PhD in 2017, I joined Prof. Martí-Renom's lab at CRG (Barcelona) to study 3D genome structure, demonstrating my versatility by successfully transitioning to a new field of research. This led to 5 publications (4 as first author, all Q1 journals).

In 2018, I led GENIGMA, an EU-funded citizen science project, while maintaining my teaching commitments and establishing key collaborations.

A notable collaboration with Prof. Tom Gilbert at the University of Copenhagen's Globe Institute resulted in several publications, including a co-first author paper in Cell (2024) on 3D genome structure in ancient DNA, which received extensive media coverage (600+ outlets).

My research career continued after being granted the highly competitive and prestigious Marie-Sklodowska Curie fellowship in 2022, providing €24,000 for independent research.

While at Globe Institute, I expanded my expertise to bacterial metagenomics, already leading to a first-author paper in Communications Biology (2025) after establishing a collaboration with the Danish National Museum.

Throughout my career, I've demonstrated leadership through student supervision, event organization (including a symposium at SMBE 2024), and continued commitment to science communication through various outreach activities. So far, I have officially supervised 1 BSc student (TFG), 1 MSc student and currently supervising a PhD student.

In September 2023, I was promoted to Assistant Professor at the University of Copenhagen, after fulfilling the merits required, which allow me to manage my own research funds, supervise students and decide my lines of research.

My research excellence is evidenced by 18 peer-reviewed publications (+3 preprints under review, + 2 book chapters) in top-tier journals (100% Q1; ~45% as first-author), including Cell, Nature and Nature Ecology and Evolution, achieving an h-index of 14 and over 1,320 citations. I have consistently secured international competitive funding and maintained strong teaching and outreach commitments.

Resumen del Currículum Vitae:

Even if ageing is a very well studied phenomenon, its precise ultimate molecular mechanisms are not yet well understood. In my proposal, I aim to investigate how DNA damage affects the three-dimensional (3D) structure of the genome and how it relates to aging. The proposal is based on the hypothesis that the 3D genome structure acts as a molecular scaffold which, when damaged, can trigger a cascade of uncharacterized events contributing to the ageing process. It has been widely demonstrated that disruptions of the DNA 3D structure have functional consequences. However, we still do not know how damage from external agents affects the 3D folding of the genome, or when does it start becoming unrepairable, and what are the precise downstream consequences linked to it. As well, given the compact nature of the 3D genome, I hypothesize that some regions may be more exposed than others to external damage, becoming hotspots accumulating an excess of damage from external sources.

I propose two research goals to address these issues:

- 1) Characterize mutagenic effects of damage to 3D DNA structure: I will use primary cultured primate cell lines exposed to mutagenic agents, such as oxidative stress and UV light, and collect data at different time points to be then analyzed through different omics.
- 2) Translate findings to human studies: Building on the results from Aim 1, I plan to validate my findings in human patients through either longitudinal studies or cross-sectional age-group analyses.

This is an ambitious proposal that is only possible to be developed by combining a deep knowledge in both 3D genomics and ageing processes. My scientific career led me to this ideal situation at the moment, where I have track-record proven expertise from both fields. Through my PhD, I gained the knowledge in evolution of human ageing, publishing first-author articles in high impact factor journals, like Nature Ecology and Evolution (2017, 2019), or Trends in Genetics (2018), among others. I consider myself a curiosity driven researcher, motivated by new challenges. Thus, after my PhD, I decided to change my field of research, and shifted to study the 3D structural organization of the genome. This shift revealed to be a success, with 5 publications, where I am first author for 4 of them, in prestigious journals like Cell (2024), or Genome Medicine (2021). My extensive network of collaborators, both at the Spanish and international level, ensures for a satisfactory completion of the proposed plan.



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I have experience managing research grants, as I have been awarded a Marie Curie postdoctoral fellowship (2022) to move to Copenhagen and study 3D genome population variation, which included budget to fund my independent research costs. Preliminary results from were key to write the proposal presented here. In terms of managing students, I have already satisfactorily supervised a BSc and a MSc student, while currently mentoring a PhD student.

I get easily motivated by interdisciplinary and new research, and I see the Ramon y Cajal fellowship as the perfect opportunity to harmonize and leverage all my knowledge to develop a strong and solid line of research for the years to come.



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Turno General

Área Temática: Biociencias y biotecnología
Nombre: PEREZ SANCHO, JESICA
Referencia: RYC2024-049082-I
Correo Electrónico: jessips@uma.es
Título: Open, collaborative, multiapproach research on plant development and stress adaptation
Resumen de la Memoria:

I am a doctor in Biotechnology, lover of research and teaching and very much interested in open, collaborative research. I have always been interested in fundamental research and my aim has always been to contribute to society through my work. I have experience in Molecular Biology, Biochemistry, Cell Biology, Image Analysis and Quantification, Genetics and generation of -omics data. I have worked in different countries including Spain, Canada, China, Belgium, USA and France, which has allowed me to discover different work environments, with different human, technical and economical resources and with different ways of approaching research.

During my research career, I have investigated how intracellular and intercellular communication regulate plant development and help plants to cope with stress, with a focus on ER-PM contact sites and tethering proteins. I have used model systems (*Arabidopsis thaliana*, *Nicotiana benthamiana*) and a great array of methodologies, gaining extremely varied experimental skills. Now I feel confident in advancing towards scientific independency and starting my own research group, deeping on how plant development is sustained under unfavourable environmental conditions. I will keep using model species, but also gaining insights from and applying knowledge to crops and wild species.

1. Top-down approach to study organogenesis under drought conditions:

Organogenesis is the process of initiation and development of new organs, and it lies in the activity of SCNs. Through my project ORGANOCOM we have exposed a role of PD-mediated cell-cell communication in SCN maintenance and root differentiation, and the formation of lateral roots, particularly under osmotic and salt stress. I will deepen in the understanding of this phenotypes in *Arabidopsis* by genetically and pharmacologically modifying PD permeability in plants subjected to osmotic and salt stress. I will use single-cell RNA-seq data that I recently obtained to instruct future experiments and I will apply for funding to perform single-cell proteomics (in collaboration with T. Nolan, Caltech, USA) to identify cell-cell móvil factors involved in these proceses. In order to transfer the acquired knowledge to crops, I have contacted E. Rodríguez Bejarano, the director of IHSM-La Mayora (Málaga, Spain), to have access to the outstanding core facilities and services they have for research in crops.

2. Bottom-up approaches to identify stress tolerance-relevant molecular components:

To gain insights from local species that are intrinsically adapted to the extreme environmental conditions of the Spanish southeast (the most arid region in Europe), I will collaborate with L. Carretero-Paulet, from University of Almería (UAL), who is exploring the genomic diversity of local orphan species of agronomic and ecosystemic interest, such as carob (algarrobo, *Ceratonia siliqua*) and wild jujube (azufaifo, *Ziziphus lotus*). We aim to identify the genes conferring these desirable traits through population and comparative genomic analysis; and to characterize those genes using the genetic, biochemistry, molecular biology, cell biology and omics approaches of my expertise. The selected target genes will be primarily investigated in the model system *Arabidopsis* and the most interesting ones will be further studied in the crops to validate our findings.

Resumen del Currículum Vitae:

My PhD focused on the role of ER-PM CS in plants ability to cope with stress. We described *Arabidopsis* Synaptotagmings (SYTs) as ER-PM tethering proteins fundamental for the tolerance to several abiotic stresses (Pérez-Sancho et al., 2015; Lee et al., 2019a, lee et al., 2019b). It was one of the first descriptions of ER-PM tethers in the plant kingdom, and the first demonstration of the physiological role of ER-PM CS in the fitness of an organism. Given the novelty and relevance of our research, we published a Trends in Cell Biology review focused on Membrane Contact Sites in plants (Pérez-Sancho et al., 2016). Later, we showed that SYTs are required for diacylglycerol homeostasis during cold acclimation, transporting diacylglycerol from the PM to the ER in planta after stress episodes (Ruiz-López*, Pérez-Sancho* et al., 2021).

I then moved to Shanghai to study plant-bacteria interactions, particularly in the pathosystems *Arabidopsis thaliana* - *Pseudomonas syringae* and *Ralstonia solanacearum* - *Solanum lycopersicum*. I led two projects, one to resolve the ER-PM CS interactome, and another one on the role of ER-PM CS in plant-bacteria interaction. Thanks to my mastering of cell biology I participated in a third project to characterize the subcellular localization of a bacterial type III effector that targets plant vesicle-associated membrane proteins to achieve infection.

My research during my second post-doc in France focused on cell-cell communication through plasmodesmata and its implication in root apical meristem (RAM) development and organogenesis. Plasmodesmata are nanoscopic membranous structures between cells, that allow direct transport of molecules. Combining genetics, cutting-edge cell biology, biochemistry and molecular biology, together with computational modelling, we demonstrated that protein-lipid interactions within plasmodesmata specialized MCS regulate cell-cell communication. The novelty and relevance of this research was twofold: 1. It was the first time that membrane contact sites were involved in inter-cellular rather than intra-cellular communication, and 2. It supposed a shift in paradigm to the established textbook model of plasmodesmata closure via the local deposition and removal of callose. This collaborative work is accepted for publication in the prestigious journal Cell (Pérez-Sancho*, Smokvarska*, Dubois* et al., in Press, 2025). Moreover, we identified a role for ER-PM contact sites in plasmodesmata biogenesis (Li et al., 2024). Additionally, our collaborative research with E. Russinova's team have shown that Plasmodesmata mediate cell-to-cell transport of BR hormones (Wang et al., 2023).

Lately, I got an Exploratory Projects grant (U.Bordeaux-INRAE) to start the way towards independency studying how cell-cell communication regulates development and differentiation of the RAM and maintenance of the RAM stem cell niche (SCN). To untangling the complex GRN governing these processes, I obtained an EMBO Scientific Exchange Grant to perform innovative, cutting-edge assays, such as single-cell RNAseq and FACS-RNAseq in



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Raleigh and Duke (USA). Working in this exciting scientific environment led to the publication of a Curr. Opin. in Genetics and Development review (Pérez-Sancho et al., 2024) and a research paper in Cell through collaboration with Trevor Nolan (Vukasinovic, Hue et al., in press 2025, Cell)



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Turno General

Área Temática: Biociencias y biotecnología
Nombre: GARRIDO RODRÍGUEZ-CÓRDOBA, MARTÍN
Referencia: RYC2024-049047-I
Correo Electrónico: mgrcprof@gmail.com
Título: Building large-scale models of cellular signaling through the integration of omics, network methods, and interpretable machine learning

Resumen de la Memoria:

I am a computational biologist with more than 10 years of experience analyzing large-scale molecular data. My work centers on the systematic integration of omics data with prior knowledge using network methods, which I employ to uncover new molecular insights and develop actionable hypotheses to advance our understanding of cellular signaling processes. My scientific merits include 30 publications and an award-winning deep learning model.

My contributions fall into three main categories: (A) applying my expertise to generate novel hypotheses and insights within specific research contexts, (B) advancing conceptual frameworks to improve the accuracy of cellular signaling models, and (C) critically evaluating methods used to study cell-cell communication and kinase-driven intracellular cascades. These findings have been presented at specialized conferences in computational biology and proteomics, as well as at broader scientific venues.

My early work illustrated how transcriptomic and proteomic data can elucidate drug mechanisms of action and translate transcriptional footprints from animal studies to humans. Building on these insights, I focused on constructing large-scale computational models of signaling processes and improving omics data analysis. This included introducing new frameworks to combine multiple types of omics data into mechanistic signaling models, revisiting established methods, and addressing technical issues such as limited programmatic interoperability. More importantly, I developed conceptual models aimed at better understanding how cells adjust their molecular states in response to external stimuli (e.g., drug perturbations) or internal shifts (e.g., disease-promoting genetic variants).

As datasets have grown larger, I have integrated interpretable machine learning methods into my research and secured funding to explore emerging tools like protein language models, which have the potential to fundamentally expand our understanding of cellular signaling. While many knowledge gaps remain, I believe my research can drive innovative breakthroughs and lead to more precise, effective interventions in biological systems.

In pursuit of these goals, my current proposal involves three key aims: (1) generating large-scale, reproducible, cost-effective, and high-quality perturbational phosphoproteomics datasets, (2) analyzing these datasets using state-of-the-art deep learning methods, and (3) constructing novel signaling pathways by interpreting the features learned by these models, supported by prior knowledge. Collectively, these aims hold potential to advance both the conceptual and technical understanding of cellular signaling.

Resumen del Currículum Vitae:

Throughout my career, I have worked at both public and private research institutions across three countries, greatly expanding my professional network and allowing me to develop my scientific expertise.

My journey began at the University of Córdoba and the Maimonides Biomedical Research Institute of Córdoba (IMIBIC) in Spain, where I completed my Bachelor's degree in Biochemistry (2011–2015) and developed my thesis on metabolomics data analysis in the context of cancer research. I continued this path with a Master's degree in Biomedical Research (2015–2016). Next, I gained industry experience at a biotechnology company in Madrid, working on the development of a combinatorial optimization tool for dermocosmetic formulations, while also pursuing a second Master's in Computational Biology and Bioinformatics (2016–2017).

From 2017 to 2021, I undertook my PhD at IMIBIC, co-supervised by the Clinical Bioinformatics Area in Sevilla. My research focused on novel methods for understanding cellular signaling in inflammatory and cancer-related processes. An EMBO short-term fellowship supported my training in Dr. Julio Saez-Rodriguez's group at Heidelberg University, laying the foundation for my subsequent postdoctoral position. My doctoral work resulted in 17 co-authored publications, including three as first or co-first author.

I then joined the DECIDER consortium at Heidelberg University for my first postdoctoral position (2021–2022), contributing to multi-omic strategies aimed at overcoming ovarian cancer drug resistance. After securing funding from the AIH fellowship, I moved to the European Molecular Biology Laboratory (EMBL) in Heidelberg and EMBL-EBI in the UK (2022–Present). Here, I have integrated phosphoproteomics and thermal proteome profiling data using network approaches and collaborated on institute-wide initiatives. My leadership is demonstrated through securing funding for independent projects, co-authoring multiple co-first and co-corresponding author publications, and reviewing for top-tier journals.

Overall, my career combines academic rigor, industry experience, strong collaborations, and successful grant acquisition. Moving forward, I aim to leverage my international research network to lead research initiatives to generate innovative insights in both the conceptual and technical understanding of cellular signaling processes.



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Turno General

Área Temática: Biociencias y biotecnología
Nombre: MARTÍNEZ CARRANZA, MARKEL
Referencia: RYC2024-049714-I
Correo Electrónico: markel.martinez-carranza@pasteur.fr
Título: Integrative structural biology of DNA replication and repair

Resumen de la Memoria:

During my PhD studies in Prof. Pål Stenmark's group, I built a solid foundation in integrative structural biology methodology while studying Botulinum neurotoxins (BoNTs). With a combination of X-ray crystallography, cryo-EM and NMR, I uncovered the structural mechanism behind the heightened toxicity of certain BoNTs in domestic animals as opposed to humans. In collaboration with Min Dong's group at Harvard Medical School and our industrial partner IPSEN, we identified the first novel BoNT since 1970, and I solved its near-atomic cryo-EM structure. In addition, a collaboration project with German biotech company NanoTag resulted in a filed patent that eventually became a commercial product, a novel protein tag named the ALFA-tag. I solved the crystal structures of their candidate peptides for rational improvement of the designed tags.

During my first postdoc at Lund University, I solved three cryo-EM structures of bacterial deoxyribonucleotide biosynthesis transcriptional repressor NrdR, explaining how it can sense the dNTP to NTP ratio in the cell to repress dNTP synthesis accordingly. Additionally, I worked as cryo-EM application expert, training and supporting Lund University researchers in sample preparation, data collection and data processing.

Following my acquired interest in DNA metabolism, in my second postdoc I joined Ludovic Sauguet's group at the Pasteur Institute to study archaeal DNA replication having secured an FRM postdoctoral fellowship. The output of this work explains with unprecedented detail the molecular mechanism behind the interaction of the conserved single stranded DNA-binding protein Replication Protein A (RPA) and DNA polymerases that are central to DNA replication and repair. Having obtained an MSCA postdoctoral fellowship, the scope of my project has recently expanded to search unidentified interaction partners of RPA guided by large-scale protein complex prediction methods, and to study archaeal replication via in-situ structural biology.

My project proposal aims to leverage my acquired experience with archaeal RPA to move on to characterize human RPA and the closely related complex CST, which play important roles in genome maintenance, cancer and telomere biology.

Resumen del Currículum Vitae:

I did my PhD in Professor Pål Stenmark's group at Stockholm University (Sweden), studying Botulinum neurotoxins and their interactions with receptors on the surface of neurons. My project was part of an international collaboration with the group of Min Dong at Harvard Medical School and our industrial partner Ipsen. Additionally, I worked with industrial partner NanoTag in a project that resulted in a filed patent and a commercially available product, a rationally designed novel protein tag.

In my first postdoc at Lund University (Sweden), I focused on NrdR, a bacterial DNA building block biosynthesis regulator. I also worked as cryo-EM application expert, leading the installation of cryo-EM sample preparation and data processing infrastructure at Lund University.

Lastly, securing funding through FRM and MSCA postdoctoral fellowships, I have worked at Institut Pasteur (France) since November 2021. My project has been focused on the integrative structural and functional characterization of archaeal DNA replication and repair factors.



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Turno General

Área Temática: Biociencias y biotecnología
Nombre: SELLÉS VIDAL, LARA
Referencia: RYC2024-050193-I
Correo Electrónico: laraselles@gmail.com
Título: Bioproduction of high-value chemicals through synthetic biology and development of novel bioinformatics tools

Resumen de la Memoria:

I completed my BSc in Biology at the University of Barcelona (2007-2012), during which I conducted internships in the groups of Prof. Daniel Turbón (University of Barcelona) and Prof. George Kassiotis at the National Institute for Medical Research (London), supported by an ERASMUS scholarship. I continued my education with an MSc in Applied Biosciences and Biotechnology (2012-2013) at Imperial College London (ICL).

I then pursued a PhD in the field of directed evolution under the supervision of Prof. John Heap at ICL (2015-2019), fully supported by an industrial case scholarship by the British BBSRC and Syngenta which also provided research funds that I managed. During my PhD, I developed a novel selection system for directed evolution broadly applicable to a wide range of biomolecules and properties, and became proficient in a large variety of molecular biology and protein engineering techniques, as well as multiple programming languages. My PhD outcomes were published in high impact journals (Nature Communications, BBA Protein and Proteomics), presented in 5 congresses/meetings and led to 2 patent applications.

After my PhD, I joined the groups of Dr. Rodrigo Ledesma-Amaro and Prof. Guy Bart-Stan as a postdoctoral researcher (2020-2021), where I engineered a variety of microorganisms to produce high-value chemicals in a collaborative project between ICL, CSIC (Spain), ACIES BIO (Slovenian leading biotechnology company) and Charité-Berlin University of Medicine. In parallel, I initiated independently a research line about the application of machine learning to biological problems and the development of new tools for the analysis of RNA sequences, and participated in the establishment of another line focusing on spatiotemporal data. This postdoctoral period resulted in high impact publications (Nature Chemical Biology, Nature Communications, PLoS One, RSC Chemical Biology, R Journal) and software packages in Bioconductor and CRAN.

I then successfully applied for highly competitive JSPS Postdoctoral Fellowship and JSPS Research Activity Start-up grants with my own project proposals concerning the development of artificial ribozymes with novel catalytic activities. Since 2021, I joined the Okinawa Institute of Science and Technology to develop this project, transitioning to a nearly independent position. The research grants, of which I am principal investigator, amount to a total of 3,730,000 yen (~23,300 euros). My results have been presented at the highly prestigious SEED conference, a paper has been accepted at Bioinformatics Advances and another paper is under consideration by Nature Communications.

In summary, my career so far has resulted in the publication of 13 peer-reviewed articles (3 D1, 4 Q1, 5 Q2 and 1 Q4; 6 as first author; 5 as corresponding author) with a total of 453 citations; 5 software packages with 80,000 downloads in total; 2 patent applications; 1 book chapter; and 3 invited talks, 1 oral presentation and 5 poster presentations at congresses and seminars (2 of which have received awards). I have supervised 6 BSc/MSc students, 3 PhD students and guided 1 technician. The combination of my research expertise, teaching and supervision experience, leadership skills and ability to transfer knowledge from academy to industry and society enable me to complete my transition to a fully independent research position.

Resumen del Currículum Vitae:

After completing my BSc at the University of Barcelona, I have developed my academic career in a series of world-class international institutions. This has allowed me to gain expertise in cutting-edge techniques and methodologies, keep up to date with the latest technological developments, and establish a deep network of connections with renowned academic researchers and members of leading biotechnological companies.

After a research internship at the National Institute for Medical Research funded by an ERASMUS scholarship and an MSc at Imperial College London (ICL), I did a PhD with Dr. John Heap at ICL fully funded by a BBSRC-iCASE scholarship. During my PhD, I developed a novel selection system for directed evolution broadly applicable to a wide range of biomolecules. The system was successfully applied to select variants of a large range of enzymes and even combinations of biomolecules constituting entire pathways of high industrial interest. The method was published in Nature Comms, and 2 patent applications protect the technology and selected variants.

Following my PhD, I joined the laboratories of Dr. Rodrigo Ledesma-Amaro and Prof. Guy Bart-Stan at ICL as a key researcher of a large collaborative international project (SyCoLim) aiming to develop new methods for establishing and analyzing artificial syntrophic microbial communities, and to apply them to the production of high-value chemicals such as limonene and perillyl alcohol. In addition, during this period I initiated independently a separate research line focusing on the application of machine learning to biological problems and the development of new tools to analyze RNA sequences, with special emphasis on ribozymes and non-coding RNA. I have taken the lead in coordinating the activities of the different researchers involved in this line. I was also involved in the establishment of a line focusing on the analysis of spatiotemporal data.

Having gained a large expertise in protein and metabolic engineering, I aimed to expand my skills toolkit with RNA engineering. To that extent, I successfully applied for highly competitive JSPS Postdoctoral Fellowship and JSPS Research Activity Start-up grants with my own project proposals, of which I am principal investigator. The project aims to engineer synthetic RNA sequences using Machine Learning, and apply them for therapeutic purposes. I am currently conducting this project at the Okinawa Institute of Science and Technology, a top research-oriented university in Japan ranked 9th in the world amongst research institutions in 2019 by the Nature Index. My results have been presented at the SEED conference (the leading venue for Synthetic Biology), a paper has been accepted at Bioinformatics Advances and another paper is under consideration by Nature Comms.



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In my proposed Ramón y Cajal project, I will combine the Synthetic Biology tools that I have mastered through my career to develop new biofactories for the bioproduction of cucurbitacins. Cucurbitacins are triterpenes found mainly in plants from the Cucurbitaceae family with many bioactive properties of human interest, such as anti-inflammatory, hepatoprotective, antidiabetic and antitumor activities. Given the high value and therapeutical applications of the target products the project is expected to result in multiple high impact publications and technology transfer activities.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Biociencias y biotecnología
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Título: Molecular basis of pathogenic bacterial-fungal interactions

Resumen de la Memoria:

Mucorales fungi (phylum Mucoromycota) cause opportunistic infections known as mucormycosis, a disease with rising incidence, limited treatment options, and high mortality rates. However, little is known about how these fungi initiate disease or evade host immune defenses. In addition, many Mucoromycota harbor bacterial endosymbionts that significantly influence fungal ecology and pathogenicity. A striking example is the endosymbiosis between *Rhizopus microsporus* and *Mycetohabitans rhizoxinica*. The persistence of this pathogenic alliance relies on endosymbiont translocation into the fungal spores. Yet, the molecular mechanisms driving endosymbiont-dependent sporulation, fungal dissemination, and infection remain unknown.

My research aims to uncover the molecular details of endosymbiont-dependent fungal sporulation using the *Rhizopus-Mycetohabitans* symbiosis as a model system. By integrating molecular, biochemical, and infection biology technologies, I will address the three following research questions:

(1) How are non-motile endosymbionts transported with fungal hyphae?

Maintenance of the *Rhizopus-Mycetohabitans* symbiosis relies on bacterial transport within fungal hyphae to fungal spores. Despite lacking flagella, *M. rhizoxinica* moves counter to cytoplasmic flow, suggesting cytoskeleton-mediated transport. Using CRISPR/Cas and microfluidic technologies, I will define fungal motor proteins and identify genes essential for endosymbiont-specific transport. Transportation of endosymbionts along the fungal cytoskeleton would represent an unprecedented case of coordinated behaviour between an endosymbiotic prokaryote and its eukaryotic host.

(2) How is endosymbiont-dependent sporulation regulated?

The molecular mechanisms of sporulation in *R. microsporus* are poorly understood. Through comparative genomics and transcriptomics, I will identify fungal genes required for sporulation. The data generated will identify genes and corresponding proteins that are vital for fungal sporulation, thus closing the knowledge gap regarding the molecular mechanisms of sporulation in *R. microsporus*. In particular, this project will likely establish the *Rhizopus-Mycetohabitans* symbiotic pairing as a model to investigate reproduction in Mucoromycota.

(3) Assess the contribution of endosymbionts to fungal pathogenicity

Airborne fungal spores are primary infection vectors. Nearly every *R. microsporus* spore contains bacterial endosymbionts, making this system ideal for investigating endosymbiont-dependent pathogenicity. I will use metabolomics, in vitro macrophage models, and in vivo murine models to identify bacterially produced molecules that support fungal infection. This information may aid the development of targeted therapeutics against mucormycosis.

This research bridges molecular biology, bioinformatics, systems biology, and infection biology to address critical gaps in understanding bacterial-fungal symbiosis and its role in fungal pathogenesis. Given that fungal infections affect over 7.5 million people annually with a devastating 50% mortality rate, this work could significantly impact society by advancing therapeutic strategies for mucormycosis and reducing the global health burden.

Resumen del Currículum Vitae:

I am a molecular microbiologist and chemical ecologist specializing in microbial interactions. Throughout my academic education, I have aimed to understand the molecular basis of microbial interactions. From early on, I oriented my scientific career towards an international projection, starting with two fellowships from the German Academic Exchange Service (DAAD). I subsequently completed a Master's degree in molecular ecology at the University of Waikato (Hamilton, New Zealand) (2011). I obtained my PhD in 2015 from Victoria University of Wellington (New Zealand) and Cawthron Institute (Nelson, New Zealand) in the field of chemical ecology and biotechnology. For my first postdoc (2015-2016), I joined Prof. Daniel Dietrich's department at the University of Constance (Germany), managing my DAAD-funded project on developing novel in vitro systems for detecting marine neurotoxins.

In 2017 I joined the group of Prof. Christian Hertweck at the Leibniz-HKI (Jena, Germany) as a Postdoctoral Researcher. There, I established an independent area of research on understanding microbial interactions between fungi and bacteria by characterising the chemical mediators in the symbiosis between the fungus *Rhizopus microsporus* and its endosymbiont *Mycetohabitans rhizoxinica*. For this, I was awarded a Marie Skłodowska-Curie Individual Fellowship funded by the European Union. During this time, I managed my project and published ten articles, including four as the first and/or corresponding author, in high-impact journals such as *Nature*, *PNAS*, *Current Biology*, and *The ISME Journal*. More recently I acquired funding through a Collaborative Research Network Grant to initiate a second, independent research topic that is focused on elucidating symbiosis factors in an insect-pathogenic fungal species newly recognized to contain a bacterial endosymbiont.

During my career, I have demonstrated strong potential for leading challenging and innovative research projects, evidenced by 19 publications (~392 citations; h-index: 10). This expertise has enabled me to achieve a high level of research independence and maturity, as demonstrated by the successful development of an independent research project at the Leibniz-HKI and the award of a prestigious Marie Skłodowska-Curie Individual Fellowship. My career has a strong international focus, with research experience in Germany, New Zealand, and Antarctica, as well as participation in over 30 international conferences, including six invited talks. I have independently initiated and fostered collaborations both internally and externally, resulting



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in publications with institutions from six countries. The success of this work was recognized by being awarded the Medac Research Prize from the pharmaceutical industry four times in the past five years.

In addition to my research achievements, I am deeply committed to the scientific community. I served as the head organizer of a conference on symbioses in 2024, and I regularly review for leading journals such as Nature Microbiology, mBio, and FEMS Microbiology Reviews. Furthermore, I have twice served as a Marie Skłodowska-Curie expert evaluator for the European Research Executive Agency. These experiences collectively highlight my dedication to advancing research, fostering collaboration, and contributing to the broader scientific community.



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Turno General

Área Temática: Biociencias y biotecnología
Nombre: KEFAUVER, JENNIFER MARIE
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Título: Molecular mechanisms of mechanobiology

Resumen de la Memoria:

The focus of my scientific career has been on understanding the molecular mechanisms by which physical force interacts with molecular and cellular structures. My research has revealed fundamental insights into how cells sense and respond to mechanical stimuli, employing innovative experimental approaches and addressing key mechanistic questions in the field of mechanobiology.

My mechanobiology journey began at the Scripps Research Institute with two important families of mammalian mechanosensitive ion channels. I led a cryoEM structural study on the hypoosmotically-activated Volume-Regulated Anion Channel (VRAC), which is vital for cell volume regulation and osmotic homeostasis. My work revealed how VRAC's subunits assemble into a functional channel and identified the molecular determinants of its pore architecture. These findings illuminated details of the channel's regulation and heteromeric assembly. I also played a pivotal role in elucidating the structure of the mechanically-activated Piezo1 ion channel, developing a biochemical purification strategy for these massive ion channels. This work enabled structural and functional studies that confirmed that Piezos are bona fide mechanically-activated channels and revealed the unique puckered architecture of Piezo1 within the membrane.

During my postdoctoral training in Switzerland, I uncovered the molecular architecture a stretch-sensitive membrane microdomain at the yeast plasma membrane, known as the eisosome. Using a specialized cryoEM data processing strategy (helical reconstruction), I solved several structures of these BAR-domain protein scaffolded protein-lipid assemblies. This work revealed a surprising degree of organization of individual lipids beneath the protein lattice, with the amphipathic helices of the BAR domain proteins sequestering sterols and charged lipids in a regular pattern. Most importantly, we observed a dynamic stretching of the protein lattice which liberates these lipids, describing a mechanism of mechanosensitivity in biochemical detail for this membrane microdomain.

I have now moved to the Cancer Epigenetics and Nanomedicine Unit, a part of the CIBERER in Oviedo, Spain to expand my training into epigenetics, bioinformatics, and AI-guided computational tools in order to help patients with rare diseases. I am using these techniques to understand the role of epigenetic modifications in shaping the unusual lobulated nuclear structure of neutrophil in the context of the rare laminopathy Pelger-Huet anomaly.

This multidisciplinary training, spanning some of the most powerful computational tools in biology, has created a unique niche for my independent career. My line of research will be devoted to exploring important questions about nuclear mechanobiology through the lens of the interplay between epigenetic modifications and the nuclear lamina, with an eye toward identifying clinically relevant targets for the treatment of rare laminopathies. Relying on my career-long interest and expertise in mechanobiology and protein structure and equipped with the skills I have gained in bioinformatics and epigenetics, I intend to identify novel mechanisms that underpin nuclear structure and deformability.

Resumen del Currículum Vitae:

I began my academic career at the University of Virginia, where I completed dual undergraduate degrees in Biology and Physics, spending three years as an undergraduate researcher developing a viral prohead-based nanoparticle delivery system. After graduating with highest distinction, I continued my Master's in Biology at the University of Virginia in the lab of Prof. W. Michael Wormington studying the role of glycolysis in cancer cell survival.

My PhD studies were completed in the labs of Nobel prize-winning mechanobiologist Ardem Patapoutian and cryoEM structural biologist Andrew Ward at the Scripps Research Institute in La Jolla, California. My doctorate work, funded for three years by a competitive NIH National Research Service Award predoctoral fellowship, was focused on solving cryoEM structures of the mechanically-activated ion channel (Piezo1) and the osmotically-activated ion channel (Volume Regulated Anion Channel), whose molecular identities were discovered in Dr. Patapoutian's lab. I published three high impact studies on ion channel structure and function, one as first author (Kefauver, eLife, 2018) and two as a co-author (Saotome, Nature, 2018; Syeda, Cell Reports, 2016). After defending my PhD, I continued a brief postdoc in the labs of my PhD advisors on a project focused on the development of antibody-based tools to modify the responsiveness of Piezo ion channels for both functional and structural studies. This work resulted in a co-authorship on a study mapping the interactome of Piezo1-proximal cell surface proteins (Koster, PNAS, 2024). During this time, I also wrote a highly cited review article on the advancements in structural and functional understanding of mechanically-activated ion channels (Kefauver, Ward, & Patapoutian, Nature, 2020).

In 2020, I moved abroad to Switzerland for a postdoc in the lab of Robbie Loewith at the University of Geneva. Here, I continued working in cryoEM, gaining new expertise in cell and membrane biology using baker's yeast as a model organism. I won a Marie Curie Postdoctoral European Fellowship to fund this postdoc. At the start of my postdoc (during the pandemic shutdown), I co-wrote a review on recent advances in the structural understanding of the Target of Rapamycin (TOR) signaling pathway (Tafur, Kefauver, & Loewith, Genes, 2020). I worked on several projects related to the mechanism by which TOR complex 2 (TORC2) senses stresses at the plasma membrane resulting in co-authorship on a recent preprint from the lab (Tettamanti, 2024, bioRxiv). My primary achievement during this postdoc was a cryoEM study on the eisosome, a stretch-sensitive organelle located at the yeast plasma membrane which revealed a new mechanism of mechano-sensing (Kefauver, Nature, 2024).

I am currently a Marie Curie Postdoctoral Fellow of the ARISTOS program (CIBER) in the Cancer Epigenetics and Nanomedicine Unit at the Research Center for Nanomaterials and Nanotechnology (CINN-CSIC) in Oviedo, Spain. My project is focused on the mechanistic causes of Pelger-Huet anomaly,



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a laminopathy that causes a defect in the nuclear architecture of neutrophils. My broad scientific goal is to combine my experience in protein structure and mechanobiology with new skills and knowledge in epigenetics and bioinformatics to identify new clinically-relevant mechanisms that underpin nuclear structure and mechanobiology.



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Turno General

Área Temática: Biociencias y biotecnología
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Título: Characterization of the epigenetic regulation of enhancers and enhancer RNAs in plants

Resumen de la Memoria:

Enhancers are distal non-coding DNA sequences essential for development but prone to genetic and epigenetic variations. The chromatin environment at enhancers is dynamically regulated during plant development, but the epigenetic mechanisms responsible for establishing their boundaries are not well understood. Active enhancers in plants produce non-coding RNAs called enhancer RNAs (eRNAs), whose functions remain unknown. I aim to explore the epigenetic regulation of enhancers and their boundaries, and to study their evolution with a focus on maize domestication. I will first focus on the epigenetic control of enhancer boundaries at the nucleosome level, by studying mutants defective in active or silencing pathways. Then, I will study the potential functions of eRNAs in plants, using chromatin conformation capture sequencing, microscopy and proteomics. Finally, I will leverage my integrative bioinformatics pipeline to study the evolution of these epigenetic mechanisms in the context of maize domestication and flowering plant evolution. Investigating chromatin at enhancers may reveal new insights into transcriptional regulation and its memory.

Resumen del Currículum Vitae:

A single question has been driving my research interests from my PhD to my current postdoc position: how is gene expression epigenetically regulated in plants? I partially resolved this question by studying DNA methylation (mC), chromatin remodeling, and histone modifications in Arabidopsis and maize. During my PhD at the University of Western Australia, I focused on the role of mC in Arabidopsis by studying the proteins that bind to it, and identified their preferential binding patterns and proteins interactors. During my postdoc at Cold Spring Harbor Laboratory, I studied the chromatin remodeler DDM1 in Arabidopsis and revealed its molecular function in remodeling histone variant H3.3 as well as the chromatin marks that contribute to epigenetic inheritance. In parallel, I led the MaizeCODE initiative to study the epigenetic regulation of transcription in maize and its evolution during maize domestication. I discovered the importance of bidirectional enhancer RNAs in transcription regulation, and the epigenetic mechanisms defining the boundaries of these enhancers. In addition, I showed that the focus of maize domestication on ears is recapitulated by these enhancers and the expression of the genes they regulate.

Thus far in my academic career, I have had the opportunity to mentor five students, to teach at the undergraduate and postgraduate levels, and to lead large collaborative projects. I presented my research at local seminars and international conferences: I was invited to talk about MaizeCODE at the Plant and Animal Genome conference (2023); my PhD work on mC readers was selected for a talk at the Plant Epigenetics Keystone symposia (2016); I presented my MaizeCODE analysis at the Maize Genetics Meeting (2022), at the CSHL Plant Genomes meeting (2023) and at EpiPlant/SEB Plant epigenetics (2024); and I presented posters at four other conferences. So far, I published nine publications in high-impact journals, including three as first author; I reviewed manuscripts for Nature, Cell, Science, Genes & Development, PLOS Genetics, Journal of Experimental Biology and New Phytologist; I participated in grant writing, notably for a funded Research Collaboration Agreement with Bayer Crop Science, and was an ad-hoc reviewer for three international grants (NSF Plant Genome Research Program, ERC Consolidator and pilot project for the Center for Collaborative Research in Health Disparities at the University of Puerto Rico).



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Turno General

Área Temática: Biociencias y biotecnología
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Título: Epithelial Cell Biology: Investigating mechanisms of tissue homeostasis, repair and disease
Resumen de la Memoria:

I have worked on Epithelial Cell Biology for over 12 years across two main stages in my career: first as a PhD student in Prof. Miguel Alonso's laboratory at the Centro de Biología Molecular Severo Ochoa (CBMSO, Madrid, Spain; 2012-2018), and later as a Postdoctoral Fellow in Prof. Fiona Watt's renowned team at King's College London (KCL, UK; 2018 - present).

I obtained my PhD in June 2017, training as a cell biologist at the CBMSO. There, I made relevant observations about the mechanisms underlying cell division and primary cilium biogenesis in polarised epithelial cells that led to several first-author publications in leading journals such as The Journal of Cell Biology. Moreover, I contributed to developing a new microscopy method to study membrane dynamics. For this, I was awarded a peer-reviewed grant by the Science and Technology Facilities Council (UK) to do a short-term stay at Dr. Jorge Bernardino de la Serna's lab (Harwell, UK). This collaborative project focused on investigating membrane dynamics at the nanoscale and led to a first-author publication in the highly respected journal Small Methods.

For my postdoctoral training, I was awarded a highly competitive EMBO long-term postdoctoral fellowship to join the laboratory of Prof. Fiona Watt (King's College London), a world expert in adult stem cells. There, I learned about mouse models of tissue repair and cancer. I succeeded in expanding our knowledge about stem cell plasticity, particularly dedifferentiation, which is the process by which terminally differentiated cells re-acquire the properties of stem cells. My work has been groundbreaking in demonstrating the influence of mechanical factors on dedifferentiation, placing c-Myc at the centre of this process. These findings have allowed me to establish my independent research niche in which I can explore the impact of this extraordinary form of regeneration. The dedifferentiation study, which sets the foundation of my research programme, was published in Nature Cell Biology and was very well-received in the stem cell research community. In parallel, I have developed a project on oral squamous cell carcinoma and the influence of the tumour immune microenvironment, which equips me with expertise in cancer immunology. These findings have been recently published in PNAS.

At this stage of my career, I am fully qualified to competitively start my own lab and show my potential to be a research leader in stem cell and cancer biology. As a Junior Group Leader, I aim to expand our knowledge about cancer cell plasticity, which is responsible for cancer initiation, progression and therapy resistance. To address this, I will explore the hypothesis that tumours hijack stem cell repair programs. Following injury, the regenerated epidermis appears superficially identical to undamaged epidermis. However, I have discovered that injury-induced tumours arise from dedifferentiated cells that persist after injury. This raises the important question of why dedifferentiated cells that apparently behave as normal stem cells are more susceptible to becoming tumorigenic. To understand the underlying molecular mechanisms, I will integrate genetic and epigenetic single-cell analysis techniques and use genetic models to identify cell state transitions and microenvironmental regulators involved in maintaining these plastic states.

Resumen del Currículum Vitae:

During my PhD I was instrumental in starting a new line of research: Primary cilium biogenesis in epithelial cells. Using four-dimensional time-series confocal microscopy, electron microscopy and other cell biology techniques, I found that the remnant of the midbody is directly involved in cilium assembly, a novel biological mechanism that establishes a functional link between cell polarity and cell division (Bernabé-Rubio et al., 2016, J. Cell Biol). Moreover, I made the observation that a zone of specialised condensed membranes situated at the base of the cilium is necessary for efficient cilium elongation establishing the importance of the lipid content at the ciliary base (Reales*, Bernabé-Rubio* et al., 2015, J. Cell Sci). Furthermore, to complement my education, I did a short-term stay in Harwell Oxford, where I contributed to develop a new microscopy method based on super-resolution and raster imaging correlation spectroscopy that allowed us to demonstrate the origins of the ciliary membrane at the nanoscale (Bernabé-Rubio et al., 2021, Small Methods). To develop this project, I was awarded a peer-reviewed grant by the Science and Technology Facilities Council (UK).

For my postdoctoral training, I secured a highly competitive EMBO long-term postdoctoral fellowship (success rate 12%) to study the mechanisms of cell plasticity during wound healing. Particularly, I focused on the mechanisms underlying dedifferentiation, which is a natural mechanism of tissue repair by which specialised cells re-acquire the properties of stem cells. My novel findings demonstrating the influence of mechanotransduction on dedifferentiation have redefined our understanding of how mechanical factors determine stem cell plasticity in the skin (Bernabé-Rubio et al., 2023, Nat Cell Biol). In developing this work, I have demonstrated my ability to deliver technically challenging projects that combine microscopy and lineage tracing with single cell RNA-sequencing and established new models to study intrinsic and extrinsic plasticity. In parallel to the dedifferentiation project, I have gained expertise in cancer models that complement my research interest in cell plasticity. Specifically, I have been investigating the role of Caspase-8 in oral squamous cell carcinoma using the 4NQO carcinogenesis model. I found that downregulation of Casp8 induces a chronic inflammation phenotype that compromises epithelial barrier integrity. I identified a subpopulation of neutrophils that infiltrate the oral epithelia acting as tumour promoters. My findings establish a functional link between epithelial integrity and tumour immune microenvironment, providing novel models to explore the interplay between chronic inflammation and cancer development (Bernabé-Rubio and Watt, 2024, PNAS).

Therefore, my track record as a PhD student and postdoc includes consistently delivering my research projects in a timely manner and publishing my results in leading journals, substantiating my commitment to excellence.



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Área Temática: Biociencias y biotecnología
Nombre: MANGIONE, FEDERICA
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Título: Developmental Assembly and Functional Architecture underlying Mechanosensation

Resumen de la Memoria:

My career path in Italy, Spain and the UK endowed me with a multidisciplinary mindset and a rich research portfolio that has grounded my pathway to independence. Over the years, I developed the ability to both lead projects independently and work collaboratively with scientists with diverse backgrounds. For my PhD, I unravelled fundamental principles governing the development of the epidermis. My PhD was supported by a competitive PhD scholarship (JAE-CSIC). During my postdoc I established an independent line of research on the cellular basis underlying mechanosensation in the skin epidermis. To support my interdisciplinary research, I established collaborations with scientists in the UK and in France. My research has resulted in several publications in highly renewed journals (Nature Cell Biology, Cell Reports, Current Biology, Frontiers in Physiology, Journal of Visualizing Experiments, Methods). Through my research I also implemented methodologies with broad applications and disseminated my findings at international conferences and invited talks. I also participated in writing several competitive Spanish and UK projects, and in a project that I have fully conceptualised independently, all of which received generous fundings. Capitalising on my independent postdoctoral line of research, and my expertise acquired during my career, I now propose an interdisciplinary programme for reaching a comprehensive understanding of mechanosensation and its peripheral detection. Specifically, I will focus on the cellular and molecular basis underlying sensory mechanotransduction in the epidermis, which remains understudied. Using the *Drosophila* epidermal mechanosensory organs as a model, I now wish to understand how the morphological and functional architecture of mechanosensation emerges during development to allow perception of mechanical stimuli in adulthood. Long term, my goal is to tackle the peripheral contribution to neurodevelopmental disorders and the dysfunction of mechanosensation in aging and disease. Building on interdisciplinary approaches and innovative tools, I will gain understanding of mechanosensation by working on three complementary aims. In aim1, I will investigate the molecular diversity underpinning mechanosensation and its relevance in the developmental assembly supporting this sensation. This will shed light on the molecular diversity, developmental programs paving mechanosensation, and expand the repertoire of cell-specific tools for studying mechanosensation. With aim2, I will elucidate the intercellular dynamics shaping the architecture of mechanosensation. This will provide a mechanistic understanding of the morphological assembly supporting mechanosensation. With aim3, I will investigate the repertoire of mechanosensory molecules (ion channels) for mechanosensation and their impact on the sensory transduction. This will elucidate the molecular machinery underlying mechanosensation, providing fruitful support for future studies addressing the functional assembly of sensory systems. In summary, my proposed research addresses fundamental aspects of the mechanosensory biology of tissues and organs, using a tractable model with robust experimental frameworks. I anticipate that my research will inform understanding in sensory dysfunctions and in the evolution of the physiological architecture of the sensory system.

Resumen del Currículum Vitae:

During my PhD at the Molecular Biology Institute of Barcelona (IBMB-CSIC), for which I was awarded a competitive PhD scholarship by the Spanish Research Council, I conceptualised the core ideas for my project and established a novel live imaging strategy to study epidermal morphogenesis using *Drosophila* as an in vivo model. Working in the team of Dr Enrique Martin-Blanco, my work uncovered a key contribution for intercellular adhesion in tissue architecture and established a key role for the conserved cadherins Fat and Dachsous in this process. I also established the first long-term live imaging set up, enabling the tracking of epidermal morphogenesis at high resolution in vivo. My PhD work led to 2 lead author publications (Cell Reports and Journal of Visualized Experiments) and 1 co-author publication (Methods). While completing my PhD, I started working with the team of Dr Nicolas Tapon at the London Research Institute in UK, first as a visiting scientist, supported by a travel grant by the Spanish Research Council and, soon after, to conduct my postdoc. For my postdoc, I moved to the Francis Crick Institute in UK where I studied the cellular basis underlying mechanosensation in the epidermis. This was an independent line of research that I conducted in the lab of Dr Nicolas Tapon. Integrating my solid experience in *Drosophila* genetics and live imaging with electron microscopy (EM) and functional assays for which I developed expertise, I elucidated how mechanosensory organs development impact mechanotransduction. I implemented novel optical strategies and tools for studying the differentiation of the epidermal mechanosensory organs using *Drosophila* as in vivo model. This allowed me to uncover a new cell type within the epidermis, the F-Cell, that is essential for mechanosensation in adulthood. For this multidisciplinary project, I established collaborations for dissecting the signalling mechanisms and for performing EM experiments respectively. I also gained expertise in electrophysiology joining the team of Dr Ilan Davis (University of Oxford) as a visiting scientist. My postdoctoral work led to 2 lead author publications (Nature Cell Biology and Frontiers in Physiology), in which I am also the corresponding author. I have additionally contributed to elucidating mechanisms of growth arrest in developing epithelia with my host lab, resulting in 2 co-author publications (Current Biology and bioRxiv). My research has gained international recognition as evidenced by awards from learned societies, including the Genetic Society of America, and the French National Agency for Research. I have been disseminating my research work at over 15 international conferences, 7 invited talks, and numerous local meetings. Adding to the above, during my career I actively participated in the scientific layout and writing of competitive projects (BFU2011, BFU2014, CDM2015, WTA2015), and to a project that I have fully conceptualised independently (AAPG2024). I have also made significant contributions to the development of individuals through formal teaching and training initiatives, including mentorship and supervision of 4 PhD students, 2 postdocs, as well as MSc students and staff scientists, contributing to their scientific career development. I also delivered lectures at University College London (UCL), where I was appointed an Honorary Research Fellow.



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Turno General

Área Temática: Biociencias y biotecnología
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Título: Exploring local and systemic aspects of metabolic control and their relevance in disease

Resumen de la Memoria:

My overarching goal is to define the key inputs that control cellular metabolism, so that they can be rewired for therapeutic gain. During my career, I have considered this at multiple levels, across diverse fields, starting during my PhD in which I found a co-treatment targeting cancer cell metabolism. During my first postdoctoral work, I considered the systemic control of metabolism in the context of obesity and, in my second postdoc, I defined the systemic circadian inputs that control metabolism in muscle stem cells. Long term, my goal is to synthesize my findings and experience to date into a high-impact research line that considers both the role of local and systemic signalling in the breakdown of muscle homeostasis during cancer cachexia. To facilitate this, I spent seven years in an international multi-topic lab where I had the opportunity to perform high-impact research in different fields: cancer metabolism, autophagy, and metabolism, highly improving my scientific knowledge and vision, and starting to develop as an independent researcher. My experience in this highly active environment catalyzed my scientific growth and set me on the path to an independent research career. Fascinated by understanding mechanisms that support living organisms' adaptation to the surrounding environment, in 2020 I began the next phase of my research with Pr. Muñoz in Universitat Pompeu Fabra, Barcelona, an expert in muscle biology and muscle stem cells. This advanced my formation towards group leader and also gave me additional expertise in circadian biology, a key controller of cellular metabolism, and direct experience in cutting-edge techniques such as proteome-specific labeling, and analysis of omics datasets. This phase of my career has been characterized by increasing independence, supervising students, as well as organizing several conferences within Barcelona, and initiating collaborations to support my future research. My research line is distinct from my previous supervisors, and I will consider local (cell-cell within the muscle) and systemic (tumor-muscle) signalling in cachexia, the progressive muscle loss that accompanies various diseases including cancer and for which no viable therapies exist to date. I am confident that my extensive experience and collaborative outlook will facilitate a high-impact and internationally relevant independent research line. Long term, my goal is to lay the foundation for therapeutic breakthroughs that help slow, prevent, or reverse muscle loss in cachexia and myopathies, to significantly improve patient outcomes in these devastating conditions.

Resumen del Currículum Vitae:

In 2012, I moved to Paris with a scholarship from the University Paris-Sud to carry out my PhD project with Pr. Guido Kroemer. My PhD thesis was in collaboration with Bayer Pharma which developed a putative anticancer agent (B87). Specifically, I found a synthetic lethality upon cotreatment of cancer cells, with B87 and the metabolite α -ketoglutarate, and elucidated the underlying mechanism as metabolic catastrophe induced by nuclear translocation of MDM2 (1st author in Cell Reports in 2019, citations: 50; 1st author review in International Journal of Cancer, citations 179). In the Kroemer Lab, I collaborated on multiple projects related to autophagy. I published a review in Molecular Cell as 1st author on the different molecular pathways involved in selective organelle-specific activation of autophagy (citations: 216). During my first postdoc, I explored another field, different from the subject of my PhD. We studied the role of Acyl-CoA binding protein (ACBP) secreted into the bloodstream upon induction of autophagy, regulating metabolism and appetite (co-1st author, Cell Metabolism, citations: 106). This study opened a new line of research in Kroemer's lab, and the use of therapies based on ACBP modulation is currently patented by him. During these studies, I coordinated international collaborations with Pr. Martinou in Geneva and Pr. Magnan in Paris.

Seeking to understand cellular control of metabolism in a novel context, in 2020 I moved for a second postdoc to the lab of Pr. Pura Muñoz at Universitat Pompeu Fabra.

In my main project, I set out to understand the role of the circadian clock system in controlling the functions of the muscle stem cell, a rare cell type also known as satellite cells (SC). Using a mouse model of SC cell-specific rescue of Bmal1 (a master regulator of circadian genes) we found that brain inputs are the dominant regulator of circadian rhythms in SCs, driving the oscillation of lipid metabolic genes in a manner dependent on autophagy. I also started a collaboration with Dr. Nina Cabezas, group leader in Freiburg, that confirmed the modulation of metabolites in SCs in this context. At the functional level, also early phases of muscle regeneration depend on brain-driven circadian signals (1st and co-corresponding author, answering reviewer comments in Cell Reports, bioRxiv link provided). For this study, I was awarded two international fellowships: the FEBS Long term and the Marie Skłodowska-Curie individual fellowship (MSCA) (ID895380 score: 99/100). The MSCA also provided €19200 research costs under the direct management of the fellow. In parallel, I also worked on projects looking at communication between muscle and liver clocks, revealing a bidirectional role for these two clocks in inter-organ communication and metabolic function (Sica et al, under consideration at Journal of Biological Rhythms, bioRxiv link provided) I supervised a master's student (Trabajo Fin de Master), I have been invited as a PhD thesis examiner at Universidad de Oviedo and de Extremadura. I served as a reviewer for several journals and as Volume Editor I published an issue in International Review of Cell and Molecular Biology entitled "Circadian rhythms in health and disease". Lastly, I am passionate about disseminating science to the public; I collaborated with Native Scientists and I participated in the "OpenPRBB" 2023.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Biociencias y biotecnología
Nombre: ESCUDERO MARTÍNEZ, CARMEN MARÍA
Referencia: RYC2024-048253-I
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Título: Biotic interactions: plant microbiome

Resumen de la Memoria:

Ongoing climatic modifications, political instability, and high energy costs threaten global crop production and food security. Consequently, identifying and selecting novel crops capable of thriving under growth-limiting conditions is gaining centre stage in fundamental science and its transfer to agriculture. Microbes, i.e., bacteria and fungi thriving in the rhizosphere, the interface between root and soil, and the endosphere, or the root interior, can underpin extended plant phenotypes. These plant phenotypes, similar to vertebrate gut microbiota, can provide probiotic functions to crops. The root-associated microbiota, hereafter, is an untapped resource that has beneficial functions for plants, including the provision of nutrients and tolerance to abiotic stresses. The composition of the root-associated microbiota is mediated, at least in part, by the host plant genome. I aim to characterise the microbial diversity and functionality associated with the roots of agricultural grasses, both under normal and limiting conditions, and detect genomic regions underpinning microbial recruitment. I aim to develop this research with a particular focus on the fungal component of the microbiota. Therefore, identifying plant genes shaping the microbiota will set the stage for the development of crop varieties, decoupling profitable yield from non-renewable inputs in the environment.

My research follows a ground-breaking comprehensive multi-omics approach by integrating plant genetics, microbial-targeted metagenomics, plant transcriptomics, and metabolomics. The anticipated outputs of this research will impact both fundamental and applied research, setting the stage for the deployment of specific plant traits that enhance microbial functions and overall plant performance in resource-limited environments.

Resumen del Currículum Vitae:

Growing up on a farm nurtured my commitment to food security and equitable-sustainable agriculture, leading to a career focused on plant-biotic interactions, from plant-pathogen research to the broader plant microbiota.

I studied for my BSc in Environmental Sciences at CLM Uni. (Spain) including a year of Erasmus in Agronomy at Marche Uni. (Italy). Shortly after my graduation, I began an internalisation journey that still lasts. I obtained a Leonardo da Vinci and a COST-action internship at INRAE (France). Afterwards, I secured a competitive Erasmus Mundus MSc in Nematology at Gent (Belgium), Jaen (Spain), and Wageningen (The Netherlands) Uni, completed with the greatest distinction and a first-authorised publication.

I obtained an ERC-funded PhD in molecular plant-insect interactions at The James Hutton Institute (JHI, UK). My doctoral research results were part of 6 peer-reviewed manuscripts: I obtained the first insights into barley immune responses during different types of interactions with aphids, generated key genomics resources, and characterized aphid effectors in a monocot crop, developing independence and networking skills as the only crop researcher in the team. Including a scientific visit to Warwick Uni. (UK). My thesis pioneered using CRISPR-edited barley for Plant Pathology, earning international recognition, e.g., a selection to talk at the ICCP 2018, USA.

During my UKRI-funded postdoctoral research at the Uni. of Dundee (UoD, UK), I expanded my research into the entire plant microbiota, which required mastering a new skill set; while I had expertise in molecular biology and genetics, I acquired skills in computational biology and multivariate statistics. I lead a novel approach using microbial profiles as external quantitative traits in QTL mapping at the root-soil interface. This methodology provided a powerful tool for understanding the host genetic basis of microbial traits. We published this work in Nature Communications. I gave oral presentations at 11 national and international conferences. I was also awarded the MECEA prize from the UK cereal research community. I also contributed to my colleagues' investigations on the effects of secondary metabolites and nitrogen fertilization on the microbiota in 2 additional manuscripts. Lastly, I secured a Wellcome Trust/ISSF grant to bridge my continuity between this project and my current position.

Since October 2022, I have been part of the Horizon Europe project Root2Res. Here, we investigate root/rhizosphere traits on different crops, including the microbiota, to develop climate-smart crops. I lead the experimental work in WP2, coordinating a group of technicians and PhD students at the JHI and UoD. Likewise, I organise international meetings with our partners at BOKU (Austria), Teagasc (Ireland), and FiBL (Switzerland). I was also awarded funding from the SSCR to investigate the fungal component of the microbiota in barley. This project is greatly expanding my network and boosting my leadership skills.

Recently, I have been awarded a Scientific Talent Attraction Grant from Salamanca Council, where I will join as Junior Group Leader at IRNASA-CSIC. There, I will establish a novel research line looking at microbial functions in the rhizosphere of cereal crops in the domestication framework. The significant budget provided by this highly competitive grant (Ranked first, success ratio < 10%) will enable me to hire a technician and a postdoctoral scientist.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Biociencias y biotecnología
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Título: Mechanisms of Bacterial Mutagenesis and Evolution

Resumen de la Memoria:

I am a biologist that uses molecular biology, biochemistry, genetics and genomic techniques to understand the mechanisms of mutagenesis and DNA repair, and their role in evolution, especially on the evolution of antibiotic resistance. These topics have been a constant throughout my career, where I have used different model organisms to understand how DNA gets damaged and repaired and how this promotes or prevents mutagenesis. During my PhD, I was a co-mentored student in the labs of Drs. Dale Ramsden and Jeff Sekelsky, at the University of North Carolina at Chapel Hill. There, I studied a highly mutagenic chromosome break repair pathway, alternative end joining, using mammalian cell culture and fruit flies. In particular I worked on describing the molecular mechanism of this pathway and its genetic relationship with other chromosome break repair mechanisms. I am currently a postdoctoral fellow in the lab of Dr. Houra Merrikh at Vanderbilt University, using bacteria as a model to understand spontaneous mutagenesis and the evolution of antibiotic resistance. In the Merrikh lab, I have found that bacterial transcription-coupled repair, a highly conserved DNA repair pathway, promotes spontaneous mutagenesis and antibiotic resistance evolution, and I have described in molecular detail how this pathway leads to mutagenic events. With that in mind, we found and characterized a small molecule that inhibits transcription-coupled repair and therefore the evolution of antibiotic resistance.

The main question that will be addressed by this line of research is: How do mutations arise spontaneously? I will use bacteria as model organisms to answer this question. There are three factors that affect spontaneous mutagenesis that I will investigate:

- 1) How do different genomic processes, especially transcription, affect mutagenesis and evolution?
- 2) How does endogenous DNA damage lead to mutations and evolution?
- 3) What cellular pathways promote spontaneous mutagenesis and evolution?

To answer these questions, I will combine genetic and genomic techniques which I have become proficient in during my postdoc with molecular biology and biochemistry-based assays which I learned during my PhD.

My lab will use a multi-species approach. Our main model organism will be *Bacillus subtilis*, a Gram-positive, genetically tractable species that I have ample experience working with. Additionally, I will determine whether the observations we make in *B. subtilis* can be translated into different bacteria species that I also have experience working with, the Gram-positive *Staphylococcus aureus* and the Gram-negative *Salmonella enterica* and *Pseudomonas aeruginosa*. Afterwards, and provided we get additional funding, we will study mutagenesis in eukaryotic cells in culture, which I used during my PhD. This approach will provide a unique perspective on both the mechanisms of mutagenesis and into their evolution.

Resumen del Currículum Vitae:

I graduated with a degree in Biotechnology from the University of Oviedo, in Spain in 2015. There, I worked in the laboratory of Dr. Felipe Lombo, studying the biosynthetic pathway of an antitumor compound. I spent my third year of university at the University of North Carolina, Chapel Hill (UNC), where I worked in the lab of Dr. Dale Ramsden to study the chromosome break repair pathway non-homologous end joining (NHEJ). During that time at UNC, I contributed to a publication of which I am second author. As soon as I returned to Spain, I applied to return to UNC, this time as a PhD student. For my PhD, I returned to Dale's lab, and I also joined Dr. Jeff Sekelsky's lab as a co-mentored student, as I wanted to study chromosome break repair from multiple approaches, using mammalian cell culture and fruit flies. During my PhD, I studied polymerase theta-mediated end joining (TMEJ), a chromosome break repair pathway that is essential in BRCA-deficient breast and ovarian tumors. During my PhD, I published three first-author papers: two using flies to describe the genetic interactions between chromosome break repair pathways (Carvajal-Garcia et al., G3, 2020 and Carvajal-Garcia et al., PLOS Genet., 2021), and one using cell culture to describe TMEJ's mechanism and mutational signature (Carvajal-Garcia et al., PNAS, 2020). Moreover, I contributed as a middle author to 6 more papers, the most exciting of which describes how polymerase delta cooperates with polymerase theta during TMEJ (Stroik et al., Nature. 2023). In the last year of my PhD, I was awarded the Graduate Fellow Award in Basic Science, given each year to the best PhD student in the UNC Cancer Center.

For my postdoc, I moved to Vanderbilt University, in Nashville, Tennessee, to work in the lab of Houra Merrikh. There, I am working on understanding how spontaneous mutations arise in bacteria and how they lead to the evolution of antibiotic resistance. I chose to join Dr. Houra Merrikh's lab at Vanderbilt University, as her work has involved detailed mechanistic studies, investigations of antibiotic resistance in pathogenic bacteria, and connecting findings to fundamental evolutionary processes. Since joining Houra's lab, I have become proficient in bacterial genetics, and I have worked with several pathogenic bacterial species. During my postdoc, I have published two first-author papers. In the first of these papers, I describe the molecular mechanism by which transcription-coupled repair (TCR) creates mutations and promotes the evolution of antibiotic resistance (Carvajal-Garcia et al., PNAS, 2023). The second one describes the development and characterization of a small molecule that inhibits the evolution of antibiotic resistance by targeting TCR (Carvajal-Garcia et al., NAR Mol. Med, 2024).

A year after I started my postdoc, I was awarded the prestigious Helen Hay Whitney Foundation postdoctoral fellowship, which is currently funding my research (total approx. cost: \$220,000). Moreover, of all the awardees that year, I was one of two selected to be funded by the company Merck. In 2024, I received two awards from Vanderbilt University: The Outstanding Achievement in Postdoctoral Studies Award, given to the best postdoc in the Biochemistry Department and the Postdoctoral Trainee of the Year Award, awarded by the Vanderbilt Institute for Infection, Immunology, and Inflammation.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Biociencias y biotecnología
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Título: Deciphering Lipid-Protein Interactions in Immune Signaling to Treat Inflammatory Disease
Resumen de la Memoria:

As an independent researcher in chemistry and immunology, I have built a strong track record investigating lipid-protein interactions in immune signalling. My research has led to breakthrough discoveries in understanding immune system regulation and inflammatory diseases. I discovered that cardiolipin (CL) acts as a specific inhibitor of caspase-4/11, offering promising therapeutic potential for treating sepsis and endotoxemia. This groundbreaking work demonstrated that CL inhibitory mechanism differs from previous therapeutic approaches, opening new avenues for sepsis treatment. My findings have been recognized through invitations to present at prestigious conferences, including the Anti-Infective Synergy Symposium and EMBO Pathogen Immunity and Signaling.

I uncovered how bacterial ornithine lipids modulate immune responses through TLR4 and NLRP3 pathways, revealing their dual role in immune response regulation. This research earned me the Best Talk Prize at the Centre for Cell Biology of Chronic Disease Symposium, with findings published in Cell Reports. The work provides crucial insights into bacterial pathogenicity and immune evasion strategies.

My research on CL's role in TLR4 regulation revealed how its saturation state determines inflammatory responses, with implications for diseases like Barth Syndrome. I demonstrated that while unsaturated CLs antagonize TLR4, saturated forms activate it. This work has been published in Cell Mol Science and received significant recognition at international conferences.

I've secured over €400,000 in competitive funding as principal investigator, including fellowships from Wallonie Bruxelles International, and grants from the Barth Syndrome Foundation. This funding has enabled me to build an independent research program and establish collaborations across Belgium, UK, Spain, and Australia.

My research impact is evidenced by 12 peer-reviewed publications in high-impact journals (5 as first/corresponding author), generating over 300 citations. I've presented at 19 international conferences and received multiple awards, including the Solvay Thesis Award. My invited review on CL's role in immune signalling has been highly influential, accumulating 91 citations.

I've demonstrated leadership through successful student supervision (receiving 5/5 feedback) and key roles including Executive Secretary of EMCRA and Communications Officer for the Australasian Cell Death Society. I've organized workshops on leadership, grant writing, and EDI initiatives, and as Inclusivi-Tea Time Coordinator, created safe spaces for discussing equity and inclusion in academia.

My commitment to open science includes sharing preprints, publishing in open-access journals, and maintaining transparent methodologies. I actively engage in public outreach through events earning recognition including the Three Minute Thesis Competition's Awards.

Throughout my career, I've built strong international networks through positions at prestigious institutions, working with leading experts in immunology and inflammation research. While my previous research focused on exogenous CL and its potential use as therapeutics, my ultimate goal is to lead a world-class research team to uncover the role of endogenous CL in TLR4 and CASP4/11 regulation to bridge basic research and clinical applications to treat inflammatory disorders.

Resumen del Currículum Vitae:

I am Malvina Pizzuto, a scientist specializing in immunology, molecular biology, and inflammation. I am currently a Postdoctoral Researcher and Project Leader at the Institute for Molecular Bioscience at the University of Queensland, Australia. My research focuses on the role of lipids in immune modulation, particularly within the innate immune system, with an emphasis on Toll-like receptors (TLRs), inflammasomes, and their involvement in inflammatory diseases, sepsis, and bacterial infections.

My academic journey began with a PhD in Science from the Free University of Brussels, where I received the prestigious Solvay Award for my work on TLR regulation by synthetic ionizable lipids. This research contributed to the development of safer gene therapy and vaccine transfection agents. My work on TLR promiscuity also advanced our understanding of food-related inflammatory diseases, such as celiac disease. During my studies, I also completed a secondment at the University of Cambridge, UK.

Following my PhD, I have led various projects as a postdoctoral researcher at institutions such as the University of Brussels, the Biomedical Research Institute of Murcia, and the University of Queensland. My research has led to key discoveries, such as the identification of ornithine lipids as a new class of bacterial lipids that modulate immune responses. A significant part of my research focuses on the mitochondrial lipid cardiolipin (CL), which plays a dual role in inflammation, acting as both a pro- and anti-inflammatory molecule depending on its acyl chain saturation. My groundbreaking discovery that CL can inhibit endotoxemia by preventing LPS binding to caspase-4/11 opens new avenues for sepsis treatment and has significant clinical implications, particularly for Barth Syndrome.

I have published 12 impactful papers and contributed to groundbreaking research in lipid biology, earning an H-index of 10 and over 300 citations. My work has led to collaborations with leading scientists globally, and I have secured funding for 7 competitive research projects. Proficient in English, Spanish, French, and Italian, I maintain a strong international network across Argentina, Germany, Switzerland, Spain, Belgium, the UK, and Australia. My scientific contributions extend beyond research; I actively engage in public outreach, having delivered 19 talks and organized 5 scientific events. I am also committed to fostering equity, diversity, and inclusion in science and am involved in leadership roles in various research associations. Additionally, I have designed and delivered lectures, supervised and mentored students, and participated in multiple leadership training courses. My teaching is highly rated, and I take pride in supporting students to achieve successful scientific careers. In addition to my research, I have received 14 prestigious awards for scientific excellence, dissemination, and equity, emphasizing my dedication to advancing science and fostering a collaborative and inclusive research culture.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Biociencias y biotecnología
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Título: Harnessing enzyme evolution for sustainable biotechnological applications

Resumen de la Memoria:

My research goal is to master cutting-edge experimental and computational tools to unlock the full potential of enzymes and guide their engineering for ground-breaking biotechnological applications. In my career, I have navigated the interface between phylogenetics and advanced enzymology. As a result, I have consistently published in top-tier journal in all stages of my career, resulting in 17 publications, with 9 as first or co-first author, 1 review as corresponding author and 1 research article as 1st and corresponding author (h-index 12, >460 citations in Google Scholar).

My training in enzymology started with my MSc studies at IQOG-CSIC (2012), where I developed new methods for cofactor regeneration, leading to a first author publication. I began my PhD studies at CIB-CSI (2013-2019) funded by a Spanish government FPI-fellowship, where I focused on the evolution of lignin-degrading enzymes and organisms. Research at CIB improved my independent thinking, developing the ancestral sequence reconstruction techniques for the first time in that research centre. I showed when in evolution key structural changes led to efficient lignin degradation, how this process was convergent in fungi and how plants and fungi co-evolved. This work was published in 4 first-author publications, including two papers in PNAS. From 2019 to 2020, I worked at CIB participating in an international effort to understand the evolution of Agaricales fungi, yielding 2 papers as co-first author and 1 co-authorship. This stage of my career triggered my deep interest into studying evolutionary processes from an interdisciplinary point of view and also made me aware of the crucial importance of truly in-depth, advanced characterization of enzyme catalytic properties.

Pursuing scientific maturity, in 2020 I moved to NMBU in Norway to work with Prof. Vincent Eijsink (h-index 104, >38k citations) as a postdoctoral researcher in the ERC-Synergy project CuBE [Unraveling the secrets of Cu-based catalysts]. The Eijsink group discovered LPMOs in 2010, and opportunity allowed me to specialize in LPMOs and to work in a highly dynamic, interdisciplinary and ambitious international project. I have independently developed the use of stopped-flow spectroscopy to understand LPMOs, granting me 4 co-authorships (JACS, Nature Communications and two FEBS Letters) with others in preparation. I also brought to the Eijsink group my skills in phylogenetics, where I reconstructed the evolutionary history of bacterial LPMOs and is part of manuscripts in preparation. The combination of my two main research lines culminated in a high-impact publication in Nature Communications as first and co-corresponding author, where I led an international collaboration to understand how LPMOs are protected from oxidative damage. During my time in Norway, I joined 5 international conferences, supervised 4 MSc students and mentored 1 postdoc and 1 PhD student.

I earned the EU-Seal of Excellence in the MSCA-PF 2023, with a project integrating molecular simulations and evolutionary studies for protein engineering. In July 2024, I joined the EU project ROBUSTOO, where I lead the directed evolution of laccases. This opportunity is allowing me to supervise 2 MSc students and 1 PhD student.

Resumen del Currículum Vitae:

The development of innovative technologies from an interdisciplinary perspective is essential to address resource scarcity and the climate crisis. In this context, advanced experimental research on enzymes combined with cutting-edge computational techniques enables the tailored design of new biocatalysts that efficiently carry out more sustainable and environmentally friendly chemical reactions.

During my career, which includes pre- and postdoctoral stays in the United States and Norway, I have combined experimental and computational disciplines to investigate the fundamentals and biotechnological applicability of enzymes of high industrial relevance that participate in the degradation of natural polymers (lignin, cellulose, or chitin). Specifically, I have carried out:

▣ The study of the biochemical evolution of oxidoreductases with a crucial role in the biodegradation of plant biomass through the reconstruction and resurrection of ancestral enzymes.

▣ Structure-function studies and advanced characterization of the catalytic mechanisms of various metalloenzymes, including the use of stopped-flow techniques that allow the measurement of reactions in milliseconds. This enables the elucidation of key aspects of catalysis such as substrate binding or protein stability, providing detailed insights into enzyme functioning.

▣ The integration of evolutionary studies, structure-function and kinetic characterization of enzymes, and molecular simulation to obtain a comprehensive understanding that serves as a guide for the design and engineering of new enzymatic biocatalysts.

The development of these research lines, resulting in high-impact publications, has positioned me as an expert integrating evolutionary studies, fundamental enzymology research, and applied biocatalysis investigation of enzymes involved in the degradation of recalcitrant natural polymers—a framework applicable to any enzyme family. These research lines have led to 17 publications, 13 in Q1 journals, 9 as first author, and 2 as corresponding author (h-index 12, 516 citations, according to Google Scholar).

In 2023, I applied for the Marie Skłodowska-Curie postdoctoral fellowship with a project to develop new computational tools integrating phylogenetic studies and molecular dynamics for the design of improved variants of PET-degrading enzymes, applicable to any enzyme family. This project achieved a score of 90.6/100. It was awarded a Seal of Excellence by the European Commission, recommending my funding as a researcher through other programs. In July 2024 I joined the EU-project ROBUSTOO to lead the directed evolution of other metalloenzymes from the plant biomass degradation. This opportunity is allowing me to specialize in high-throughput screening design for enzyme engineering, directed evolution techniques and computational tools to guide enzyme engineering.

Regarding the supervision of students, I have supervised 4 MSc students in NMBU, and I am currently supervising 2 MSc and 1 PhD student. I have also participated as a reviewer for numerous articles (notably the Early Career Referee program of the Journal of Biological Chemistry) and reviewed projects for international organizations.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Biociencias y biotecnología

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Título: Modelling Complex Dynamics in Biology

Resumen de la Memoria:

The area of research where I develop my work is the Mathematical Modelling of Complex Dynamics in Biological Systems. Within this area, I have developed two independent research lines which share mathematical modeling as common ground.

The aim of the first research line is the understanding of the spatial distribution of seagrass meadows and their function in the marine ecosystem. Making use of mathematical models combined with geospatial information, and experimental data I investigate the growth and deterioration of different species of marine vegetation with a special focus on *Posidonia oceanica*, an endemic plant of the Mediterranean. The spatial organization of seagrasses is a crucial aspect for the preservation of marine ecosystems and their biodiversity but also to understand the changes the coastal ecosystem experience under the external pressure of climate change.

The second research line has as a main objective the understanding of spatiotemporal coordination of the cell cycle. In order to disentangle the essential components of the complex regulatory network controlling the cell cycle, I use different models to simulate the activity of different biochemical components and explore different hypotheses theoretically. By combining this theoretical approach with experimental data from fluorescence microscopy, I can gain further understanding of the underlying processes behind cellular division. My research focuses on the dynamics of the main cell cycle regulators and their influence on the nuclei and the cytoskeleton. Accurate coordination of these processes is critical to maintain tissue homeostasis and to avoid devastating diseases such as cancer.

As such, the research I carry not only contributes to the understanding of Biological Systems but to three of the sustainable development goals of the EU: Life Below Water, Climate Action, and Good Health and Well Being.

Resumen del Currículum Vitae:

I am a dedicated interdisciplinary researcher who has been trained as a physicist and is applying his skills to gain understanding into how biological systems function. I studied Physics at the University of the Balearic Islands, completed a Master in Physics of Complex Systems and earned my PhD in Physics with the highest distinction (Cum Laude) at the Institute for Cross-Disciplinary Physics and Complex Systems (IFISC), a Unit of excellence Maria de Maeztu from the Spanish Research Agency (AEI).

During my PhD, I developed my expertise in complex systems, nonlinear dynamics, and pattern formation and started my first research line using mathematical modeling to analyze the dynamical behavior of self-organized, large-scale seagrass spatial patterns. Remarkably, I had the opportunity to further developed my skills with a research stay at the prestigious University of California, Berkeley.

As a postdoctoral researcher I incorporated a second research line gaining international experience at the Laboratory of Dynamics in Biological Systems (DiBS) which is part of the Department of Cellular and Molecular Medicine at KU Leuven. In the group of Dr. Gelens, I investigated the mechanisms driving the spatiotemporal coordination of the cell cycle. Since 2025, I have been developing my research at IFISC, focusing on these two complementary research lines, both grounded in mathematical modeling of biological systems.

The results of my work have led me to publish my research in various peer-reviewed journals, including the prestigious high-impact journals Science Advances, Physics Reports, Nature Communications and PNAS. Moreover, my work has been presented at multiple international conferences, has been reported by more than 45 Spanish and international media outlets and has been highlighted in the journal Nature Physics. I have participated in six research projects about Complex Systems, and Seagrass Ecosystems. Notably, the research of my PhD contributed to obtain funding for two of these projects, which are specifically devoted to investigate Seagrass Ecosystems under Climate change pressure. Furthermore, I have attracted competitive funding to pursue my research including three postdoctoral fellowships and a research project which I lead as IP from the Càtedra del Mar, Iberostar Foundation to develop monitoring strategies for seagrass meadows at risk. I have co-supervised three master's theses contributing to the training and promotion of young students.

The research experience I have acquired combined with my background in Statistical Physics and Nonlinear Dynamics makes my research profile the perfect combination to understand Complex Dynamics in Biological Systems.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Biociencias y biotecnología
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Título: Deep-time investigation and analysis of human-pathogen evolution through ancient DNA

Resumen de la Memoria:

I specialise in the analysis of ancient pathogen genomic data at a world leading center of ancient DNA, the Max Planck Institute for Evolutionary Anthropology. I gained my first experience with Next Generation Sequencing data and ancient DNA during my masters by analyzing ancient mummified remains for the presence of Clostridium botulinum infection.

I further developed my skills on ancient pathogenomic analyses during my doctorate. My work focused on understanding the long term evolution of one of the most devastating pathogens in human history, Yersinia pestis, the etiological agent of plague and multiple epidemics including the infamous C14th Black Death, using specialised genome reconstruction and phylogenomic methods. I developed a novel method for the screening of this bacterium in large ancient metagenomic datasets, and established a workflow to analyse known virulence factors of Y. pestis in ancient genomes. With these novel methodologies, I have provided insights into the past diversity and the early prehistoric evolutionary history of Y. pestis by providing "deep time" temporal windows to the gain and loss of key virulence genes of this pathogen. During my PhD, I also began challenging the established reference-based method "status quo" in the ancient pathogenomics field, demonstrating new workflows to incorporate de novo assembly into ancient pathogen reconstruction. I took the first steps to incorporate ancient pathogens into pangenomic reconstructions. During this period I contributed to projects on other pathogens such as Salmonella enterica enterica, and open software community projects, such as the nf-core/eager pipeline for the reconstruction and authentication of ancient (meta-)genomes.

As a postdoctoral researcher, I extended the screening method developed during my Ph.D. to implement an automatic screening pathogen pipeline used by the Archaeogenetics department. I currently lead two projects to investigate past diversity of Y. pestis and the leprosy bacterium Mycobacterium leprae. I have established my own collaborator network, resulting in three on-going projects: the characterisation of the global diversity and evolution of Y. pestis (Institut Pasteur, FR); exploring infectious disease in the megalithic population in South-Eastern Iberia (University of Granada, ES; University of La Laguna, ES; University of Tübingen, DE); characterization of the pathogens affecting individuals from Menorca during the Bronze Age (University of Granada, University of Tübingen).

My proposed line of research shifts the time frame from prehistory to history, exploiting the richer material and written historical documentation to develop more interdisciplinary understandings of past disease landscapes. Due to these richer contextual records, this time period presents unique opportunities to more deeply explore the influence of human cultural and behavioral practices in the shaping of the pathogen diversity and vice versa, compared to the more sparse archaeological sources of prehistory. In the proposed project, I will explore the taxonomical and functional diversity of pathogens in Middle Ages Iberia, and explore the impact of the Islamic period on the pathogenic landscape and whether infectious disease may have played a role in this societal change, whilst continuing developing open-source and community-based scientific resources.

Resumen del Currículum Vitae:

I graduated with a BSc. of Genetics in the Universitat Autònoma de Barcelona (ES) in 2013. During my last bachelor's year, I was an exchange student at the University at Buffalo (US), where I joined the lab of Dr. Gunawardena as a research assistant and participated in the characterisation of axonal transport in Drosophila larvae.

I changed my topic of research from neurobiology to ancient DNA by joining the MSc. in Archaeological Science offered by the University of Tübingen (DE). There I gained my first experience with Next Generation Sequencing and ancient DNA by analysing mummified remains for the presence of Clostridium botulinum infection - the topic of my master thesis.

During my doctorate at the Max Planck Institute for the Science of Human History (DE), I specialised in the analysis of metagenomic datasets with a focus in the detection and analysis of pathogenic bacteria that infect humans. My work on prehistoric Yersinia pestis genomes has been published in peer-reviewed scientific journals such as Current Biology and PNAS. These projects were interdisciplinary research that integrated palaeogenomics, archaeology and microbiology. I gained experience in leveraging extensive collaboration networks and project management. I contributed and I am still actively co-developing the open-source pipeline for the analysis of ancient (meta-)genomes nf-core/eager.

I am currently a postdoctoral researcher at the Max Planck Institute for Evolutionary Anthropology. I have implemented the automatic pathogen pipeline for the Archaeogenetics department. This has led to the start of two projects in two different pathogens: Yersinia pestis and Mycobacterium leprae. I have also focused on growing my international collaboration network: I am (co-)leading two projects contributing the analysis of ancient pathogen genomes, one during the Megalithic period in South-Eastern Iberia, and another in Bronze Age Menorca. I also work on modern DNA together with colleagues from Institut Pasteur (FR) to understand the evolutionary mechanisms driving the global diversity of modern plague. I have also served as a reviewer for scientific journals and grant calls, such as the 2022 ERC Consolidator Call.

I am a member of the SPAAM community - a grassroots community of early-career ancient metagenomic researchers that serves as a network for developing new projects, training and fosters collaboration between labs. As co-organiser of the SPAAM3 conference, I gained experience with event organisation and team management. I joined the SPAAM Steering Committee in 2022 as an engagement officer. My role was to coordinate different community projects, and create new initiatives. I have now been re-elected as chair. I lead the Speed Networking events, which aim to connect early career researchers with established professors in the community. I am a member of the AncientMetagenomeDir core team. The AncientMetagenomeDir project compiles standardised sample and library metadata of all publicly available ancient metagenomic data in an open repository to improve accessibility following FAIR principles. Within the core team, I am leading the radiocarbon dating initiative, to collect associated dating information to help the community to easily find that data and perform analyses such as molecular dating.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Biociencias y biotecnología
Nombre: GÓMEZ SANTACANA, XAVIER
Referencia: RYC2024-050744-I
Correo Electrónico: xavier.gomez@iqac.csic.es
Título: Development of a photochromic covalent technology to unravel the complexity of GPCRs in native environments

Resumen de la Memoria:

Xavier Gómez-Santacana have consistently been involved in projects located in the boundaries between the chemistry and biology and throughout his scientific career, more specifically, in the fields as chemical biology, medicinal chemistry, pharmacology and photochemistry, all focusing on G Protein-Coupled Receptors (GPCRs).

Since the commencement of his PhD formation, he has been engaged in the field of GPCRs, combining medicinal chemistry and molecular pharmacology. At that moment, he became an expert of photopharmacology, which is a discipline that combines the use of bioactive molecules and light to control biologic activity with an unprecedented precision. In particular, he could control the binding affinity azobenzene-based photoswitchable ligands with different light wavelengths both in vitro and in vivo. X Gómez-Santacana participated in the reports of most advanced applications in photopharmacology in world-leading journals in the field of chemistry, chemical biology and neuroscience such as Nature Chemical Biology, ACS Central Science or Molecular Psychiatry. After his PhD dissertation, he joined the VU Amsterdam (Netherlands) as a post-doc to work in a project of photopharmacology in GPCRs, using ligands with the capability to change their functional activity with light. He published the results also in a world-leading chemistry journal as Angewandte Chemie. After this experience, he moved to the IGF (Montpellier, France) to change the research topic to a Chemical Biology project on native GPCR labelling with chemical probes. In 2021, he returned to the IQAC thanks to a Marie Skłodowska-Curie fellowship as part of the EU COFUND programme Tecniospring Industry, to continue the project of GPCR labelling. In this project, he was able to label dopamine receptors both transfected and endogenously expressed with fluorescent dyes without modifying their basal activity, having currently have a paper in revision in Communications Chemistry (rebuttal recently submitted). Additionally, he continued working in photopharmacology, publishing different papers.

The presented research line is based on the combination of photopharmacology and labelling approaches to develop of a new technology based on covalent tool compounds to study native GPCRs in their endogenous environment. These involve the development of photoswitchable tethered ligands (PTL) and photochromic ligand-directed (LD) labelling probes that will covalently react with native GPCRs to allow a control of its activity with light and/or to label them with fluorescent dyes. This covalent technology will serve in a second phase to develop new assays to control and monitor the activity, dynamics and organization of native GPCRs. This will include assays to control the GPCR signalling from endosomes or plasma membrane, and also assays to monitor the visualization, trafficking, dimerization and evaluate the activity of GPCR heterodimers. These assays will be initially performed in cells overexpressing the corresponding receptors but, after their validation, they will be translated to cell lines endogenously expressing the target receptor and eventually in tissues or in vivo. At the end, this research line will offer to the scientific community and biotechnological/pharmaceutical industry a new technology to unravel the GPCR complexity with a minimal modification of the living system.

Resumen del Currículum Vitae:

Xavier Gómez-Santacana a chemist that had always been interested in the application of chemistry to the fields of biology and pharmaceutical sciences. He holds a PhD in Chemistry (UB, 2012-2016, cum Laude) for a project in the field photopharmacology, in particular, on photoswitchable ligands for G Protein-Coupled Receptors (GPCRs) involving chemistry and pharmacology in vitro and in vivo. As a post-doc, he joined the VU Amsterdam (2016-2018), to lead a line in GPCR photopharmacology, and later the IGF, Montpellier, (2018-2020) in the frame of a Chemical Biology project in collaboration with the Cistbio (Revvity). In this period, he mastered on the chemical modification of membrane proteins. In 2021, he joined the MCS group after being the recipient of a Tecniospring - MSCA post-doctoral grant to investigate on chemical biology of GPCRs.

Overall, the results of his research have been the object of 17 original papers, 1 book chapter and 1 popular science article. These include 5 publications with IF over 10, 6 as the 1st author and 3 as co-corresponding author. He is co-authoring 2 patents and 4 original papers in preparation and 5 submitted or in revision (3 of them as co-corresponding author). His publications have received 413 citations (h index 11-Scopus). He has presented his work in 25 international conferences: 11 oral communications -3 invited-, 2 flash and 14 poster presentations. He has received two prizes for oral communications, one poster prize, the extraordinary PhD prize awarded by University of Barcelona and the "Fotón emitido" award by Instituto de Óptica Daza Valdés in 2020, for an article in the magazine Investigación y Ciencia.

He is co-PI of a 4-year PID project granted by the AEI in 2024, participated in the evaluation interview of a Caixaimpulse granted project in 2024, and is a co-proposer of a COST action proposal and co-PI of a MSCA Doctoral Network proposal. He has participated in >10 projects in collaboration with international partners and also developed industrial R+D for >4.5 years. His experience in team management involves leading the research line of protein labelling technology in the MCS group and supervising the chemistry of projects involving GPCR photopharmacology. He has co-directed of 2 PhD students (one graduated in Dec. 2021) and supervised 1 PhD (graduated in Nov. 2023), 7 MSc, 1 BSc students and others including technicians and visiting students. He is a member of national scientific societies and international research network such as i-GPCRnet and ERNEST COST CA18133 and he has organised symposia, seminars and other activities, such as co-editing a special issue of a peer reviewed journal.

Overall, Dr Gómez-Santacana is an internationally recognised expert in GPCR Photopharmacology (+12 years), with expertise the synthetic chemistry, molecular pharmacology and biochemical part. Moreover, he is leading a chemical biology research line in the MCS group. The molecules and techniques developed by Dr. Gomez-Santacana are important as biochemical tools in neuroscience and physiology and may pave the way to the discovery of precise potential diagnostic technology and personalised therapeutic treatments. The skills and expertise proven by Xavier Gómez-Santacana entirely match all the aspects necessary to led to success new multidisciplinary projects in the interface between Chemistry and Biology.



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Turno General

Área Temática: Biociencias y biotecnología
Nombre: UREÑA SALA, ENRIC
Referencia: RYC2024-048507-I
Correo Electrónico: enric.urena@gmail.com
Título: Mecanismos moleculares del envejecimiento y otros procesos biológicos
Resumen de la Memoria:

Durante mi carrera científica, me he dedicado al estudio de tres procesos biológicos diversos, con un objetivo común: comprender los mecanismos genéticos y moleculares que los regulan.

En mi doctorado, investigué la regulación genética de la metamorfosis en insectos y descubrí que el factor de transcripción E93 es clave para iniciar este proceso, una función conservada en insectos con tipos de metamorfosis muy diferentes, como cucarachas (*Blattella germanica*), escarabajos (*Tribolium castaneum*) y moscas (*Drosophila melanogaster*). Además, caractericé cómo E93 interactúa con otros factores de transcripción esenciales para el desarrollo de la metamorfosis.

Motivado por aplicar mi experiencia a investigaciones más traslacionales, realicé un postdoctorado centrado en los mecanismos moleculares de resistencia a insecticidas en la mosca mediterránea (*Ceratitis capitata*), la principal plaga de cítricos en España. Durante este período, desarrollé un método de genotipado rápido y eficiente para detectar mutaciones responsables de la resistencia al insecticida spinosad. Este avance permitió optimizar estrategias de manejo en cultivos españoles, conectando la biología molecular con aplicaciones prácticas en el campo. Sin embargo, a pesar de la relevancia de este trabajo, sentí la necesidad de enfocar mi carrera hacia un área con mayor impacto en la salud humana.

Actualmente, me especializo en biomedicina, investigando los mecanismos que regulan el envejecimiento y explorando posibles terapias anti-envejecimiento utilizando como modelo experimental la mosca *Drosophila*. En mi proyecto actual, estudio los efectos del fármaco trametinib, que prolonga la vida de las moscas y mejora parámetros clave de salud. He demostrado que trametinib mejora la patología intestinal asociada al envejecimiento, un proceso análogo al que ocurre en humanos, y he identificado el mecanismo genético subyacente. Además, mis estudios han revelado que trametinib estimula la autofagia y reduce la inflamación asociada al envejecimiento. Estos hallazgos son esenciales para el diseño de ensayos clínicos humanos destinados a evaluar la eficacia de trametinib en el tratamiento de enfermedades relacionadas con el envejecimiento.

Mi transición al campo del envejecimiento combina mi experiencia previa en biología molecular con mi deseo de abordar retos globales. Este tema no solo es biológicamente fascinante, sino también urgente, dado el envejecimiento progresivo de la población mundial y el aumento de enfermedades asociadas, como patologías cardiovasculares, neurodegenerativas y cáncer. Trabajar con la Prof. Dame Linda Partridge en UCL, un referente mundial en biología del envejecimiento, consolidó mi pasión por este campo y mi interés por terapias como trametinib.

Mi experiencia me permite ahora establecer en España un grupo pionero que estudie los mecanismos moleculares del envejecimiento y desarrolle terapias innovadoras contra enfermedades asociadas a la edad, utilizando *Drosophila* como modelo.

Resumen del Currículum Vitae:

Me licencié en Biología en la Universitat de Barcelona y completé un máster de investigación experimental en Bioquímica y Biología molecular.

Empecé mi carrera investigadora en el Instituto de Biología Evolutiva (IBE, CSIC-UPF, Barcelona), donde realicé mi doctorado sobre la regulación genética de la metamorfosis en insectos. Mis resultados generaron 6 publicaciones científicas en revistas de alto impacto, tres de ellas como primer autor (PNAS, Molecular Biology and Evolution, Plos Genetics).

Después de un paréntesis en mi carrera científica, empecé mi primer postdoctorado en el Centro de Investigaciones Biológicas (CIB, CSIC, Madrid), donde estudié los mecanismos moleculares que confieren resistencia a insecticidas. Durante esta investigación diseñé varias herramientas de genotipado de mutaciones que se aplican actualmente para asegurar la sostenibilidad del uso de insecticidas en cultivos españoles. Estos trabajos se publicaron en tres artículos científicos, en uno de los cuales soy el primer autor (Scientific Reports).

Actualmente, llevo casi 8 años en el Institute of Healthy Ageing de la University College London (IHA, UCL, London), investigando la biología del envejecimiento y estrategias terapéuticas para mitigar enfermedades asociadas a la edad. Durante esta etapa he publicado 2 artículos de primer autor en PNAS y Nature Aging (en revisión), además de varias colaboraciones en revistas de alto impacto (Nature Aging, Neuron, Plos Genetics). También he contribuido al diseño y preparación de un proyecto de investigación financiado por BBSRC. Además de mi trabajo como investigador, en UCL ejerzo como profesor en asignaturas de biología del envejecimiento y dirijo varios proyectos de investigación para estudiantes de doctorado, máster y grado.

Mi objetivo es establecer un grupo de investigación en España centrado en la biología del envejecimiento, utilizando *Drosophila* como modelo experimental. Mi experiencia interdisciplinaria y liderazgo me posicionan para liderar investigaciones innovadoras en este campo, contribuyendo al avance del conocimiento y a la formación de nuevas generaciones de investigadores.

Mi carrera científica se podría resumir en los siguientes parámetros:

- Publicaciones: 13 artículos científicos (5 como primer autor) y 3 en revisión (uno como primer autor)
- Liderazgo: Supervisión de 2 estudiantes de doctorado, 5 proyectos de máster y 2 de grado. Diseño de proyectos de investigación financiados. Revisor en varias revistas científicas. He establecido 5 colaboraciones internacionales



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

- Pedagogía: Doy clases en dos asignaturas de la biología del envejecimiento en la UCL.
- Disseminación de resultados: 17 conferencias internacionales (5 comunicaciones orales y 12 pósteres). Participación en jornadas de divulgación científica.



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Turno General

Área Temática: Biociencias y biotecnología
Nombre: DÍAZ PERLAS, CRISTINA
Referencia: RYC2024-048612-I
Correo Electrónico: cdperlas@gmail.com
Título: Development of new brain shuttle peptides, novel phage display strategies, and innovative activatable approaches to generate highly efficient biotherapies for brain cancers

Resumen de la Memoria:

My aim as a researcher is to continue innovating in the development of therapeutics based on cyclic peptides and antibody derivatives using the phage display technology. I will combine the expertise acquired during my PhD and postdoctoral stages to develop novel phage display methodologies and library formats to design molecules able to cross the blood-brain barrier and selectively target or degrade proteins involved in brain cancers. With the help of the Ramon y Cajal fellowship, my long-term goal is to establish myself as an independent researcher and exploit the potential of phage display to evolve new biotherapeutics, especially for the treatment of cancer.

During my PhD in Prof. Giralt's group (IRB Barcelona, Spain), one of the leading peptide laboratories in Europe, I explored new sources and formats of peptides able to overcome the blood-brain barrier (BBB) and hijack endogenous transport mechanisms to transport cargoes across the BBB. I engineered a new family of cyclic peptides inspired by venoms displaying excellent transport to the brain and able to increase the BBB permeability of therapeutic payloads. I also found that by exploiting multivalency the transport of bigger cargoes is enhanced. Furthermore, I have extensively used phage display for the development of protease-resistant peptides as biotherapeutics. I implemented a strategy combining the chemical synthesis of proteins with the use of phage display to evolve protease-resistant peptides able to block protein-protein interactions.

After working with phage display during my predoctoral and short postdoctoral stage at IRB Barcelona, I was eager to explore the possibility of combining directed evolution with my chemistry background. To this end, I pursued a postdoctoral stage at EPFL (Switzerland) with Prof. Heinis, one of the world leading scientists in chemical modification on phage. I contributed to the development of methods to chemically cyclize the peptides displayed on phage creating libraries of hundreds of peptide scaffolds, which represents a general approach for the generation of protease-resistant peptides. With these methods, we have evolved peptides binding with high affinity to intestinal proteins and serine proteases to be used in therapy and diagnostic. Additionally, I have collaborated with a Swiss diagnostics company to develop a lateral flow assay based on our peptides. The patent of these peptides is being exploited by the same company to make the first in vitro diagnostic test based on peptides.

With the aim of learning about synthetic biology applied to antibody engineering and eager to combine it with my expertise in phage display, I joined the ChemSynBio group, an emergent and thriving laboratory lead by Dr. Oller-Salvia, at IQS-URL (Spain). Here, I lead the research line for the generation of smart biotherapeutics combining chemistry with directed evolution to enhance antibody specificity and decrease side effects. I have developed masked antibodies designed to be selectively activated within tumors, enabling precise targeting of cancer cells. In the following years, I aim to set up an unprecedented platform for the discovery of new receptors promoting protein degradation, to generate activatable bivalent antibodies to promote selective degradation, and to show applicability on brain tumor targets.

Resumen del Currículum Vitae:

I am a senior postdoctoral researcher at Institut Químic de Sarrià-Universitat Ramon Llull (IQS-URL) since 2022 within the ChemSynBio group led by Dr. Oller-Salvia. I currently lead a team composed of 2 PhD students, 2 MSc students and 1 research assistant. The focus of my research program is the generation of novel biotherapeutics via directed evolution to selectively target or promote the degradation of therapeutically relevant proteins for brain cancer treatment. Overall, I have published 14 research papers (6 as first author and 1 as corresponding author), 1 book chapter, and 1 patent. I have presented my research at 16 international conferences, through oral and poster communications. In addition, I have received the Certificate R3 (AEI, 2024) and various distinctions including the RSC Outstanding Early Career Research Award by RSC Chemical Biology, the Extraordinary Prize for my MSc thesis, and an Excellent Cum Laude distinction for my PhD thesis. Overall, I co-designed and wrote the 5 competitive projects I have obtained in the last 3 years as a principal or co-principal investigator, including a Marie Skłodowska-Curie Fellowship (2022), a Proyectos en colaboración público-privada (2023), and a Proyectos de Generación de conocimiento (2023). The Ramon y Cajal grant will serve as a springboard to consolidate the independence I have achieved as a researcher and will enable me to advance my ambitious research at an academic center in Spain.

Before joining IQS-URL, I was a postdoctoral researcher in Prof. Heinis' laboratory at EPFL (Switzerland) working on establishing new phage display methodologies aimed at discovering peptides resistant to proteases that target intestinal proteins. The outstanding selectivity of our peptides fostered the collaboration with Bühlmann AG, a Swiss diagnostics company, initiated with an Innosuisse Grant, to develop an early diagnostic test for inflammatory diseases. These results have been patented and published in Nat. Commun. (2023, IF: 14.7, first author). Moreover, in my 3-year stage at EPFL, I collaborated in other studies that have resulted in 5 more publications. At EPFL, I had mentored and supervised 1 MSc, 1 BSc thesis, and trained many students in phage display screenings.

My MSc and PhD research were pursued in Prof. Giralt's group at IRB Barcelona (Spain) funded by the competitive FPI-Severo Ochoa grant. I also performed a secondment in Prof. Pasqualini's laboratory at the University of New Mexico (US) to learn peptide phage display. My interests in the discovery of protease-resistant peptides able to disrupt protein-protein interactions and in exploring new sources and formats of peptides able to reach the brain were crystalized in 4 first-authored peer-reviewed papers. Beyond the bench, I was in the organizing committee for the 4th IRB PhD Symposium, and I often volunteer at outreach activities.

In addition, I have established several collaborations with national and international groups that have contacted us for our expertise in antibody engineering, biophysical characterization and brain shuttle peptides, like Prof. Sally Ward (U. Southampton), Prof. David Baker (U. Washington), Prof. Concepció Soler (UB), and Prof. Laura Soucek (VHIO). I am also involved in collaborations with ONA Therapeutics, SpliceBio and Peptomyc.



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Turno General

Área Temática: Biociencias y biotecnología
Nombre: PETERS PÉREZ, CHRISTIAN
Referencia: RYC2024-049044-I
Correo Electrónico: petersman@gmail.com
Título: Neural circuits for feeding behavior

Resumen de la Memoria:

I have developed my career as researcher in Chile (2008-2017) and Germany (2017-present), participating in 5 different research funded projects. In those two countries I published 21 publications in total, 9 as first author.

I have been in numerous conferences in several countries like USA, Singapore, France, Germany, and Chile, presenting and discussing my work. Moreover, I've been invited for oral presentations and lectures in countries like Germany, Chile, and Perú. I received funding for every step of my career. I have worked in three different labs for my Master (Dr. Opazo), PhD (Dr. Aguayo), and Postdoc (Dr. Klein). In each lab I worked on different topics and successfully published the work.

In Chile, I played a role in academic and research activities. Oversaw the theses of two biochemistry bachelor students, with which we publish six papers together, four of which I authored. Additionally, I supervised internships for two international medical students and a national biochemistry student. I participated in outreach programs like "Brain Awareness Week" from 2011 to 2016, aiming to share neuroscience knowledge with the community through talks and laboratory tours. To secure grants for my research, I pursued independent funding after my Ph.D. and received the MECESUP (UCO1311) for a short postdoc on anti-Alzheimer assays (€14,200). Additionally, I contributed to various winning grants like Fondecyt (1140473) and some unfunded projects, like the NIH R21 proposal, gaining valuable experience.

In Germany, at the Max Planck Institute for Neurobiology, I transitioned to a senior postdoc, leading my own project on hormonal control in feeding behavior. Notably, I discovered that the hunger hormone, ghrelin, activates a subpopulation of neurons in the central amygdala, subsequently increasing food consumption in satiated mice. This effect is dependent on opioid and ghrelin receptors, and send projections to the Parabrachial nucleus, a brain region involved in feeding behavior. This groundbreaking work was published in Science Advances.

Over the last 5 years, I supervised students, collaborated on diverse projects, and published 11 papers (4 as first author) in high impact factor journals like Nature Communications, Cell Reports and Science Advances. I developed a robust global network with researchers, and in 2023, I lectured in the Master of Neuroscience programme at the LMU Germany.

With the Ramon y Cajal program I aim to unravel the neural circuits controlling appetite regulation. I will study the connection between the central amygdala and the paraventricular nucleus, until now unexplored. The combination of innovative methodologies, preliminary positive results, and a well-defined research plan is proof of its impact and feasibility. My extensive first-author publications and collaborative efforts showcase my ability to independently drive projects and contribute to collective research endeavors.

Resumen del Currículum Vitae:

I have authored 21 publications, including 16 original research articles (9 as first author), 2 reviews, 1 book chapter, and 2 preprints. My Google Scholar metrics include an H-index of 14, I10-index of 14, and 710 citations. My research spans copper in neurotransmission, Alzheimer's disease, and neurometabolic disorders, demonstrating my versatility and independence as a researcher over 15 years. I have a strong background in electrophysiology recordings, circuit mapping, chemo- and optogenetics, and cellular neuroscience.

After earning my BSc in Biochemistry, I was awarded a scholarship to pursue a Master's in Biochemistry and Bioinformatics at the Universidad de Concepción, Chile. During this period, I investigated the role of copper in protein homeostasis and synaptic activity. One of my most significant findings was the biphasic effect of copper on excitatory neurotransmission, published in my first first-author paper (Peters et al., 2011), recognized with the Best Poster Presentation Award at the Fourth International Workshop on Iron and Copper Homeostasis in Pucón, Chile.

For my PhD, I received a Conicyt fellowship and pursued three major research objectives focused on Alzheimer's disease. My thesis evaluated amino acids' roles, the neuroprotective potential of a pentapeptide, and how membrane proteins impact Aβ toxicity, resulting in three first-author publications (Peters et al., 2013, 2015, 2016). My PhD research contributed to additional studies in the lab, a patented invention, and awards such as the Chapter Travel Award from the Society for Neuroscience (USA) and recognition as one of the top three postgraduate theses in cell biology in Chile. I also secured a MECESUP postdoctoral fellowship to lead research on neuroprotective small molecules. Concurrently, I served as a Graduate Teaching Assistant, teaching physiology and contributing to new research proposals.

To internationalize, I joined the Max Planck Institute of Neurobiology in Germany as a senior postdoctoral researcher. Over the past three years, I have published several first-author papers on neurometabolism, neuronal circuits, retina physiology, and Alzheimer's disease. My recent work on ghrelin's influence on feeding behavior, published in Science Advances (Peters et al., 2023), was highlighted on the Science webpage. Additionally, I have co-authored papers currently under revision in high-impact journals such as Nature Neuroscience and Nature Communications.

Beyond research, I have contributed as a reviewer for Communications Biology (Nature Publishing Group) and as a Guest Editor for Frontiers in Molecular Neuroscience. I have supervised students in Chile and Germany, guiding their projects and fostering their development.

My scientific journey reflects a commitment to excellence, independence, and diverse contributions to neuroscience. From early work on copper's role in neurotransmission to recent discoveries on ghrelin's neuromodulatory effects, my research has significantly impacted our understanding of neuronal function and behavior.



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Turno General

Área Temática: Biociencias y biotecnología
Nombre: FLORES ROMERO, HECTOR
Referencia: RYC2024-049204-I
Correo Electrónico: hector_uniupv@hotmail.com
Título: Mitochondria and MERCS at the crossroad between health and disease

Resumen de la Memoria:

MERCS are dynamic signalling hubs that mediate several vital cellular functions, including calcium signalling, autophagy, and cell death. Consequently, alterations in MERCS are frequently associated with various human diseases, including age-related pathologies such as neurodegenerative disorders and cancer. Despite their significance, there is limited understanding of the composition and dynamics of MERCS, particularly regarding how they transition from a healthy state to disease. This gap in knowledge is partly due to the technical limitations associated with studying their formation dynamics, which are typically investigated using EM or dimerization-based biosensors. Certain proteins are known to be enriched at MERCS, including those involved in calcium regulation, such as IP3R and VDAC, as well as BCL-2 family proteins, which are the main regulators of mitochondrial apoptosis. BCL-2 family proteins have recently been associated with inflammation, a key risk factor in the diseases mentioned above. Additionally, proteins such as alpha-synuclein, amyloid beta, and the Sigma-1 receptor (Sig-1R), associated with neurodegenerative diseases (AD and PD) and cancer, respectively, are localized at MERCS, suggesting a link between MERCS dysfunction, inflammation, apoptosis, and disease progression.

The aim of my research line is to decipher key aspects of MERCS dynamics and composition, focusing on how the transition between health and disease states is regulated. This includes understanding the cross-talk between apoptotic machinery (e.g., BCL-2 family proteins) and MERCS resident proteins, with the goal of identifying proteins and molecules that regulate mitochondria-ER distance and functionality, and prevent this transition, leading to the development of new therapeutic strategies.

For this, I have experience in studying mitochondria as a pivotal organelle in human physiopathology. During my PhD, I investigated BCL-2 family proteins, using an in vitro reconstitution approach combined with classical biophysics techniques. As a postdoc, I explored BCL-2 proteins beyond apoptosis, including their roles on regulation of MERCS and MERCS-associated functions such as cellular stress or mitochondrial dynamics. I developed tools like the MERLIN biosensor, a BRET based biosensor that enables the study of MERCS in a reversible manner with no toxicity. MERLIN is compatible with high-throughput screening studies which allowed us uncovering compounds modulate MERCS distance with the promising objective to identifying drugs to restore MERCS functionality during disease. Moreover, I designed a strategy combining proximity-dependent biotinylation with mass spectrometry to analyse MERCS composition under physiologically relevant conditions.

This approach aims to address outstanding questions about MERCS dynamics and composition in neuropathologies like AD and PD, where neuroinflammation, apoptosis, and altered MERCS distances are key factors. I believe that uncovering the mechanisms driving the transition from a healthy to a diseased state could provide critical insights into the potential use of MERCS as health biomarkers. Furthermore, identifying molecules that modulate the formation or destabilization of MERCS could lead the way for the development of novel drugs to treat a wide range of diseases.

Resumen del Currículum Vitae:

As an Ikerbasque Research Fellow at the Achucarro Basque Center for Neuroscience, I lead the Laboratory of Neuropathology of Interorganellar Contact Sites. Our team focuses on the transition from healthy to diseased states in neurodegeneration and cancer. We explore how mitochondria-ER contact sites (MERCS), BCL-2 family proteins, mitochondrial dynamics, and cell death mechanisms contribute to disease progression. While these processes are known to be disrupted in disease, the mechanisms underlying their crosstalk, especially within MERCS, remain poorly understood, limiting therapeutic advancements. Recently, we published a perspective in Trends in Cell Biology (Larrañaga-SanMiguel, A. et al. Flores-Romero H, 2024), offering insights into this field. Our approach integrates biophysical and cell biology perspectives, proposing that apoptotic machinery is finely tuned by MERCS. We aim to identify MERCS modulators to restore mitochondria-ER communication in disease, supported by the Spanish PGC (PID2022-141616OA-I00) and an Ikerbasque Starting Grant.

My research journey began at University of the Basque Country (UPV-EHU), I earned a Bachelor's degree in Biochemistry and Molecular Biology with first-class honors and a Master's in Biomedicine and Molecular Biology. At the Biofisika Institutua (CSIC-UPV/EHU) with Dr. Gorka Basañez, I developed strategies to reconstitute apoptosis in vitro. My PhD studies, funded by an FPU grant, focused on BAX's membrane topology (Flores-Romero H et al., Scientific Reports, 2017) and the pro-death role of BFL1 in apoptosis (Flores-Romero H et al., Cell Death and Diff., 2019), uncovering new therapeutic targets.

For postdoctoral training, I joined Ana J. García-Sáez's lab (IFIB, Uni. of Tübingen, and CECAD, Uni. of Cologne). I expanded research on non-canonical roles of BCL-2 proteins in metabolism, mitochondrial dynamics, and MERCS. We discovered tBID can replace apoptotic effectors, killing leukaemia cells and modulating bacterial infections (Flores-Romero H et al., EMBO J., 2021). Using advanced microscopy, I characterized MERCS and developed the MERLIN biosensor, recognized for its speed and versatility (Hertlein, V* and Flores-Romero H* et al., Life Sci. Alliance, 2019; Flores-Romero H et al., Methods Mol Biol., 2022; Guéguinou M et al., Cell Mol Life Sci., 2022). Collaborating with the EU-OPEN SCREEN initiative and CRC1218, we identified compounds that effectively modulate MERCS. One is a niclosamide derivative that can rescue MERCS defects in ALS models, improving cellular health (Etxebebeste-Mitxeltoarena, M et al., J. Med. Chem., 2025).

With over a decade of research experience, including international collaborations, I have expertise in mitochondria, BCL-2 family proteins, MERCS and advanced techniques for their study. My contributions are reflected in 22 publications and consortia participation (CRC1218, ApoRed). Beyond



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research, I engage with the scientific community through press releases, a professional X account (@floresromeroh), and 31 conference presentations. I promote open-access science, review articles for journals such as EMBO Reports, and mentored students and research assistants. I also co-organized academic courses and obtained the R3 certification, underscoring my commitment to scientific excellence and education.



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Turno General

Área Temática: Biociencias y biotecnología
Nombre: JIMÉNEZ ROJO, NOEMI
Referencia: RYC2024-048954-I
Correo Electrónico: noemi.jimenez@ehu.eus
Título: Unraveling the Role of Lipids and Membrane Mechanics in Cellular Senescence and Collagen Secretion
Resumen de la Memoria:

My scientific journey has been shaped by a passion for understanding the complexities of lipids and membranes and their critical roles in cellular processes. My expertise lies at the intersection of membrane biophysics, lipidomics, and cell biology. During my PhD in the lab of Prof. Alicia Alonso at the University of the Basque Country, I explored the biophysical intricacies of sphingolipids, highlighting their thermal properties and effects on membrane permeability, which had previously been underestimated. Building on this foundation, my postdoctoral work in lipidomics in the Riezman lab at the University of Geneva allowed me to uncover novel lipid functions and develop innovative approaches such as the optical control of membrane fluidity. These efforts have resulted in high-impact publications and recognition, including the Darlene Solomon Award for early-career women in mass spectrometry, which was instrumental in establishing my independent research trajectory.

During the next years as a research group leader, I propose to investigate cellular senescence, with a specific focus on lipid metabolism and collagen secretion. Cellular senescence, a hallmark of ageing, has profound implications for diseases such as cancer and cardiovascular disorders. My research plan is structured around three core objectives. First, I aim to identify the lipid metabolic networks that delineate senescence-associated secretory phenotypes (SASP), focusing on collagen secretion. Second, I will investigate the specific roles of sphingolipids and other lipids in collagen export pathways, with a particular emphasis on the effects of senescence. Third, I will explore how changes in membrane mechanics modulate collagen secretion and contribute to the establishment of senescence. This multidisciplinary approach integrates my expertise in lipid biochemistry, mass spectrometry, membrane biophysics, and photopharmacological techniques, with the potential to shift paradigms in the field of ageing research. My goal is to uncover how lipid composition and membrane mechanics influence collagen secretion during senescence, ultimately aiming to develop new metabolic interventions for age- and skin-related disorders.

As an independent researcher, I have led projects, secured competitive funding, mentored students, and established myself as a leader in lipid and membrane biology. My career has been also marked successful collaborations and leadership roles in scientific organizations. I am fully committed to fostering an inclusive and innovative research environment at UPV and beyond as well as advancing interdisciplinary science.

The RyC 2024 program represents a unique opportunity to further establish my position as a principal investigator at the forefront of lipid and membrane biology. With the support of this program, I aim to make significant contributions to understanding the interplay between lipid metabolism, membrane mechanics, and cellular senescence, while addressing critical challenges in ageing and membrane biology and advancing therapeutic strategies for age- and skin-related diseases.

Resumen del Currículum Vitae:

In 2010 I was awarded a predoctoral fellowship from the Basque Government to pursue my thesis in the laboratory of Prof. Alicia Alonso. My work shed light into the complex membrane behaviour of the disease-connected sphingolipids and I discovered important features such as the mechanisms by which sphingosine permeabilizes membranes. My PhD work gave rise to 5 first author publications in well-known journals in the field of biophysics (Biophys.J, BBA-Biomembranes, Chem. Phys. Lipids). During this period, I performed two stays at Stony Brook Cancer Center, in the laboratory of Dr. Yusuf Hannun, an internationally-known researcher in the area of lipids and signal transduction. In 2014 I received a postdoctoral fellowship from the Basque Government to apply lipidomic analysis to understand how membrane lipid homeostasis is achieved in mammalian cells in the prestigious lab of Prof. Howard Riezman at the University of Geneva. I got fascinated by lipid diversity and I concentrated on using lipidomics to uncover new lipid functions. I have discovered conserved roles for two structurally different lipid classes, ether lipids and sphingolipids, in the early secretory pathway. The publication arising from this work has had wide international impact in the lipid community, reflected by various invitations for scientific seminars. My interdisciplinary profile has given rise to fruitful collaborations which resulted on impactful publications in ACS Central Science and JACS Au among others. Additionally, we have developed an optical approach based on photoswitchable lipids that is allowing us to manipulate membrane mechanics remotely with high spatiotemporal resolution in an unprecedented way. The publication arising from this project is currently under revision in Cell and I intend to further develop this novel technology at the UPV/EHU thus bringing photopharmacological approaches with high therapeutic potential. In summary my postdoctoral stay in Geneva has given rise so far to 5 first-author publications (3 research articles, 1 book chapter, 1 review) and 6 publications in collaboration with scientists from very diverse backgrounds and institutions. Moreover, I was awarded with the Darlene Solomon Award from Agilent that supports early-career women in the field of mass spectrometry which represented an important boost in my career. I feel as such confident and highly motivated to establish myself as an independent group leader in an academic environment. I have been invited as speaker to 7 conferences and symposia in the last 3 years and my abstracts were selected for talks in 6 conferences during my postdoc. I moved back to Spain in 2022 thanks to the Maria Zambrano "Talent attraction" call and I have secured a more stable position under the Ikerbasque program after my sick and maternity leaves to start my independent research line with funding from the State Subprogram for Knowledge Generation. I also enjoy mentoring students (1TFG, 1TFM in 2024) and I am involved in teaching activities where possible, especially at the Master's level. I am also involved in management activities in my institution. During my postdoc I co-founded Geneva Postdoc Association, organized lipid webinars, and now I coordinate SEBBM Biomembranes Group and I am an elected member of the Standing Commission of the Department of Biochemistry and Molecular Biology.



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Turno General

Área Temática: Biociencias y biotecnología
Nombre: CALATRAVA PORRAS, MARÍA VICTORIA
Referencia: RYC2024-050514-I
Correo Electrónico: mariavictoriacalatrava@gmail.com
Título: De la Simbiosis Microbiana a la Agricultura del Mañana
Resumen de la Memoria:

Mi trayectoria científica se ha centrado en el estudio de la biología molecular de microalgas y su papel en las interacciones simbióticas con bacterias, investigando cómo los intercambios metabólicos regulan estas relaciones y su impacto en el crecimiento de las plantas. Durante mi formación predoctoral en la Universidad de Córdoba (UCO), descubrí nuevas interacciones mutualistas entre microalgas y bacterias promotoras del crecimiento vegetal, lo que marcó el inicio de mi interés por integrar enfoques interdisciplinarios en ecología microbiana, biología evolutiva y biotecnología. Uno de los principales logros de esta etapa fue identificar mecanismos genéticos y metabólicos clave en la producción de auxinas por microalgas, resaltando su papel dentro de la microbiota de las plantas y abriendo nuevas vías para aplicaciones biotecnológicas en la agricultura.

En mi etapa postdoctoral en Carnegie Science (Stanford, EE.UU.), lideré investigaciones sobre la evolución de los plastidios en el organismo modelo *Paulinella*, desentrañando los mecanismos genéticos que facilitaron su integración simbiótica. Simultáneamente, participé en estudios sobre comunidades microbianas en ambientes extremos, destacando la cooperación entre cianobacterias y bacterias fototróficas en la formación de biofilms adaptados a altas temperaturas. Estas experiencias fortalecieron mis habilidades para liderar proyectos multidisciplinarios y establecer colaboraciones internacionales.

Actualmente, como profesora interina en la UCO, estoy desarrollando una línea de investigación independiente que examina el papel de las microalgas en la rizosfera. Mi objetivo es comprender cómo estas modulan las comunidades microbianas del suelo y contribuyen a mejorar la productividad agrícola y la resiliencia frente a estrés. Mi enfoque combina herramientas avanzadas como la metagenómica, la metabolómica y la biología sintética, con el propósito de descifrar los mecanismos moleculares y ecofisiológicos que sustentan estas interacciones. A largo plazo, mi aspiración es consolidar un grupo de investigación que se convierta en un referente en el estudio de la ecología microbiana aplicada a la biotecnología agrícola, contribuyendo de manera significativa a las estrategias globales de sostenibilidad y mitigación del cambio climático.

Resumen del Currículum Vitae:

Soy investigadora especializada en biología molecular y ecología microbiana, con una trayectoria internacional que abarca desde mis estudios en la Universidad de Córdoba (España) hasta mi postdoctorado en Carnegie Science (Stanford, EE.UU.). Mis aportaciones científicas incluyen 17 publicaciones en revistas de alto impacto liderando investigaciones pioneras en interacciones alga-bacteria y endosimbiosis. Destacan estudios que han identificado mecanismos genéticos y metabólicos esenciales en mutualismos microbianos y en la evolución de la endosimbiosis primaria. He liderado y colaborado en proyectos financiados por instituciones internacionales como NASA y NSF, integrando técnicas avanzadas de genómica, transcriptómica y biología sintética. Durante mi etapa en Stanford, participé activamente en la organización de seminarios y simposios internacionales, fortaleciendo redes de colaboración interdisciplinaria. Mi experiencia docente incluye más de 200 horas de formación en los grados de Biotecnología, Bioquímica, Biología y Química, y supervisión de trabajos fin de grado y estancias de investigación. He diseñado e implementado talleres prácticos de técnicas moleculares y actividades educativas internacionales, fomentando el intercambio científico. Actualmente, lidero un proyecto como investigadora principal en la UCO, centrados en el papel de las microalgas en la rizosfera y su potencial como biofertilizantes vivos.



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Turno General

Área Temática: Biociencias y biotecnología
Nombre: ERCILLA EGUIARTE, AMAIA
Referencia: RYC2024-048471-I
Correo Electrónico: amaiaercilla@gmail.com
Título: Genome homeostasis in pathophysiology

Resumen de la Memoria:

Throughout my whole career, my research interest has been focused on deciphering the molecular determinants that ensure an accurate cell proliferation and maintenance of genome homeostasis. Whereas the first years of my career were focused on the very basic fundamentals of DNA replication and on the problems that arise during this process, these last years in the Carracedo lab have nurtured me with a broader and more multidisciplinary scientific view of cancer disease and beyond. My interest in the field of cell proliferation and genome homeostasis was born during my internship at the laboratory of Prof. Agell (Barcelona), where I also developed my Ph.D. At that time, we were working on the characterization of novel mechanisms involved in the replication stress response. We contributed to the characterization of p38 and JNK kinases (Cell cycle, IF: 4.4, 2012) and described a new mechanism that is important to prevent new origin firing and genomic instability (NAR, IF: 16.1, 2016). In collaboration with Dr. Aranda at the Karolinska Institutet (Stockholm), we also performed an iPOND-MS analysis that allowed us to have a better understanding of the molecular changes at replication fork level in response to acute or severe replication stress (CMLS, IF: 7.7, 2019). After successfully defending my PhD, in 2016 I joined the laboratory of Dr. Toledo (Copenhagen) where I made a major contribution to the characterization of the mode of action of the polymerase alpha inhibitors. The unexpected conclusion from this work was that the specific disruption of lagging strand synthesis does not impede fork progression and is compatible with cell survival (Cell reports, IF: 8.5, 2020). Besides consolidating my background in the field, my postdoctoral time in Copenhagen provided me with strong lab management competences and the unique expertise on pioneer High-content microscopy approaches. In 2019 I joined the Carracedo lab (Bilbao) as a senior postdoctoral researcher. During these past years, my research has been focused on studying the role of genes involved in cell proliferation in driving metastatic disease. On the one hand, I have led and supervised the work of Jana Crespo in which we have shown that IER5L sustains prostate cancer aggressiveness through a mechanism that is consistent with the regulation of phosphatase PP2A (Cell death & Disease, IF: 8.6, AC). On the other hand, I have led and executed a project in which we combine computational and empiric approaches to identify the causal role and prognostic potential of TCF19 in aggressive prostate cancer (manuscript under review). Besides working on the above indicated projects, throughout my career I have collaborated in more than 11 additional projects, and I have led the implementation of High-content & Deep learning microscopy approaches at the CICbioGUNE. Thanks to all that, in 2023 I was granted a tenure-track-like Ikerbasque Research Fellow grant to lead my path to independence. My line of research will be focused on exploiting High-tech microscopy approaches to decipher the molecular determinants of genome homeostasis in health and disease. More specifically, we will study the universal evolutionary nature of stress-induced mutagenesis to adapt to growth-limiting environments in human cells, and the potential interplay between this process with cell proliferation mechanisms.

Resumen del Currículum Vitae:

I am bachelor in biotechnology and PhD in Biomedicine with a distinctive expertise in High-content microscopy and a longstanding background in cell proliferation and genome homeostasis. I am enthusiastic, dedicated, well organized and critical. Although I am originally from the Basque Country, I studied and developed my PhD in Catalonia. My PhD studies were key for my development as a scientist by shaping my skills for critical and independent thinking. Besides learning state-of-the-art technologies in the Cell cycle and Genome integrity maintenance fields, those years were important to start developing supervision (MSc thesis), review and other transferable skills. I also attended several national and international conferences, and spent 4 months at Karolinska Institute in Stockholm, which allowed me to meet many world-leading experts and start developing my own scientific network. Motivated by my commitment to be trained in a rich and international research environment, after receiving my PhD degree with honours *cum laude* in 2016, I moved to the Center for Chromosome Stability in Copenhagen. My postdoctoral time in Copenhagen was critical to learn the pioneering High-tech microscopy approaches that I aim to further develop in the incoming years. Besides the scientific and technical training, throughout those years I strengthened my background, expanded my international network, and acquired the interpersonal skills and lab management competences required to lead research lines in a cutting-edge lab. Thanks to that, in 2019 I came back to my hometown and joined the Carracedo lab as a senior postdoctoral researcher. My incorporation to the Carracedo lab stemmed from two key premises: 1) the legitimate mentoring skills of Prof. Carracedo in supporting the path to independence of early-stage researchers and 2) the proven capacity of the lab to support the implementation of innovative research lines in a collaborative and rich environment. These past years, I have implemented in the center High-content & High-throughput microscopy coupled to Deep learning approaches, which has placed our lab in a leading-edge position. These years have also been very fruitful to gain the transferable skills required to become a successful mature researcher. I have led the project of Jana Crespo and I have co-directed her PhD thesis (reading expected by summer 2025). Thanks to the support of my mentor, I have received training on leadership, grant/manuscript writing and scientific communication to overcome the great challenges that entails to be a good leader. Moreover, motivated by my commitment to sharing scientific results, I have participated in a great variety of national and international meetings and conferences, as well as on dissemination activities. Collectively, my incorporation into the Carracedo lab has nurtured me with a broader and more multidisciplinary scientific view, scientific network and mentorship skills. Thanks to all that, last year I was awarded an Ikerbasque Research fellow grant (230K€) to capitalize all my previous experiences and transition into full research independence. In this regard, besides defining my line of research, this 2024 has been particularly important for my training on grant writing by means of: 1) participation in the seminars organized by Innarima consulting and 2) the application of funding opportunities.



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Turno General

Área Temática: Biociencias y biotecnología
Nombre: ARROYO LOPEZ, MARIA DE LA CABEZA
Referencia: RYC2024-048889-I
Correo Electrónico: arroyo.lopez.mc@gmail.com
Título: Epigenomic regulation of cellular plasticity and its role in pluripotency, differentiation, and malignant transformation

Resumen de la Memoria:

In 2010, I started working in the laboratory of Dr. Marchal Ortega at the University of Jaén as an undergraduate student. I got immersed in a project investigating the molecular background of the primary microcephaly syndrome, caused by mutations of the microcephaly protein MCPH1. This led to the obtention of an awarded master's thesis (2013) and my PhD (2018) investigating the role of MCPH1 in chromosome condensation and cell cycle control. As the main research output of my PhD, we discovered the novel role of this protein in chromosome alignment during mitosis and decatenation checkpoint adaptation, and its prospective correlation with genome stability and cancer. I received the Extraordinary PhD award in 2022.

In 2019, I moved to Dr. Cardoso's laboratory at TU Darmstadt (Germany) and focused my research on epigenetics. I got involved in the teaching of the M.Sc. Biology and the supervision of undergraduate students, leading a research project about the regulation of DNA modifications during the cell cycle. I learned several new techniques related to the study of the epigenome and I established new international collaborators. My work leading this project resulted in a publication about the regulation of TET1 dioxygenases and their isoform-specific subnuclear distribution. In 2022, I started leading a second project studying the epigenomic regulation of DNA replication dynamics, in which we could show the role of the histone variant macroH2A in the replication dynamics of the inactive X chromosome. Also related to replication, I have been investigating the response of the replisome to genotoxic stress and the epigenetic regulation of DNA repair, combining my knowledge in epigenetics with the expertise acquired during my PhD. This project led to a recent publication in 2025 and a new project investigating the cellular outcomes of TOP2A inhibition.

In parallel to replication-focused projects, I continued developing a new line of research related to TET dioxygenases and their interplay with epi-readers like methyl-CpG binding domain protein 1 (MBD1). Unexpectedly, we found that TET proteins interact with splicing speckles and increase RNA splicing efficiency (publication recently submitted), which has interesting implications in the regulation of alternative splicing. Furthermore, we could show the role of MBD1 in mouse and human embryonic stem cell pluripotency and differentiation (publication under revision). Leading these projects, I could develop extensive experience in a broad range of methodologies and expand my network of collaborators. I will continue this line of research focused on the interplay between epi-modifiers and epi-readers and their effect on stem cell pluripotency, differentiation, and transformation. Specifically, my interest is focused on the epigenomic regulation of pluripotency capacity and neural differentiation. I aim to investigate TET1/MBD1 crosstalk using mouse embryonic stem cells, human induced pluripotent stem cells, and derived neural stem cells. Key objectives include analyzing transcriptional changes and their link to epigenetic variations, chromatin remodeling and repeat element activation during neural differentiation, and the effect of TET1/MBD1 depletion. This study will provide insights into the molecular mechanisms underlying chromatin plasticity and the roles of TET1/MBD1 in neural development.

Resumen del Currículum Vitae:

Licensed in Biology (2012) and with a Master's in Biotechnology and Biomedicine (2013) from the University of Jaén, I started my doctoral studies at this institution in the group of Dr. Marchal Ortega. I obtained a PhD fellowship from the University of Jaen, which involved me in teaching (60h/year, 4 years), in addition to a grant from The School of Doctorate and an EMBO Short-term fellowship that allowed me to spend 9 months at the University of Minnesota (USA) in the laboratory of Dr. Clarke. As a result of my PhD and our collaboration with Dr. Clarke, I published 5 first authorship articles, obtaining the international doctorate in July 2018, and being awarded in 2022. I was also involved in outreach activities, including teaching innovation projects (2016-2017) and the European Researchers Night (2017-2019). I presented the results of my PhD at 16 international and national conferences. From July 2018 to June 2019, I worked as a postdoctoral researcher at the University of Jaen. I obtained a postdoctoral position at the TU Darmstadt with Dr. Cardoso in July 2019. Since then, I have accumulated 5 years and 7 months of international experience in this institution. In 2024, I completed official training as a project leader and biological safety manager, taking care of the biological safety regulations in our laboratory. I have been involved in developing and leading 5 different projects on the topic of epigenetics, successfully achieving first-authorship publications for each of them, in addition to international and national collaborations (5 published articles, 1 under review), and the first study as the main corresponding author (submitted in January 2025). I presented my postdoctoral research at 11 conferences in total. Furthermore, I have been involved in other activities, including teaching in the M.Sc. Biology (35h/week, five weeks; 175h/year, 5 years), and supervision of bachelor, master, and doctoral theses, contributing to the training and mentoring of young researchers. In this sense, I joined as a mentor the network "Mentoring Hessen", being the formal mentor of the M.Sc. Martina Burkle. I have improved my training as a teacher and obtained the "Higher Education Teaching Certificate", implementing a teaching innovation project entitled "Improving cooperative group work in a student-diverse context" (November 2024). Adding on, I have transferred my knowledge to other researchers by being the first postdoc representative in the Department of Biology of the TU Darmstadt, organizing the respective symposiums and transferable skill courses, as a reviewer in scientific journals (Cells, Frontiers), member of an editorial panel (Frontiers Cellular Biochemistry), two times Ph.D. international reviewer, and member of a Ph.D. thesis board. At the moment, I am part of the Equality Team Commission in the Department of Biology (since March 2024).

In summary, my career has achieved a high level of internationalization and leadership as demonstrated by: 16 research articles in SCI journals; 11 well-established international collaborations; the formal supervision and mentoring of 16 undergraduate students (7 bachelor theses, 5 master theses, 3 research internships, and 1 mentee) and the Ph.D candidate Andreas Zhadan; and the successful leading of 5 different projects, including two funding proposals under evaluation.



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Turno General

Área Temática: Biociencias y biotecnología
Nombre: DE LA TORRE MARTINEZ, ROBERTO
Referencia: RYC2024-049061-I
Correo Electrónico: rober.dltm@gmail.com
Título: NEUROCLAP: The Role of the Claustrum in Neuropathic Pain

Resumen de la Memoria:

I earned my PhD with honours from the University Miguel Hernandez of Elche, Spain, under the supervision of Prof. Antonio Ferrer Montiel and Prof. Asia Fernandez Carvajal in July 2016. In my thesis, "Characterization and evaluation of TRPV1 and TRPM8 antagonists as potential therapeutic tools for treating pain", I studied the activity and modulation of several ion channels from the TRP family responsible for transducing noxious stimuli, including TRPV1, TRPM8, and TRPA1. I described potential analgesics for combating chronic pain by combining in vivo pain models and electrophysiological techniques such as in vitro whole-cell patch-clamp and microelectrode array recordings in the dorsal root ganglia neurons. During my Ph.D., I was also involved in teaching and supervising undergraduate students. My work has led to three patents, two of which have been licensed for commercial exploitation, multiple publications in high-impact journals (D1 and Q1), and presentations at international conferences.

In December 2016, I joined Prof. Gilad Silberberg's laboratory at Karolinska Institutet, where I conducted research on sensory-motor interactions in the dorsolateral striatum of awake healthy and parkinsonian mice. Using patch-clamp recordings in vivo in behaving animals, the study showed that neurons respond to both sensory stimuli and spontaneous whisking and that sensory responses are attenuated by whisker-related motor activity. Additionally, the research demonstrated that in Parkinsonian mice, dopamine depletion affected both sensory and motor striatal representations. These findings were published in Nat. Commun., with me serving as the first and corresponding author of the paper. Now, I have embarked on my own research project aimed at establishing an independent career as a researcher. I am focused on studying the claustrum, a small brain region that has been implicated in a wide range of functions, including awareness, consciousness, and pain processing. In my previous project related to the claustrum, I employed a combination of in vivo multiunit silicon probe recordings in awake mice, ex vivo paired whole-cell patch-clamp recordings, optogenetics, and pharmacology to investigate which cortical layers and cell types were targeted by the claustrum. This project resulted in a manuscript titled "Pre- and postsynaptic determinants of claustrum-cortical connectivity" available in Curr.Biol., where I am co-first author. During this period, I secured funding in Sweden to lead my own projects related to the claustrum function (StratNeuro 75,000 €, Ake Wibergs 50,000 € and KI Forskningsbidrag, 38,000 €).

For the Ramon y Cajal 2024, I propose a research line centered on investigating the role of the claustrum in neuropathic pain processing. Studying the role of the CLA in the CLA-ACC network will enhance our understanding of the underlying mechanisms that contribute to the generation and maintenance of chronic neuropathic pain. Moreover, investigations in the CLA-ACC network could facilitate the development of new diagnostic tools and treatments for persistent neuropathic pain.

Resumen del Currículum Vitae:

I earned my PhD (2016-Cum Laude) from the University Miguel Hernandez of Elche, Spain, guided by Prof. Antonio Ferrer Montiel and Prof. Asia Fernandez Carvajal and supported by an FPI fellowship. In my thesis, "Characterization and evaluation of TRPV1 and TRPM8 antagonists as potential therapeutic tools for treating pain", I studied the modulation of ion channels within the TRP family responsible for noxious stimuli transduction. I published 13 works in D1 and Q1 JCR-indexed journals. I am an inventor on 3 international patents (1 licensed for commercial exploitation and 1 passed Phase 3 clinical trials). I participated in 3 different projects, 15 dissemination events, and 8 conferences.

In December 2016, I started my postdoc in Prof. Gilad Silberberg's lab at the Karolinska Institutet, Sweden, where I have been for more than 8 years. Here, I studied sensorimotor functions of striatal neurons in awake mice, funded by National and European projects. My contributions to the field were acknowledged through publications in outstanding journals like Nat. Commun., where I am the first and corresponding author. Currently, I am studying the claustrum and its implication in pain processing. In this time, I published 4 papers and 1 preprint under revision in Neuron. I have been awarded competitive grants by The Swedish Strategic Research Area Neuroscience grant (75,000 €), the Åke Wibergs Foundation (50,000 €), the Karolinska Institutet founding (11,000 € and 25,000 €), and the Maria Zambrano grant (96,000 € - declined), invited lecturer in 3 international conferences and in 5 national and international seminar series, selected for oral presentation in 3 international conferences, and attended 15 international congresses.

I am the organizer of the Swedish Basal Ganglia Congress for 2022 and 2024, as well as the Society for Claustrum Research meeting in 2024 in the USA. In 2024, I was an instructor in the Cajal Advances Neuroscience Training Program organized by FENS and IBRO in France. I served as an expert reviewer for the United Kingdom Research and Innovation funding agency. I contributed to academic excellence by evaluating BSc and MSc degrees at both Karolinska Institutet and the Universitat Pompeu Fabra and as a member of a thesis committee at the University of Vigo. My involvement extends to the editorial boards of journals such as Frontiers in Neural Circuits and Frontiers in Cellular Neuroscience, where I serve as a Review Editor. I have an h-index of 11 and over 290 citations on Google Scholar (20-01-2025). I have made substantial contributions to the scientific community through the publication of 18 articles, including 3 as a first author and 2 as a corresponding author. My teaching experience spans 80 hours, and I have actively participated in 15 projects, assuming the role of Principal Investigator for 5 of them. Furthermore, I have supervised 4 BSc students, 2 MSc students, co-supervised 1 PhD student, and 2 postdocs in different countries, facilitating their journey toward scholarly excellence.

In addition, I have published 5 popular science articles on neuroscience, reaching over 250,000 readers. These articles have been republished in National Geographic, BBC News, and CNN. In October 2022 I became a father, taking paternity leave from May to December 2023. I was 1st on the reserve list for the Ramon y Cajal fellowship 2023.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática:

Biomedicina

Nombre:

MEDEROS CRESPO, SARA

Referencia:

RYC2024-049051-I

Correo Electrónico:

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Título:

Brain mechanisms underlying adaptive decision-making and goal-directed behaviours

Resumen de la Memoria:

I am passionate about understanding how flexible behaviors arise from interactions within brain circuits. My long-term goal is to lead an independent research program that uncovers general principles of brain computation underlying adaptive and flexible behavior.

My neuroscience journey began during my undergraduate studies at the Diaz-Guerra Lab (CSIC, Spain), where I explored NMDAR pathways. During my Master's in Neuroscience (2015), I investigated epigenetic-targeting drugs in Alzheimer's Disease using electrophysiology at the Perea Lab (Cajal Institute, CSIC), sparking my interest in synaptic and circuit-level mechanisms driving brain function.

I was awarded a fellowship from the Spanish Ministry of Science and Technology to pursue a PhD at the Perea Lab, where I focused on GABAergic-to-astrocyte signaling in the prefrontal cortex (Mederos et al., Nat Neurosci., 2021) and developed a novel optogenetic tool for astrocyte calcium signaling (Mederos et al., Glia, 2019). These findings earned recognition through presentations and awards.

As a postdoctoral researcher in the Hofer Lab at the Sainsbury Wellcome Centre (London), I investigated neural circuits underlying adaptive decision-making and sensory-guided behaviors. Supported by a Wellcome Early Career Award, I established a team and produced impactful findings, including a co-corresponding author publication (Mederos et al., Science, 2025).

To date, I have published 16 original research papers (six as first author, two as co-corresponding author), two reviews, and one book chapter (see CV). Key contributions include:

1. Neuronal Pathways in Fear Suppression (Mederos et al., Science, 2025): Identification of brain circuits leading to suppression of an instinct.
2. Astrocyte-Neuron Signaling in Decision-Making (Mederos et al., Nat Neurosci., 2021): Demonstration of GABAergic-to-astrocyte signaling in the prefrontal cortex as critical for decision-making.
3. Melanopsin for Astrocyte Activation (Mederos et al., Glia, 2019): Development of melanopsin as a precise tool to study astrocyte calcium signaling in vivo.

Throughout my career, I have mentored 16 trainees and contributed to open science, public engagement, and collaboration. Recognitions include the FENS EJN Young Investigator Prize (2022).

Future Research Program: My lab will integrate advanced behavioral models, chronic electrophysiology, in vivo and in vitro recordings and computational approaches to investigate the neural circuit mechanisms underlying flexible decision-making:

- ☐ Behavioral Paradigms: Using an established task modeling dynamic shifts, we will study how internal states and context shape decisions.
- ☐ Neural Circuit Interactions: Probing prefrontal, hypothalamic, and thalamic dynamics in decision-making under aversive and neutral conditions.
- ☐ Individual Variability: Exploring how risk preferences modulate neural representations in decision-making.
- ☐ Learning and Plasticity: Leveraging chronic Neuropixels recordings to understand reactivations and representational drift driving adaptive behavior.

My lab will focus on the neural basis of adaptive behavior, combining cutting-edge methods to explore how internal states and experiences shape decision-making. By uncovering these principles, we aim to inform treatments for psychiatric disorders characterized by maladaptive decision-making.

Resumen del Currículum Vitae:

I am a Wellcome Early Career Award recipient at the Sainsbury Wellcome Centre (UCL), where I lead a five-person multidisciplinary team within the Hofer Lab to investigate how neural circuits govern adaptive decision-making and flexible behavior. My research integrates advanced techniques such as in vivo electrophysiology in freely moving mice, optogenetics, in vitro electrophysiology, and serial-section two-photon imaging to study neural circuits involved in fear suppression. In collaboration with Dr. Claudia Clopath (ICL), we developed computational models to interpret these findings. My research has resulted in a first-author and co-corresponding manuscript (Mederos et al., Science 2025), along with two additional manuscripts in preparation. I have been invited to present at major conferences, including the Gordon Research Conferences, FENS, SfN, and SPiNES (NYU).

A key strength throughout my career has been my ability to secure competitive funding. My current research is supported by the Wellcome Early Career Award (2023-2027), focusing on neural pathways regulating fear. Previously, I was awarded the prestigious EMBO Postdoctoral Fellowship (2021-2023) to investigate escape decision pathways in the ventrolateral geniculate nucleus. I also received a Spanish MINECO PhD Fellowship (2015-2019) and travel grants to collaborate with prominent labs, including those of Professors György Buzsáki (NYU) and Alexey Ponomarenko (Düsseldorf University), which led to high-impact publications.

During my postdoctoral work in Professor Sonja Hofer's lab at SWC, I explored subcortical circuits involved in sensory-guided behaviors, identifying the role of inhibitory circuits in adaptive fear suppression. I co-authored a paper in STAR Protocols (2022) and mentored two PhD students and a master's student, furthering my commitment to fostering early-career researchers.



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My PhD research at the Neuron-Glia Networks Lab (Cajal Institute, Spain) pioneered innovative techniques to study astrocyte-neuron interactions, particularly uncovering the role of astrocyte-parvalbumin interneuron interactions in cognitive decision-making (Nature Neuroscience, 2021). My doctoral work earned several prizes, such as the Laia Acarin Prize, the Alberto Rábano Award, and the Margarita Salas Award.

I am also passionate about teaching and mentoring. I have supervised students at University College London, the Autonomous University of Madrid (UAM), Carlos III University of Madrid and Complutense University of Madrid. Currently, I co-supervise three PhD candidates and one Master student and recently co-directed master's student Lucie Deveau, who graduated with distinction, received the Best Project prize, and was nominated for the Dean's List. I have served as a teaching assistant for UCL's Sainsbury Wellcome Centre PhD program, Neuroscience Master (UAM) and third-year Biochemistry courses (UAM).

I have published 15 research papers, including five as first author, and contributed to six collaborative projects. I have been recognized with seven awards at different stages of my career, including the FENS EJN Young Investigator Prize (2022).

My goal is to establish an independent lab that bridges fundamental neuroscience with real-world behavior, elucidating how sensory representations and internal states are encoded in the brain and enable adaptive and flexible behaviors.



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Turno General

Área Temática: Biomedicina
Nombre: MARTIN TRUJILLO, ALEJANDRO
Referencia: RYC2024-049366-I
Correo Electrónico: amartint1979@gmail.com
Título: Identification of novel genetic mechanisms in human traits and disease

Resumen de la Memoria:

Dr. Alejandro Martín Trujillo completed his PhD in 2014 under the supervision of Dr. David Monk at the Cancer Epigenetics and Biology Program (PEBC) in Barcelona (Spain), where he focused on defining the Human Imprintome in health and disease. He then joined the laboratory of Dr. Andrew Sharp at the Icahn School of Medicine at the Mount Sinai Hospital (ISMMS, New York, USA) as a postdoctoral researcher, where he further enhanced his expertise in (epi)genetics and genomics. Currently, Dr. Martín Trujillo holds the position of Assistant Professor at the ISMMS, where he continues leading cutting-edge research in genomics.

Dr. Martín Trujillo's research combines computational and experimental approaches to study the contribution of rare and complex genetic variation to genome regulation and human phenotypes, including disease. With an outstanding scientific track record, he has (i) authored 30 publications (9 as first author and 1 as co-senior author) in high-impact journals such as Nature Communications or Genome Research, (ii) demonstrated expertise in leading both independent and collaborative projects, and (iii) received 7 prestigious awards, including 2 postdoctoral fellowships and 5 early-career investigator grants. Throughout his career, he has consistently participated in multiple conferences, delivering oral presentations at leading events such as those organized by the American and European Societies of Human Genetics.

The classic understanding of genetic disease mechanisms has primarily focused on SNVs, small insertions/deletions, and, more recently, also structural variants. However, considering their cumulative impact, these variants typically account for only a minority of the estimated heritability. This missing heritability raises the hypothesis that other types of genetic variants may also play a significant role in human traits and disease. Consistent with this hypothesis, growing evidence supports the functional and clinical relevance of rare genetic variation within non-coding and complex regions of the genome. Yet, these variants are consistently ignored in current GWAS due to technical challenges or limited statistical power, remaining largely understudied. In recent years, multiple initiatives have generated and shared WGS data from thousands of individuals, many with detailed phenotypic information. This offers a unique opportunity to comprehensively explore the relationship between sequence variation and phenotypic diversity. By combining these rich datasets with innovative and sophisticated computational approaches, rather than relying solely on standard protocols, we can uncover novel genetic mechanisms, identify biomarkers for disease, and drive the development of targeted therapeutic strategies. Using this approach, Dr. Martín Trujillo's Ramón y Cajal research line aims to identify novel genetic variants underlying molecular and human phenotypes, with particular emphasis on types of genetic variation that are typically missed by standard genetic studies such as rare non-coding regulatory SNVs or TR variants. If funded, the proposed work of Dr. Martín Trujillo will advance our understanding of the genetic basis of human traits and diseases, leading to novel insights and potential breakthroughs in disease management, including improved diagnosis, prognosis, and therapeutic strategies.

Resumen del Currículum Vitae:

I am an Assistant Professor in the laboratory of Dr. Andrew Sharp hosted at the Icahn School of Medicine at the Mount Sinai Hospital (ISMMS, New York, USA). My research primarily focuses on uncovering the genetic mechanisms that regulate genome function and their contribution to disease, with particular interest in genetic variation that is typically ignored in genetic studies, such as rare non-coding variants, tandem repeats (TRs), and DNA methylation.

During my PhD and early postdoctoral years, my research focused on defining the full extent of genomic imprinting and its dysregulation in human disease, ranging from classical imprinting disorders to multiple cancer types. Subsequently, I moved to New York to undertake my postdoctoral training in Dr. Sharp's lab at the ISMMS, where I expanded my expertise in large-scale genomic analysis, focusing on the biological relevance of TR variation. My contributions and expertise led to my promotion to Research Instructor in 2021 and, a year later, Assistant Professor. As a junior faculty, my research has focused on the role of TR variation in phenotypic diversity, including human disease. To date, my work has yielded a total of 30 publications (9 as first author and 1 as co-senior author), with some published in high-impact journals such as Nature Genetics, Nature Communications, and Genome Research.

Throughout my career, I have actively participated in both national and international conferences, where I delivered oral presentations as an invited speaker and through competitive abstract selection. Notably, in 2024, the work I co-directed was also selected for an oral presentation at the American Society of Human Genetics Conference (Denver, USA). My research has also been recognized with 7 international awards, including 2 postdoctoral fellowships and 5 early career investigator grants. Additionally, I have participated as a reviewer in leading journals such as Genome Research and the American Journal of Human Genetics, and in 2025, I will join as an Early Career Reviewer to the Molecular Neurogenetics study section of the National Institute of Health. Altogether these scientific accomplishments demonstrate my ability as a PI to lead independent research projects and highlight the innovative and impactful nature of my work.

Collaborations have been instrumental in enriching my research, allowing me to work with leading experts such as Dr. Bruce Gelb (ISMMS, New York, USA), Dr. Silvia de Rubeis (ISMMS, New York, USA), Dr. Pablo Lapunzina (University Hospital La Paz, Madrid, Spain) and Dr. Egor Dolzenko (PacBio, California, USA). These collaborations have expanded the scope of my work, provided fresh perspectives, and enabled me to contribute to large-scale research initiatives.

In addition to my research, I am deeply committed to mentoring. I have guided bioinformaticians and students, helping them develop their research skills and advance their careers. Many of my mentees are now pursuing or applying to PhD programs, highlighting my commitment to fostering talent and shaping the future of the next generation of scientists.

Overall, my extensive scientific achievements and experience in leading research projects position me uniquely to fully leverage the Ramón y Cajal program, developing innovative research and mentoring the next generation of scientists in Spain



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Biomedicina
Nombre: PASCUAL PASTO, GUILLEM
Referencia: RYC2024-048764-I
Correo Electrónico: guillempascualpasto91@gmail.com
Título: Next-generation immunotherapies for pediatric solid tumors

Resumen de la Memoria:

My motivation in research is to develop new treatments for childhood malignancies. My research focus integrates basic understanding of pediatric cancer biology and immunology with the use of robust preclinical platforms, with the final goal of developing innovative therapies for children with incurable solid tumors. Here, I will focus on developing next-generation cellular therapies for two pediatric solid tumors; osteosarcoma (OS) and Ewing sarcoma (ES). OS and ES are aggressive developmental bone sarcomas with poor survival and limited therapeutic options. Chimeric Antigen Receptor (CAR) T-cells are revolutionizing the field of cancer therapy; however, they have shown limited activity against OS and ES in recent clinical trials. The principal hypothesis of this project is that the determinants of CAR T-cell failure in OS and ES are driven by the presence of immunosuppressive cells such as pro-tumoral myeloid cells in the tumour microenvironment, the tumour secretion of T-cell inhibitory proteins and the presence of physical microstructures in the extracellular matrix (ECM). Overall, I aim to identify immunosuppressive components that can impair T-cell function to rationally design more effective CAR T-cells. For this, I will dissect the immunobiological landscape of OS and ES through deconstructing proteomic, cellular and physical architectures to reveal potential resistance mechanisms to CAR T cells. Then, I will develop, and preclinically test, three innovative CAR T cell approaches focused on co-targeting myeloid cells within the sarcoma microenvironment, hijacking sarcoma-secreted proteins as synthetic gates to enhance CAR T-cell fitness and disrupting ECM physical microstructures. The final outcome of this project will be to demonstrate the preclinical efficacy of novel CAR T-cell therapies with potent and prolonged anti-sarcoma activity. Here, I will prompt a change in our understanding of the immunobiology of paediatric bone sarcomas and will change our way of developing cellular therapies by concomitantly targeting cell surface tumour antigens and different components of the hostile solid tumour microenvironment. The CAR vector design applied in this project will enable future cellular therapies, and the new preclinical models developed here will allow testing future immunotherapies against these incurable solid cancers.

Resumen del Currículum Vitae:

I am a research scientist focused on developing innovative therapies for pediatric solid tumors. During my PhD in the laboratory of Dr. Angel M. Carcaboso (Fundación Sant Joan de Deu, Barcelona, Spain), I established innovative models of retinoblastoma that served to demonstrate the preclinical efficacy of a novel oncolytic adenovirus (VCN-01), which was the basis for the initiation of a first-in-human clinical trial. In my PhD, I also demonstrated the preclinical efficacy of optimized drug delivery systems and combination targeted therapies for pediatric sarcomas. For my postdoctoral training, I joined the laboratory of Dr. Kristopher R. Bosse at the Children's Hospital of Philadelphia (CHOP, US), where I expanded my expertise in translational pediatric oncology with focus on immunotherapy for neuroblastoma. There, I developed innovative immunotherapies targeting a new surface antigen, GPC2, including next-generation chimeric antigen receptor (CAR) T-cells and antibody-drug conjugates (ADCs). At CHOP, I continued to contribute on retinoblastoma research, where I have become a leader in CAR T-cell therapies against this disease. Throughout my 10-year research career, I have published 27 research articles, including 7 as first author in high-impact journals such as Science Translational Medicine, Nature Communications, JTC or Journal of Controlled Release, and 1 as corresponding author in Clinical Cancer Research, all related to pediatric oncology. My work has been involved in the initiation of three clinical trials (NCT05650749, NCT03284268 and NCT03275818) and the filing of one patent (WO2023107898A1), currently being licensed by a startup where I will serve as co-founder and scientific advisor. I have been invited to speak at two international conferences and have received seven awards (four national and three international), including the prestigious Schweisguth Prize from the International Society of Pediatric Oncology (SIOP). Importantly, I have granted 5 competitive research projects as Principal Investigator (PI) from the Alex Lemonade Stand Foundation (ALSF; two different grants), the Kate Amato Foundation (KAF), the Penn RNA Institute at the University of Pennsylvania, and from The Foerderer Award at CHOP. My long term career goal is to become a group leader in the field of pediatric immunology and immunotherapy in Spain, aiming to provide novel and potentially curative therapies for children in urgent need.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática:

Biomedicina

Nombre:

PRIETO GARCIA, CRISTIAN

Referencia:

RYC2024-050670-I

Correo Electrónico:

cristian.prieto.garcia@gmail.com

Título:

From Proteostasis to Precision Medicine: Advancing Future Therapies

Resumen de la Memoria:

I am a young, enthusiastic interdisciplinary scientist focused on exploring molecular mechanisms underlying diseases. Since beginning my PhD in November 2015, I have explored novel therapeutic approaches with significant translational implications for health conditions, such as cancer and retinitis pigmentosa-driven vision loss. My key achievements include discovering new molecular mechanisms, advancing understanding of pathogenic biological processes, developing innovative models and technologies, and proposing novel therapeutic strategies for aggressive disease with relevant society implications, such as:

Retinitis pigmentosa (RP): We revealed how splicing dysregulation leads to proteotoxicity and vision loss, providing the first plausible mechanism for RP and identifying protein degradation systems as potential therapeutic targets for this incurable disease (Science 2024).

Cancer: We investigated how dysregulated protein homeostasis drives cancer. Key findings include USP28's role in ∆Np63-driven squamous tumors (Cells 2021) and lung cancer (Mol. Onc. 2022), its connections to metabolism (Mevalonate pathway; Cell Death Diff. 2023) and DNA repair (Fanconi Anemia pathway. Cell Death Diff. 2021), and the therapeutic potential of USP28 inhibitors (EMBO Mol. Med. 2020). Additionally, we identified IRGQ-mediated autophagy drives immune evasion in liver cancer (Cell 2024).

Cardiovascular diseases: We demonstrated that long non-coding RNAs regulate epigenetics (SWI/SNF function), proliferation, angiogenesis, and DNA repair in vascular endothelial cells (Nat. Commun. 2025; Cell Rep. 2022).

Infectious diseases: We identified FOS as a cytotoxic factor in Acinetobacter baumannii-infected cells, proposing FOS inhibitors as treatment for multidrug-resistant strains (Nat. Commun. 2024).

In my first-author paper (Science 2024), we introduced the novel concept of "proteotoxic splicing" demonstrating for the first time the pathogenic proteotoxicity (characterized by ER stress and protein aggregates) caused by the translation of mis-spliced RNA transcripts. This discovery provides a potential explanation for the cytotoxicity observed in splicing-related diseases, such as RP, and opens new pathophysiological mechanisms and therapeutic avenues. To differentiate my future research lines from my previous work, I aim to develop projects studying the importance of proteotoxic splicing beyond RP, and exploring proteotoxic splicing role in:

A) Cancer: My preliminary in vivo results show that proteotoxic splicing via USP39 inactivation has therapeutic potential in aggressive liver cancers. My goal is to develop novel drugs targeting proteotoxic splicing (e.g., USP39 PROTACs) to establish innovative cancer therapies

B) Neurodegenerative Diseases: I found that proteotoxic splicing in rat neurons and zebrafish triggers the formation of protein aggregates in neuronal tissue, suggesting a potential role of proteotoxic splicing in neurodegenerative diseases characterized by pathogenic protein aggregation. I plan to investigate this mechanism further, aiming to develop protein degradation modulators to delay disease onset and provide new insights into the origins of conditions like Alzheimer's and Parkinson's disease.

The development of the projects will have direct impact in the creation of novel therapeutic avenues for these aggressive diseases.

Resumen del Currículum Vitae:

Achievements:

Since 2020, I have published 15 papers (13 research articles, 1 review, 1 highlight) in Q1 journals (73.3% D1; 11/15 top 5%; IF mean=16), achieving an h-index of 8, i10-index of 7, and 222 citations. Highlights include five first-author publications including Science, EMBO Mol. Med., and Cell Death Diff., and contributions to Cell, Nat. Commun., and NAR, among others. My first-author Mol. Onc. paper was featured as a journal cover and 2022 research highlight. I am a corresponding author on a Cells article and have presented at +10 prestigious conferences, giving oral presentations at five international events (USA, Germany, France, Croatia). My awards include the 2024 Poster Award (46th Symposium Hormones & Cell Regulation) and the 2023 Young Investigator Award (AEK Cancer).

Internationalization:

With over a decade of international experience across six universities in four countries, I hold a Veterinary Medicine degree from Universidad de Córdoba, complemented by Erasmus-funded periods at Milan (academic) and King's College London (research; K. J. Liu's group). At King's, I completed postgraduate courses in regenerative medicine and stem cells (60 credits). My thesis for the UCM Master's in Biochemistry was conducted at CNIO (F.X. Real's group). During my PhD (Summa Cum Laude) in Biomedicine at Würzburg, I explored USP28's roles in cancer and DNA repair, developing novel genetically engineered lung cancer models. I was the first PhD student in Diefenbacher group and established the lab. Currently at Frankfurt University, I lead translational research in Dikić's lab, advancing projects on proteostasis, cancer, infectious diseases, and RNA biology, securing competitive funding.



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Leadership:

I lead international, multidisciplinary collaborations, exemplified by my Science paper involving 40 scientists across +20 global institutions. I independently initiated and executed this research line in Dikic lab, linking RNA splicing and proteostasis. The project was entirely conceptualized, planned, and led by me, including experimental design, collaborations, and funding. I wrote and defended the beLAB2122 proposal that secured €684.204 in competitive funding. This highlights my experience driving independent research programs and engaging international pharmaceutical companies, such as Genentech, Evotec and BMS, to collaborate with us. In addition, I participated in the writing and presentation of funding proposals such as TRR387, LOEWE-Zentrum-FCI, and SFB1361, demonstrating my ability to secure and manage competitive grants. Furthermore, I established (including design, animal licenses, and execution) mouse models for liver cancer (Cell) and infectious diseases (Nat. Commun.), featured in high-impact publications. I have mentored five PhD students, one Master's student, and several undergraduates, and taught biochemistry in Medicine, Biomedicine, and Dentistry degrees at two international universities. As a reviewer for journals like Oncogene (Q1) and an editorial board member (Frontiers in Oncology), I contribute to the academic community. I am a member of the RNA Society and CERFA and engage in science outreach events like and school talks. My work has been featured in national and international media (+20), including interviews in Diario Sur (cover), Canal Sur Radio, and local TV.



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Turno General

Área Temática: Biomedicina
Nombre: REQUENA MÉNDEZ, ANA
Referencia: RYC2024-049395-I
Correo Electrónico: ana.requena@isglobal.org
Título: Evaluating migrant health needs through big-data driven approaches and personalized medicine
Resumen de la Memoria:

My research in migrant health focuses on generating evidence for infection screening in migrant populations and designing innovative strategies to improve the healthcare for these groups. In this context, I have developed a decision support tool for screening that provide real-time recommendations to health professional about the conditions to screen for in migrants using a personalized approach based on the individual risk assessment. The tool has been tested in Catalonia and Andalusia to date. My current objective is to scale-up, validate and expand this tool in other health information systems, ultimately implementing it in routine care. To achieve this, I plan to develop an Application Programme Interface (API) that contains epidemiological data by country of origin for each disease. This structured approach will facilitate the future implementation of the tool across other health information systems.

A closely related goal is to develop personalized decision support tools aimed at improving the detection of rare imported diseases in migrants. Using a unique clinical research dataset from the Institute for primary care research Jordi Gol i Gurina, which contains a duplicate of the operating EPR system of PC in Catalonia, I will employ advanced statistical methods (i.e., machine learning), to create automated algorithms for predicting health conditions in at-risk migrants. These algorithms will also include relevant information extracted from unstructured clinical text using simple natural language processing techniques such as named entity recognition. The most effective algorithms will be integrated into a digital tool, and its feasibility, acceptability, and preliminary efficacy will be evaluated through a pilot intervention.

Another area of my research focused on developing multi-infection screening tests which include conditions prevalent in migrants. I have already designed and developed a multi-infection serological screening test based on Luminex technology, which cover 6 imported infections. The test was pilot-tested in a case-control study with promising results. I now plan to validate it further in a prospective multicentric study involving centres in Madrid, Stockholm, and Rome, as part of ongoing migrant screening programs. Additionally, I intend to incorporate other infections, such as malaria, into this multiple test. A current study at Karolinska Institutet is evaluating recombinant proteins associated with recent malaria exposure.

I am also working on improving data collection and surveillance related to vaccination and key diseases affecting migrants in the Middle East and North African region. I am developing an innovative digital tool to facilitate the monitoring of key migrant health indicators, enabling better assessment of health needs, gaps in service provision and health outcomes. The tool will support data collection, facilitate cross-country comparisons, and enhance service delivery and policy-making around migration and health. We plan to test the tool in other regions, such as South-East Asia, and compare its feasibility and sustainability with other tools used for migrant data collection.

Finally, I am deeply committed to promoting participatory research in science and plan to include a participatory research component across all my projects.

Resumen del Currículum Vitae:

I am Assistant Research Professor at the Barcelona Institute for Global Health (ISGlobal), where I lead the area of Migrant Health and I am the co-chair of the "Malaria and neglected parasitic diseases" programme. I am also the coordinator of the Science with Society hub in ISGlobal, and I am affiliated as senior researcher at Karolinska Institutet. I have a strong publication record, which includes 105 peer-reviewed articles, being priority author in 51, last author in 24, corresponding in 46. (Scopus (20/01/2025) Number of times cited 3,795; h-index: 31). I am or have been the PI of more than 11 competitive research projects, 6 tenders, three personal fellows and two fellows for my team (almost 3,7M € in total); all of them without the collaboration of my former supervisors. I completed the supervision of 3 PhD and 15 MSc students, and I am now supervising 8 PhD students at University of Barcelona(UB), 4 as main supervisor.

I have collaborated as consultant/advisor for the European Commission, and the International Organization for Migration) to enhance data collection and healthcare provided to migrants in North African countries and in Europe. I have also been advisor of European Centre for Diseases Prevention & Control in two occasions for the development of screening guidelines to migrant and I have been in the Technical Advisory group to develop e-material for WHO.

I am often invited as speaker in International Conferences to present the results of my research.

In 2019, I moved to Sweden with an International visiting researcher grant (funded by the Swedish government- FORTE) to work at the department of Global Public Health at Karolinska institute (KI) and in 2020, moved to the department of Medicine-Solna (Infectious diseases research group) of KI where I led 2 competitive research projects aimed to develop personalized automated algorithms that predict the risk of infections in immunosuppressed migrants using electronic health records through advance statistical methods (i.e., machine learning).

I went back to Spain at ISGlobal funded by La Caixa Junior leadership fellowship where I am establishing my own research team (Migrant Health Research group), currently composed by 11 members based on Barcelona and 6 additional PhDs affiliated to the group through the MHPC project but based on Morocco, Tunisia and Egypt.

In 2022, I became the coordinator of the Barcelona Caixa Research Living Lab that has allowed as to create the Science with society hub in ISGlobal aimed to promote participatory research in health in Barcelona.

I have continuously developed my teaching skills, involved in several courses at KI and other prestigious universities such as the LSHTM and University of Barcelona. At KI, I was the director of the course Applied Epidemiology 1, a 5 ECTS course of the MSc programme in Public Health, (2019-2023). I have produced different teaching materials for lectures and seminars.

Since 2022, I am the co-PI of a research group (PI: Prof Gascon) of the network CIBERINFEC, in the program of Global Health, emerging and re-emerging diseases.



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From 2022-2024, I was in the executive committee of study group on infections in migrant travellers of the European Society of Clinical Microbiology and Infectious Diseases.

I have been reviewer for high impact journals (The Lancet, BMJ, Clin Infect Dis, Clin Microbiol Infect) among others.



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Turno General

Área Temática: Biomedicina
Nombre: RAMIREZ VILLEGAS, JUAN FELIPE
Referencia: RYC2024-050020-I
Correo Electrónico: jramirez@ist.ac.at
Título: Subcortical neural circuit mechanisms of learning and memory

Resumen de la Memoria:

With pioneering research in brainstem neurophysiology and 15 years of experience in neuroscience (380 citations; H-index: 8), my work aims to elucidate the functional role of brainstem and thalamic neural activities and their system-level interactions with hippocampal and cortical circuits in the formation and maintenance of memory.

During my early career, I developed automated methods for predicting cardiovascular risk and detecting early cancer signs by studying signals from medical electrophysiology and imaging. This work, supported by an Intramural Young Investigator Grant, led to novel mathematical models that advanced our understanding of population-level primary visual cortical dynamics. In 2011, I joined the Max Planck Institute for Biological Cybernetics in Germany as a PhD fellow, funded by a competitive Max Planck Society Fellowship. Under the mentorship of Prof. Nikos K. Logothetis, I pioneered the use of neural-event-triggered fMRI (NET-fMRI) to study neural circuits associated with memory formation. My work advanced techniques to identify sharp wave-ripple (SWR) subtypes, concurrent mapping of whole-brain activity, and biophysical modelling, providing key insights into the ontogeny and mechanisms of SWRs and pontogeniculooccipital (PGO) waves. As a postdoctoral fellow at the Institute of Science and Technology Austria (ISTA), under Prof. Jozsef Csicsvari, I expanded on these findings by demonstrating how brainstem circuits influence hippocampal neural activity. Supported by competitive fellowships, including the Marie Skłodowska-Curie Postdoctoral Fellowship, I established a research program that is now producing a manuscript suitable for a high-impact journal such as Nature.

My international collaborations with the Human Brain Research Laboratory at the University of Iowa and the Krembil Brain Institute in Canada, granted me a NARSAD Young Investigator Grant as Principal Investigator. We utilized human intracranial and intracortical recordings to investigate brainstem control of arousal and its interaction with markers of mnemonic processing. This research, for which I was co-first and co-corresponding author, has yielded significant findings on how brainstem-related autonomic modulation may shape memory consolidation.

My future research program will investigate memory representation in brainstem and anterior thalamic nuclei, along with the causal role of brainstem activity in mnemonic processing, in both rodents and humans. This research will provide insights into system-level brainstem functions, identifying preventive targets to ameliorate stress- and memory-related pathologies.

With a proven track record of impactful research, leadership in mentoring students at all levels, and success in securing competitive funding, I am well-positioned to transition into an independent research role. I am committed to advancing our understanding of fundamental neuroscience questions, fostering local and international collaborations, and mentoring the next generation of scientists.

Resumen del Currículum Vitae:

The mission of my research is to uncover systems-level neural mechanisms underlying cognitive processes, with a focus on the formation and maintenance of memory. My work investigates how coordinated activity between brainstem circuits and the hippocampus drives memory-related processes. I have characterized patterns of high neural synchrony associated with memory formation, mapping their influence on brain regions, behavioral outputs, and memory retention.

As a pioneer in brainstem neurophysiology, I combine theoretical and experimental systems neuroscience approaches. My expertise is reflected in publications in top-tier journals such as Nature, Neuron, and PNAS, showcasing multi-structure in vivo electrophysiology experiments, advanced data analysis, and modeling to establish the physiological roles of specific neural activities. Over the past decade, I have supervised master's, MD, and PhD students in systems and computational neuroscience, and have had extensive teaching experience.

During my PhD at the Max Planck Institute for Biological Cybernetics, funded by a competitive fellowship from the Max Planck Society, I explored the dynamics of neural ensembles of distinct brain structures, leveraging pioneering technology permitting concurrent extracellular recordings and functional MRI in non-human primates. A seminal finding revealed how pontogeniculooccipital (PGO) waves influence hippocampal theta and sharp wave-ripples during sleep, events critical for memory consolidation and synaptic homeostasis. I also advanced biophysical models of brainstem and hippocampal neural circuits, uncovering mechanisms of sleep-related memory reactivation and cortical plasticity. These discoveries form the foundation of my long-term goal to establish a subfield in neuroscience exploring system-level brainstem interactions in mnemonic processing.

As a postdoctoral researcher at ISTA under Prof. Jozsef Csicsvari, I investigated the relationship between brainstem and hippocampal neural activities and their role in memory formation. Supported by competitive fellowships, including an ISTplus Fellowship for Exceptional Researchers and a Marie Skłodowska-Curie Postdoctoral Fellowship, I developed novel techniques for chronic recordings in rodents, targeting brainstem and thalamic nuclei alongside hippocampal and cortical regions, combined with optogenetics of deep brain targets. I established international collaborations with the Human Brain Research Laboratory at the University of Iowa and the Krembil Brain Institute, funded by a NARSAD Grant as Principal Investigator. These studies used human intracranial and intracortical recordings to reveal how brainstem control of autonomic tone interacts with markers of mnemonic processing, offering therapeutic insights for anxiety and stress disorders.



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Turno General

My expertise covers the core approaches of systems neuroscience research, including in vivo electrophysiology, imaging, optogenetics, and advanced data analysis. This extensive expertise in neuroscience and experience with diverse animal models ensure my research is both feasible and innovative, with strong potential for groundbreaking discoveries. Fittingly, my track record, leadership, international collaborations, and success in securing third-party funding fully support my transition to an independent research position.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Biomedicina
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Título: Developing next-generation cancer immunotherapies

Resumen de la Memoria:

I have developed a robust research career spanning three institutions, including two national and one international laboratories, achieving significant scientific outcomes and fostering impactful collaborations. Since the beginning of my career, I have focused on developing gene- and cell-based therapies for cancer, leveraging the immune system's potential to fight malignancies.

During my Master's and PhD studies in Dr. Alemany's lab at ICO-IDIBELL (Barcelona, Spain), supported by a PFIS PhD Fellowship (Instituto de Salud Carlos III), my research centered on engineering oncolytic adenoviruses with enhanced tumor specificity, intratumoral dissemination, and immune response activation. This work resulted in five original research articles (two as first author) and earned me the Extraordinary Doctoral Award.

In 2015, I transitioned to Dr. Powell's lab at the University of Pennsylvania (Philadelphia, USA), where I pursued postdoctoral training in CAR-T cell therapies, a field pioneered at this institution with the development of the first FDA-approved CAR-T treatment. Leading two major projects, I secured competitive funding as principal investigator through grants from the Ovarian Cancer Research Alliance and the Sandy Rollman Ovarian Cancer Foundation. These projects explored novel CAR-T targets for gynecologic malignancies and developed CAR-T therapies targeting tumor-associated macrophages to overcome the immunosuppressive tumor microenvironment. This phase of my career resulted in 12 publications, including two main-author research articles, two first-author reviews, and a patent.

Since 2020, I have been part of Dr. Guedan's lab at IDIBAPS (Barcelona, Spain), where I was awarded the prestigious "Investigador AECC 2022" grant from the Spanish Association Against Cancer. My work has focused on advancing CAR-T cell therapies by addressing critical challenges such as overcoming T cell suppression within the tumor microenvironment (TME) and countering tumor escape through antigen loss. This includes investigating how CAR affinity influences sensitivity to PD-1/PD-L1-mediated T cell suppression and contributing to the preclinical development of ARI0003, a dual CAR targeting both CD19 and BCMA. My work here has produced two original research articles (one as co-first and co-corresponding author), a review, and a book chapter. I have also contributed to international collaborations and I am leading an industry partnership to explore DNA-LNP as a therapeutic strategy in preclinical models of hepatocellular carcinoma.

This trajectory demonstrates my capacity to lead innovative research and advance scientific discovery across diverse fields and institutions. Moving forward, my research will focus on translating preclinical findings into clinical candidates to enhance CAR-T therapies for solid tumors, overcoming immunosuppression and addressing challenges posed by the tumor microenvironment.

Resumen del Currículum Vitae:

Since 2009, I have focused on developing gene- and cell-based therapies for cancer treatment. After completing my Biotechnology degree at the Autonomous University of Barcelona, I joined Dr. Ramon Alemany's group at the Bellvitge Biomedical Research Institute (IDIBELL) for my PhD studies. During this time, I developed a novel oncolytic adenovirus, VCN-01, which combines a tumor-targeting capsid modification with the expression of a matrix-degrading enzyme. This work led to a well-cited publication in the field of oncolytic virotherapy (Rodriguez-Garcia, Clin Cancer Res, 2015) and the clinical evaluation of VCN-01 in five phase 1 (NCT03799744, NCT02045602, NCT02045589, NCT03284268, NCT05057715) and one phase 2b trial (NCT05673811). After completing my doctorate in 2015, I joined Dr. Daniel Powell's research group at the University of Pennsylvania as a postdoctoral fellow. There, I contributed to the development of CAR-T cell therapies for solid tumors, focusing on identifying novel tumor-specific antigens (Rodriguez-Garcia, Mol Ther, 2019) and reprogramming the tumor microenvironment by targeting immunosuppressive tumor-associated macrophages (Rodriguez-Garcia, Nat Commun, 2021). The latter work, which received numerous citations, was awarded second prize in the SETGyC "Paper of the Year 2020-2021" contest. In 2020, I joined Dr. Sonia Guedan's laboratory at the August Pi Sunyer Biomedical Research Institute (IDIBAPS) as a senior postdoc to continue my research on CAR-T therapies for solid tumors. Since then, I have co-authored two original research articles, including one as co-first and co-corresponding author, investigating how CAR affinity impacts sensitivity to PD-1/PD-L1-mediated inhibition (Andreu-Saumell*, Rodríguez-Garcia*, Nat Commun 2024). Throughout my career, I have also co-authored three review articles (two as first author), two book chapters, and I am an inventor on a CAR-T therapy patent (PCT/US2020/028073). I have co-directed two master's theses and currently co-supervise three PhD students. Additionally, I have been invited to review articles for journals, evaluate grant applications, and teach master's classes. I have presented my research 13 times, including one invited talk, eight oral presentations, and four posters at national and international conferences (including ESGCT, ASGCT, SETGyC, SITC and ESMO IO), earning four awards for travel or best presentations. I have secured two principal investigator grants (Stand Up to Cancer Ovarian Cancer Dream Team Grant by the SROCF and the Ann and Sol Schreiber Mentored Investigator Award by the OCRA) and currently hold an "Investigador AECC 2022" grant. Furthermore, I contribute as a team member to several national and international projects, including collaborations with industry. With more than 15 years of research experience, I have mastered a broad range of techniques, including molecular biology, virology, cell culture, immunological assays, and mouse models. I am a highly organized and scientifically rigorous researcher with strong team skills, positioning me to become a productive independent principal investigator in cancer immunotherapy. Total publications (original research articles and reviews): 20; publications as first author: 7; publications as corresponding author: 1; publications in D1: 14 (70%); publications in Q1: 20 (100%); total citations: 878; h-index: 14. Search performed on January 13th, 2025 (Scopus, JCR 2023).



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Turno General

Área Temática: Biomedicina
Nombre: FOLGUEIRA COBOS, CINTIA
Referencia: RYC2024-050343-I
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Título: Central nervous system and peripheral metabolism
Resumen de la Memoria:

I initiated my research career between the groups of Rubén Nogueiras, Luisa M Seoane and Felipe Casanueva in Santiago de Compostela. In 2018, I completed my PhD in Endocrinology at the University of Santiago de Compostela, obtaining the extraordinary doctorate award and the award for the best thesis in Endocrinology by the Fundación de la Sociedad Española de Endocrinología y Nutrición (FSEEN). I was focused on the study of new hypothalamic signals involved in the regulation of energy homeostasis through the central nervous system and its implications in metabolic disorders. As the first author, my research was published in high-impact journals such as Diabetes (2016), Nature Communications (2018), Scientific Reports (2018), Neuroendocrinology (2020) and Nature Metabolism (2018 and 2022). My scientific expertise and my scientific contributions have been recognized by different awards, including the Prize for the best article published in obesity and metabolic syndrome awarded by the FSEEN, Prize for Poster Communication EMBO Workshop organ crosstalk in energy and metabolic disease and Honorary mention Investigation Award 2019-2020 Fundación Dr. Antoni Esteve for the best pharmacologic publication. In 2020 I joined CNIC under the supervision of Dr. Guadalupe Sabio obtaining a Juan de la Cierva-formation fellowship. Subsequently, I obtained a Sara Borrell fellowship, leading me to reject the previous grant. My ongoing research at CNIC explores the role of stress kinases in controlling central and peripheral metabolism. I secured funding to lead six projects as a principal investigator from prestigious organizations, including the European Association for the Study of Obesity (EASO), European Foundation for the Study of Diabetes (EFSD), IBSA foundation, the Society for Endocrinology and the FSEEN. In addition to my research, I actively contribute to mentoring and supervision of undergraduate students, including co-directing two Ph.D. thesis, mentoring Cicerone at CNIC, TFM and TFG students as well as AECC summer internships.

Since starting my postdoctoral stage, I've made significant contributions, serving as the second author for publications in PNAS (2020), Metabolism (2022), Redox Biology (2023), Nature Communications (2022 and 2024). Notably, I achieved success as the corresponding author for an article in Nutrients (2024) and co-corresponding author in papers published in Science Advances, Acta Physiologica in 2024 and in Nature Metabolism (2025). In 2022, I received the 'Best Career Young Scientist Under 35' award, the Young Endocrinologist Research Award from FSEEN, as well as recognition as a Rising Star from the Society for Obesity (SEEDO 2022) and EFSD in 2024, Young Investigator award from EFSD/Lilly in 2022 and the New Investigator Award in Basic Science from EASO-NOVO NORDISK in 2023. All these achievements have enabled me to receive a Miguel Servet in the latest call, which I will start at the Instituto de Investigación Sanitaria de Santiago de Compostela (IDIS). In summary, I have a proven track record in biomedical research and health sciences, demonstrating leadership, enthusiasm, and a commitment to addressing the challenges of obesity and metabolic diseases, with a specific focus on the central nervous system and peripheral metabolism as primary aspects of my research career.

Resumen del Currículum Vitae:

I obtained the B. Sc. in Biology Degree at the University of Santiago de Compostela (USC), where I started in 2014 my scientific carrier thanks to the IDIS predoctoral scholarship in the framework of collaboration between research groups of the Health Research Institute of Santiago de Compostela (IDIS). The project that I developed under the supervision of Rubén Nogueiras, Luisa M Seoane and Felipe Casanueva, was defended in 2018, and focused on the study of new hypothalamic signals involved in the regulation of energy homeostasis and its implications in metabolic disorders. I published 11 articles as first author in the following journals, highlighting: Diabetes (2016, IF:8.68), Nature Communications (2018, IF: 12.35), Scientific Reports (2018, IF:4.01), Neuroendocrinology (2020, IF:6.8), 2 Nature Metabolism (2019 and 2022, IF:19.86). Additionally, I was honored with the extraordinary doctorate award (2019) and the award for the best thesis in Endocrinology by the Fundación de la Sociedad Española de Endocrinología y Nutrición (FSEEN). In 2020 I moved to Madrid to join the Spanish National Center for Cardiovascular Research ISCIII (CNIC) under the supervision of Dr Guadalupe Sabio. I obtained a Juan de la Cierva-formation fellowship, but I declined this grant when I got a Sara Borrell fellowship Instituto de Salud Carlos III that allowed me to continue my research career studying the role of stress kinases in the control of central and peripheral metabolism. During my postdoc, I contributed as the second author to publications in PNAS (2020), Metabolism (2022), Redox Biology (2023), Molecular Metabolism, BBA Molecular Basis of Disease and Nature Communications (2024). In addition, I am the corresponding author of publications in Nutrients (IF:5.9), Science Advances (IF:11.7), Acta Physiologica (IF:5.6) in 2024 and Nature Communications (IF:14.7) in 2025.

In terms of capacity of funding, during the last years I have obtained funding as principal investigator of 6 projects supported by: the European Association for the Study of Obesity (EASO) (2023-2024), IBSA Foundation (2023-2025), European Foundation for the Study of Diabetes (EFSD) (2022-2024) and (2024-2025), the Society for Endocrinology (2022-2024), and FSEEN (2022-2023). In total, I obtained 170.136,66 euros for the period (2022-2024). I have recently been selected for a Miguel Servet contract from the Instituto de Salud Carlos III, which I will carry out at the IDIS starting in March 2025.

I actively engaged in various scientific dissemination activities, participated in national and international meetings with oral or poster presentations, and served as an invited speaker at events such as the 46th FEBS Congress in 2022 and the 37th Congress of SGENM in 2024. Moreover, I have supervised 2 TFG and 5 TFM students, and I am currently co-supervising two PhD students. In summary, I have authored 42 original articles, 4 as the corresponding author with an h-index of 20 and over 1087 citations, 900 excluding self-citations. My contributions have been recognized with prestigious national and international awards, including the AMIT-Gal 2021 prize for the best young scientist under 35 years old, the Rising Star award from the SEEDO 2022 and EASD in 2024, the Young Investigator award from EFSD in 2022, and the New Investigator Award in Basic Science from EASO-NOVO NORDISK in 2023.



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Turno General

Área Temática: Biomedicina
Nombre: MOYA GARZON, MARIA DE LOS DOLORES
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Título: Molecular dissection of signaling pathways of diet in health and disease

Resumen de la Memoria:

I am a multidisciplinary biological chemist with extensive expertise in medicinal chemistry, chemical biology and molecular metabolism. During my PhD at the University of Granada (Spain), I worked on the discovery of novel drugs for the treatment of Primary Hyperoxaluria type 1 (PH1). As a result, I unveiled the capacity of salicylic acid derivatives of acting as glycolate oxidase inhibitors and efficient agents against PH1 able to decrease oxalate in hyperoxaluric mouse hepatocytes. I also developed novel double glycolate oxidase-lactate dehydrogenase inhibitors as a novel approach for the treatment of PH1.

After completing my PhD, I looked for new challenges to expand my scientific knowledge and skillset and this led me to start my postdoctoral training in Dr. Jonathan Long's lab (Stanford University) in 2020, where I have worked on the dissection of novel signaling pathways that control energy homeostasis.

In the Long lab, I have made significant advances towards the understanding of the beneficial effects of ketosis on energy balance. In these studies, I have uncovered a shunt pathway of the ketone body beta-hydroxybutyrate (BHB) that generates a novel family of ketone metabolites called BHB-amino acids. I have identified CNBP2 as the enzyme mediating the enzymatic conjugation of BHB with free amino acids to produce BHB-amino acids, which are endogenously present in mouse and human plasma and exhibit ketosis inducibility and genetic regulation. BHB-Phe, which is the most abundant BHB-amino acid, suppresses feeding and obesity and activates hypothalamic and brainstem neurons implicated in feeding behaviors. Conversely, CNBP2-KO mice exhibit increased food intake and body weight following ketogenic diet or exogenous ketone ester administration. Altogether, these data establish a BHB shunt pathway linked to energy balance. These findings could lead to development of new therapeutics that target ketosis for obesity, type 2 diabetes, and metabolic diseases. This work was recently published at Cell.

My work on ketone metabolism has made me broadly interested in dissecting the pathways that mediate the effects of diet and nutrients on human health and disease. Diet is our main source of nutrients, and there is accumulated evidence supporting that the type and amount of food that we eat has a profound influence in health and disease progression. Despite the well-known impact of diet on overall health, our understanding of the molecular mechanisms underlying the effects of diet on human health and disease remains limited, and rigorous research is needed to address this knowledge gap as a way to progress towards precision nutrition.

Building on the BHB-amino acids discovery, I have carefully designed a 5-year research plan that aims to interrogate the physiological regulators of BHB-amino acids (Research direction 1), as well as the biological activity of these novel ketone metabolites in other physiological contexts where either BHB or ketosis have been proposed to have a beneficial effect (Research direction 2). Beyond ketosis and BHB-amino acids, I will expand my research focus to broadly investigate novel pathways and metabolites that drive the effects of diet and nutrition in health and disease (Research direction 3), with the ultimate aim of translating these findings to improve human health and advance towards precision nutrition.

Resumen del Currículum Vitae:

I am a postdoc at Stanford University in Dr. Jonathan Z. Long's lab working on the chemical dissection of nutrition with the aim of developing novel therapeutic strategies against obesity and metabolic disease. I am a multidisciplinary biological chemist with extensive expertise in medicinal chemistry, chemical biology and molecular metabolism. I earned my BSc in Pharmacy (2013) and MSc in Biotechnology (2014) from the University of Granada (Spain) and completed my PhD *cum laude* (2019) in Pharmacy at the same University under the supervision of Dr. Monica Diaz-Gavilan, supported by the FPU fellowship. During my PhD I worked on the development of novel glycolate oxidase (GO) inhibitors as a strategy for the treatment of Primary Hyperoxaluria type 1 (PH1), an inborn error of glyoxylate metabolism. My PhD work demonstrated the capacity of salicylic acid derivatives of acting as GO inhibitors and efficient agents lowering oxalate in PH1, and I also developed novel double GO/LDH inhibitors as a novel dual-target approach for PH1. My work on PH1 led a patent application and to the publication of 3 first author papers. During my PhD, I also received funding to perform research stays at other prestigious Universities, where I expanded my skills on chemoproteomic profiling (Leiden University, The Netherlands) and on protein biochemistry and murine models (La Laguna University, Spain). Following a brief postdoctoral position at the University of Granada supported by the "Contrato Puente" fellowship, I transitioned into a postdoctoral position in mammalian energy metabolism at Dr. Jonathan Long's lab at Stanford University. During my postdoc, I have uncovered a novel shunt pathway of beta-hydroxybutyrate (BHB) metabolism implicated in energy balance. By combining metabolomics, biochemical studies and mouse experiments, I have discovered a novel class of ketone metabolites called BHB-amino acids. BHB-amino acids are synthesized via CNBP2-dependent enzymatic conjugation of BHB and free amino acids and are bioactive metabolites that suppress feeding and obesity in mice. The outcome of this research has been a first author paper in Cell and a patent application (licensed). This groundbreaking discovery has laid the foundation for fostering productive collaborations and securing approximately \$1 million in funding for the Long lab and collaborators. My postdoctoral training in the Long lab has been funded by the Fundacion Alfonso Martin Escudero and the Wu Tsai Human Performance Alliance postdoctoral fellowships. Besides my work on ketones, I have contributed to collaborative projects on metabolic pathways regulating cell and organ crosstalk, with a particular emphasis on energy metabolism, resulting in six co-authorships. I have presented my research at multiple conferences, taught 220 hours of Organic Chemistry and Medicinal Chemistry classes, and mentored several undergrad and graduate students. My areas of research include metabolism, diet, metabolic disease, and age-associated chronic disease. My technical expertise includes metabolomics, murine models, molecular biology, enzymology, cell culture and medicinal chemistry. My research approach focuses on addressing a critical question: de-orphanize novel pathways and metabolites regulated by diet to provide a deeper molecular understanding of effects of diet on human health.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Biomedicina
Nombre: LABIANO ALMIÑANA, SARA
Referencia: RYC2024-050746-I
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Título: Immunotherapy for adult and pediatric tumors

Resumen de la Memoria:

My research career has always been linked to immunotherapy of cancer. First, focused on adult tumors during my PhD (CIMA-University of Navarra, Pamplona) and first postdoc (University of Lausanne, Switzerland), and second on pediatric patients as a research collaborator (Clinica Universidad de Navarra, Pamplona) and in my current position as a group leader at Center for Applied Medical Research (Pamplona). I have participated in 37 publications (5 as first or co-first author), including a manuscript published in the prestigious New England Journal of Medicine as a second author. My research has more than 2500 citations and an H index of 23. I have attended 14 national and international congresses (SITC, AACR, ISPN, SEOR, ECI,) where I presented my work (3 selected oral presentations and one invitation). I received several national and international fellowships/awards (SITC Young Investigator award, School of Sciences UNAV for the best thesis, LAIR Foundation for the best thesis in Immunotherapy, and FPI fellowship from the Spanish Ministry of Science). I also developed three patents, and I participated in two clinical trials and two contracts with the pharmaceutical industry (Roche and AstraZeneca, this last one as a co-PI). I supervise two PhD students; one was awarded the 1st prize in the XX Certamen Arquímedes (best Master Thesis supervision) by the Spanish Ministry of Universities in 2023. I am the coordinator of the Radiobiomedicine area at the Cancer Center University of Navarra (CCUN) and I have been involved in 14 research projects, being the coordinator of a work package from a strategic project (funded by Navarra's government), and the Principal Investigator in 4 of them (PCI MSCA Modality from the Spanish Ministry of Science, Alicia Koplowitz, Blanca Morell Foundations and CRIS Cancer Foundation). Since 2024, I have been an independent researcher in pediatric immuno-oncology at CIMA-UNAV, where I started the Radioimmunotherapeutic Strategies for Pediatric Tumors group to develop effective and safe alternatives for children suffering from brain tumors.

Resumen del Currículum Vitae:

I obtained my PhD in 2016 from the Department of Immunology and Immunotherapy at CIMA, under Prof. Melero, a pioneer in cancer immunotherapy in Spain. My research, funded by an FPI grant, focused on T cell receptor CD137 and revealed a novel tumor immune-escape mechanism due to hypoxia, resulting in four first-author publications and multiple awards, including the Extraordinary Award for the best thesis from the University of Navarra. In 2017, I began a postdoc in the Translational Tumor Immunology Group at the University of Lausanne, supervised by Prof. Romero. I led a project with Roche studying the effects of radiotherapy combined with a bispecific CD40 antibody in head and neck cancer, which resulted in a publication, a patent, and the initiation of a phase I clinical trial.

From 2020 to 2024, I worked as a senior postdoc in the laboratory of Advanced Therapies for Pediatric Solid Tumors (CUN, Pamplona) led by Dr. Marta Alonso. The lack of research in immunotherapy in pediatric neurooncology prompted me to apply my expertise, especially in CD137 and CD40, in developing new therapeutic strategies in the field. Thanks to the Proyectos de Colaboración Internacional (Marie Curie Modality, MCIU, PCI2021-122084-2B), I was able to study the efficacy of an oncolytic adenovirus with the targeting of the CD40 receptor in pediatric brain tumor models. I hope the results will be published soon, as we are addressing the reviewers' comments for our submission to Cell Reports Medicine. In Alonso's lab, I also participated in several projects in which I led the study of the anti-tumor immune response to immunovirotherapy, resulting in ten original papers and a patent for using the Delta-24-ACT virus as a therapeutic platform.

Securing funding for two research projects (in which I supervise two PhD students) from the Alicia Koplowitz and Blanca Morell Foundations empowered me to establish my own research lines in pediatric neuro-oncology. In the first one, we study the neurocognitive effects of brain radiotherapy. We have protected our results with a patent, and we are currently working on the manuscript. In the second project, we study the tumor microenvironment of spinal cord diffuse midline glioma using state-of-the-art techniques. In September 2024, after being funded by the CRIS Cancer Foundation with the "Emerging Leader program", I began my role as a group leader at CIMA. I aim to integrate the knowledge I have gained in tumor immunology, radiotherapy, pediatric oncology, and neuroscience in my newly established laboratory. Thus, we study the immune response to radiotherapy, the standard treatment for pediatric brain tumors, to develop effective radio-immunotherapeutic strategies for these children while minimizing cognitive side effects. We are also committed to developing neuroprotective approaches that will help ensure their quality of life.

I coordinate the Radiobiomedicine area at CCUN and have served on four PhD thesis committees as well as the grant review committee for the 2024 ASEICA fellowship for early PIs in Spain. Additionally, I participate in the Women for Science mentoring program at UNAV, along with various outreach activities with patient advocates, such as those organized by the Blanca Morell Foundation.



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Turno General

Área Temática:

Biomedicina

Nombre:

CASANOVA SALAS, IRENE

Referencia:

RYC2024-049563-I

Correo Electrónico:

icasanova@vhio.net

Título:

Extracellular vesicle-based liquid biopsy: a tool to decipher tumor evolution and therapy resistance

Resumen de la Memoria:

Since the beginning of my career, I decided to pursue my research in Prostate Cancer genomics, always keeping a bench-to-bedside perspective. My PhD studies were focused in studying biomarkers, both in tissue and in urine. And later on, this interest in biomarkers and cancer progression made me dive into the genomics driving advanced prostate cancer evolution. Driven by the motivation to translate these research efforts into a real and actionable impact in cancer care, I decided to join VHIO, a comprehensive cancer center with a clear bedside-to-bench - and back to bedside mission. In here, my research focus has continued towards pioneering new liquid biopsy tools, leveraging circulating extracellular vesicles from patient blood as a unique and novel approach for genomic and transcriptomic tumor interrogation.

Understanding the underlying mechanisms of therapy resistance and heterogeneity within metastatic prostate cancer (mPC) is crucial for developing effective treatment strategies. Traditional biopsy methods for studying drug resistance are limited by their invasiveness and inability to capture the dynamic changes occurring over time. Moreover, single-biopsy analyses may not fully represent the complexity of tumor evolution. Liquid biopsies offer a promising alternative for non-invasive monitoring of tumor dynamics, yet their utility in capturing tumor transcriptomics has been hindered by the rapid degradation of RNA in circulation.

Over the past years, I generated data demonstrating the potential of tumor-derived extracellular vesicles (EVs) to interrogate tumor genomics and transcriptomics in liquid biopsy. Building upon this foundation, I propose to investigate the utility of integrative genomic and transcriptomic profiling of liquid biopsies to uncover intra-tumor heterogeneity and therapeutic adaptation in mPC by implementing this novel EV-profiling assay in larger clinical cohorts and preclinical models. Additionally, cancer progression and drug resistance are driven not only by tumor-intrinsic factors but also by complex interactions between tumor cells and their evolving microenvironment. Understanding the longitudinal co-evolution of tumors and their microenvironment is critical for developing personalized therapeutic strategies, including optimizing immunotherapeutic approaches. For this reason, I propose to understand tumor-intrinsic pathways and the activation status of tumor-extrinsic factors, including the tumor stroma and immune ecosystem. In particular, I will: identify tumor-specific EV-RNA alterations associated with therapy response and disease progression; characterize the impact of ecosystem-derived EVs on tumor evolution and therapy outcomes; and develop a comprehensive tool to deconvolute tumor-intrinsic and extrinsic transcriptomic changes in EV-RNA.

This approach intends to provide a deeper understanding of the adaptive responses of both tumors and their ecosystems to treatments, ultimately guiding more effective and personalized therapeutic strategies. I hypothesize that profiling of circulating tumor EVs, would help us understand mPC evolution under therapy and allow pre-targeting of resistant clones. Through this integrative approach, I seek to advance our understanding of mPC biology and drug resistance mechanisms, ultimately paving the way for personalized medicine and improved patient outcomes.

Resumen del Currículum Vitae:

As a biomedical scientist, my career has been dedicated to advancing the genomics of prostate cancer (PC). After completing my undergraduate studies in Biotechnology, I pursued a PhD investigating the prognostic value of microRNAs in PC. This work was carried out at the Valencian Oncology Institute (IVO) under the mentorship of Prof. López-Guerrero. My research identified miRNAs with significant potential for improving the diagnosis and prognosis of PC. During my PhD, I expanded my expertise by visiting two internationally renowned laboratories: Dr. David Lyden and Dr. Hector Peinado's lab at Weill Cornell Medical College in New York, and Dr. Katia Scotlandi's lab at the Rizzoli Institute in Bologna, Italy. These experiences enriched my technical skills, introduced me to exosome biology, and fostered valuable international collaborations. As a consequence, I co-authored 3 publications, 2 with Scotlandi's group and 1 study investigating exosome involvement in brain metastasis.

After finishing my PhD, which was funded from the Institute of Health Carlos III and the European Commission H2020, I continue to work on PC genomics. I joined Prof. Trotman's lab at Cold Spring Harbor Laboratory (CSHL), where I further developed my expertise in genomic analysis and gained experience with the RapidCaP mouse model. During my postdoc, I received the Early Investigator Research Award from the US Department of Defense and conducted research on the genomic evolution of PC, particularly the mitochondrial changes that occur during metastasis. I also contributed to identifying therapeutic vulnerabilities, targeting mitochondrial dysfunction as a promising approach.

My transition to VHIO in Barcelona as a senior postdoc was supported by the La Caixa Junior Leader Fellowship. At VHIO, I developed novel tools for genomic and transcriptomic stratification of metastatic PC using liquid biopsy. My work focused on profiling DNA and RNA from circulating tumor extracellular vesicles, leading to two major discoveries: the tumor DNA fraction in EVs from metastatic PC plasma can predict progression risk, and transcriptomic profiling of EV-RNA reveals patient response and resistance to treatment. These transformative findings culminated in a publication in Cancer Cell, where I served as the lead author.

Throughout my career, I have demonstrated autonomy, initiative, and leadership. I have independently designed and executed innovative scientific projects, resulting in 27 peer-reviewed publications (7 as first author). I have successfully obtained national and international funding, mentored numerous students (3 Master's, 1 undergraduate and 2 PhD students) and supervised staff personnel (3 technicians and 2 bioinformaticians). I have actively contributed to scientific organizations (EACR, AACR, ASEICA, and ESMO), presented my research at national and international conferences, and fostered new collaborations. Additionally, I have been engaged in dissemination and public outreach activities.

Looking ahead, my goal is to continue developing liquid biopsy-based tools and integrate them into clinical trials. By collaborating with a multidisciplinary team of molecular biologists, bioinformaticians, and oncologists, I am eager to translate my findings into clinical applications, ultimately improving patient care and treatment outcomes in PC.



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Turno General

Área Temática: Biomedicina
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Título: Open source AI/ML for drug discovery in global health

Resumen de la Memoria:

Miquel's scientific trajectory has followed the principles of open science and the drive to create a more egalitarian scientific research ecosystem, offering better opportunities for researchers conducting studies in and for the Global South. This endeavor has involved developing and implementing AI/ML-based computational pharmacology tools, initially in a generalist context and later with a more focused scope on infectious disease research.

The work of Miquel's PhD thesis at IRB Barcelona (UPF Extraordinary Award), primarily aimed at integrating chemistry and biology data into a unified framework, culminated in the Chemical Checker (CC) resource. The CC provides an unprecedented amount of small molecule bioactivity data in an amenable format for AI/ML applications, consisting of information-rich "signatures" that capture the properties of the compounds, ranging from physicochemical characteristics to clinical information. The CC has led to numerous follow-up publications, expanding the original scope to include uncharacterized compounds and exploring use-case applications in areas such as cancer pharmacogenomics screening and Alzheimer's disease transcriptomics. In a DREAM Challenge competition related to kinase drug screening, the CC was a winning team. Based on the CC framework, Miquel co-supervised the development of the Bioteque, which aims to integrate gene and cell-based data into an ultra-large biomedical knowledge graph.

Concurrently, Miquel developed an interest in medical informatics within the context of African research centers. After research visits in Sub-Saharan Africa (ISGlobal-CISM and CIDRZ), he co-founded the Ersilia Open Source Initiative, following the highest standards of collaborative open science. Through Ersilia, Miquel has established a network of collaborators across Africa, working together to build research capacity for AI/ML-assisted drug discovery on the continent. Key collaborators include H3D (South Africa) and UB-CeDD (Cameroon), with whom Miquel has co-organized training workshops, mentoring activities, and implemented Africa's first large-scale AI/ML virtual screening pipelines. Ersilia is currently recognized as a Digital Public Good and has received recognitions such as the GitHub for Social Impact award, as well as being highlighted by media (e.g. Forbes) and presented in international conferences. As a lead scientist at Ersilia, Miquel has organized several capacity building workshops and activities in Africa, developed the first fully-automated AI/ML-based pipeline for virtual screening implemented in the continent, and participated actively in public debate around open science, decolonization, and global health.

Resumen del Currículum Vitae:

Miquel's research interests lie at the intersection of drug discovery and large-scale biological data analysis. During his PhD studies and early career, Miquel developed several in silico methods for pharmacology, producing scientific publications on a broad range of topics, from theoretical chemistry to cell-based data analysis. Throughout this process, he has worked at IRB Barcelona, the Massachusetts Institute of Technology (MIT), Tel Aviv University, ISGlobal-CISM (Mozambique), CIDRZ (Zambia), H3D (South Africa), and CeMM (Austria). At IRB Barcelona, Miquel led the development of the Chemical Checker (CC), a data-driven drug discovery tool that collects and harmonizes a massive amount of bioactivity data, making it ready for AI/ML tasks. Miquel's track record is reflected in over fifty peer-reviewed publications and over 3,400 citations, invited talks at international conferences, and significant code contributions to the open-source space.

Currently, Miquel serves as lead scientist and co-founder of the Ersilia Open Source Initiative, a Spanish foundation aimed at implementing AI/ML tools in resource-limited countries, primarily in Sub-Saharan Africa. His interest in global health stems from two research visits in Mozambique and Zambia, where he created data science pipelines to the analysis of cervical cancer and child mortality data. Ersilia's main asset is the Ersilia Model Hub, an ever-growing repository of more than 180 ready-to-use AI/ML models for antimicrobial drug discovery and global health. Miquel has led the growth of a thriving open-source community, with over 10,000 code commits in the public domain from over 100 contributors. Through Ersilia, Miquel hopes to apply his data science skills in underfunded settings, such as research institutes in low- and middle-income countries. Beyond science, Miquel holds a Master's degree in Creative Writing, studies Humanities, and has published a novel and several short stories in Catalan and Spanish.



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Turno General

Área Temática: Biomedicina
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Referencia: RYC2024-048539-I
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Título: Synaptic arrangements for brain computations

Resumen de la Memoria:

Over my research career, I have worked to understand the mechanisms by which synapses and circuits allow complex computations and higher order brain functions, such as learning and memory. I began working at Lilly UK in the private sector, using patch-clamp electrophysiology to characterize synaptic receptor modulating therapeutic compounds, gaining experience in synaptic biophysics, and drug discovery. In doctoral research (at the MRC LMB; PhD, University of Cambridge), I studied the AMPA receptor – the main excitatory synaptic receptor in the brain. In now highly cited work, I experimentally demonstrated new mechanisms controlling receptor localisation at synapses, which are a potential means for information storage at the sites of communication between neurons. I also contributed to structure-function characterisation of synaptic receptor complexes and novel AMPA receptor modulating neurotherapeutics, through collaboration with structural and computational modelling experts and have contributed to highly cited review articles with synaptic physiology leaders. This research programme was supported by numerous technical developments that I have led. First, development of IVA cloning with Javier Garcia-Nafria, a simplified molecular cloning method that has since been adopted worldwide. Second, a method for inhalation anaesthesia of neonatal rodents, replacing ethically questionable alternatives. Third, new approaches for analysis and interpretation of synaptic electrophysiology data. Together, this work gave me a fundamental grounding in the molecular mechanisms of synaptic receptors, transmission, and plasticity.

During postdoctoral work at IST Austria, I extended this experience to functioning neuronal circuits in acute brain slices. I learned and applied state-of-the-art multicellular patch-clamp to determine the properties and arrangement of synapses in hippocampal microcircuits for memory, characterising heterogeneous cell populations to demonstrate pyramidal neuron subclass-specific wiring arrangements in mouse CA3. In addition, I applied this approach to human tissue, collecting living human patient tissue through a clinical collaboration with the Medical University of Vienna. Using this, I could perform a synaptic and circuit characterisation of the human hippocampus, using cutting-edge electrophysiology and imaging techniques. This work has advanced our understanding of microcircuit computations in both rodent and human tissue, untangling how memory may be stored in interconnected neuronal networks.

I now plan to apply my synaptic and circuit knowledge to independent projects characterising the cellular and circuit properties of defined mammalian cell-types, exploring the array of heterogeneity in pyramidal neurons of the forebrain. I aim to employ resected human tissue in this programme, directly investigating the cellular and circuit mechanisms which allow us to perform our incredible cognitive functions. Finally, use of human patient tissue will allow characterisation of the means by which cells and circuits are miswired in diseases such as epilepsy.

Resumen del Currículum Vitae:

I am a highly experienced electrophysiologist (h-index 14, 1438 citations) exploring how synapses and circuits give rise to the incredible computational power of our brain. From 2012-2013 I was a year-in-industry student in the private sector at Lilly UK, where I learnt patch-clamp, characterising new neurotherapeutic compounds. I pursued doctoral research on an MRC Studentship with Ingo Greger at the MRC Laboratory of Molecular Biology (institute receiving 12 Nobel Prizes), receiving a PhD in Biological Sciences from the University of Cambridge (UK). During this time I conducted intensive research on the mechanisms of excitatory synaptic transmission using electrophysiology and imaging. This work was published in multiple first author (Watson et al. 2017, Watson et al. 2021), second author (Herguedas et al. 2019, Zhang et al. 2021, Dohrke et al. 2020) and co-author papers across high profile journals in my field (Nature, Science, Neuron, Nat. Commun., Elife, etc). In 2020 I moved to Austria to conduct postdoctoral research at ISTA in Klosterneuburg working with Prof. Peter Jonas. I was awarded two highly competitive European fellowships (MSCA-IF, EMBO ALTF) to support international mobility. Here, I have led collaborative research projects on hippocampal circuit wiring in both rodent and human tissue, resulting in two first corresponding author manuscripts (one featured on the cover of Cell, Watson et al. 2025; one as a preprint, Watson et al. 2024). I have led multiple technology development projects during my career: working with Javier Garcia-Nafria (Zaragoza, Spain) to develop ‘IVA Cloning’, a molecular cloning method which has been adopted worldwide. This project is extensively disseminated in two first author papers, one as corresponding author that together have been cited 380 times, and two book chapters. I have led a project to develop ethically improved anaesthesia of neonatal rodents in a senior author paper (Ho et al. 2020), and have invented apparatus that has been adopted by 50 institutions and commercially licenced to the private sector. Other developments include a manuscript on electrophysiology analysis (Greger & Watson 2024) and collaborations with Johann Danzl on imaging methods published in Nature Methods and Nature Biotechnology.

In addition to running and leading multiple high impact projects, I have shared my experience through lecture series over the last 7 years at both the LMB and ISTA, have directly supervised visiting students in projects that have resulted in publication, and have shared my research as open access and as preprints. I have presented my work in talks and posters at international conferences and institutions worldwide, while also contributing strongly to scientific engagement through online resources (Addgene blog), public talks (Pint of Science 24), and conference organisation (SymBLS 16). In addition, I have peer reviewed for numerous journals including Science, Nature commun. eNeuro and others, with my own research resulting in 22 publications and 2 preprints, with 7 first, 5 corresponding, and 2 as last author. Four of these have over 100 citations, including 2 as first author. I am now looking to employ my expertise in scientific research, leadership, funding acquisition to my independent career working to understand the incredible cognitive functions of our brain.



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Turno General

Área Temática: Biomedicina
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Título: Epithelial response against infections and their effect on ageing and mutant selection

Resumen de la Memoria:

During the PhD, I gained a strong background in lipid droplet (LD) biology, from the early steps of their biogenesis in the endoplasmic reticulum, the inter-cellular differences in lipid accumulation and their mobilization upon nutrient starvation to interact to mitochondria to deliver fatty acids to use as an energy source. I leaded 3 of the projects I participated in, being involved at all levels from the design and realization of experiments to the writing process. This gave me the necessary tools to develop research in the LD field.

Because I wanted to direct my career towards studying the initial steps of cancer, I decided to move outside my comfort zone and engage in epithelial pre-cancer research in Phil Jones's lab in Cambridge. There, I gained expertise in epithelial stem cell biology and how somatic mutations colonize epithelia and the environmental factors and interventions that regulate this process long before any cancer develops. In the Jones team, I leaded and co-leaded 3 projects being involved from the project design, to experimental work and manuscript writing. I discovered how PIK3CA oncogenic mutations expand in esophageal epithelium and how this expansion is sensitive to metabolic conditions such as obesity. Moreover, I developed a novel 3D primary in vitro culture that mimics the structure, dynamics and expression of adult esophageal epithelium and self-maintains for months without passaging. I used it to perform confocal live imaging, cell competition studies and CRISPR/Cas9 screenings. We applied these tools to confirm how frequently mutated genes affect cell competition and to find new drivers of expansion in normal esophagus. I also participated in the discovery of how some mutant clones eliminate nascent esophageal tumors by cell competition and collaborated in other lab projects. Finally, I co-lead a project where we described how multiple mutant clones contribute to the initiation of esophageal tumors.

Then I gained a Maria Zambrano fellowship to setup a semi-independent career at the UB and a Beatriu de Pinós to continue my research at IDIBAPS. I plan to establish my independent research at the intersection between the LD field and epithelial biology.

My expertise in mutant selection in epithelia and 3D cultures, combined with my background in LD, places me in a unique position to study whether the recently described role for liver LD in innate immunity is preserved in epithelia, the first body barrier against pathogens. This project will advance our knowledge in epithelial LD and innate immunity and could lead to the development of new therapies to fight infections, particularly those from antibiotic-resistant bacteria.

My second goal is to understand whether infections affect the selection of somatic mutations already present in the epithelium and hence cancer predisposition. I will take advantage of the 3D in vitro system developed during the postdoc, to perform expose cultures to repeated bacterial infections to reveal how epithelial tissues respond to them and their long-term effects on tissue ageing and mutant selection. In this context, the outputs of this research could lead to find prevention strategies that reduce the expansion of pathogenic mutations in adult epithelia, and therefore help to prevent cancer development.

Resumen del Currículum Vitae:

Following my bachelor's degree in Biology (UB) I did a PhD in Biomedicine (UB, Summa Cum Laude and Extraordinary doctorate award) at Albert Pol's lab (IDIBAPS) with a competitive IDIBAPS pre-doctoral fellowship. There, I leaded 3 different research projects, being involved at all levels from conceiving and performing experiments to the writing process. Those projects led to 6 publications, 3 as a first author, on lipid droplet (LD) biogenesis, lipotoxicity and interaction to mitochondria (Kassan A. & Herms A. et al JCB 2013; Herms A. et al, Current Biology 2013; Herms A. et al, Nat. Comm. 2015). Those articles were "extremely highly cited" according to the citations tool Dimension, and the last 2 were recommended in F1000Prime. I became expert in multiple lab techniques, including, confocal microscopy, live imaging, immunostaining, molecular biology, flow cytometry, cell sorting, high-resolution respirometry, multiple organelle isolation techniques, and protein and RNA analysis. During the PhD I collaborated with the groups of Prof. Gross (University of Irvine, USA) and Prof. Parton (The Institute for Molecular Bioscience, Australia).

Next, I was awarded an EMBO postdoctoral fellowship to join Prof. Phil Jones's lab in the Sanger Institute in Cambridge. In Phil's lab, I leaded four lines of research, leading to 8 publications in high-impact journals (including 2 first author and 1 second author) and 1 submitted first-author paper. We discovered how metabolic conditions regulate the expansion of Pik3ca mutant cells (Herms A., Colom B, et al., Nat. Genet. 2024). We also developed a 3D epithelial culture to study long-term mutant clone competition (Herms A., Fernandez-Antoran D, et al., Nat. Genet. 2024). I have another first-author publication under review. Moreover, I participated in the discovery of how expanding mutant clones eliminate nascent esophageal tumors (Colom B., Herms A. et al., Nature, 2021). I also collaborated in other projects leading to publications in Nat. Genetics (2), Nat. Communications (2) and Cell Stem Cell (1). I also published a Review in Ann Rev Canc Biol and a News and views article at NCB. Moreover, I learned or developed new tools such as in vivo lineage tracing and carcinogenesis models, 3D primary epithelial cell culture, in vitro cell competition assays, RNA-sequencing, laser micro-dissection, deep DNA-sequencing and CRISPR/Cas9 screenings. I also collaborated with Prof Vanhaesebroeck (UCL), Prof Frezza (U. of Cologne), Dr Fernandez-Antoran (Gurdon Institute), Dr Alcolea (Stem cell Institute), Dr Lowe (UCL) and Dr Piedrafita, (U. Compl.). During this period, I applied for a CRUK pioneer grant and I was shortlisted to interview.

Later, I was awarded with a competitive Maria Zambrano fellowship to join the Biomedicine department at the UB. There, I gained a grant (95080) from a competitive La Caixa and Barcelona City Council call for a one year project on the effect of pollution in ageing. With these funds, I hired and supervised a technician. To date, I mentored a Master student and a PhD student during the PhD and supervised a Master student and a degree student.



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I also took the EMBO Lab Leadership course, gaining tools to manage groups of people. I was invited to talk at 2 international conferences. Finally I gained a Beatriu de Pinos fellowship to continue my research at Dr. Polís lab.



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Turno General

Área Temática: Biomedicina
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Título: Epigenetic and Biophysical Insights into Cancer: A New Horizon for Therapeutic Innovation
Resumen de la Memoria:

In 2009, I graduated with honors and received a National Honorary Mention for having one of the top academic records in Biology. My master's thesis, awarded the highest distinction, led to a first-author publication.

I completed my PhD in Biomedicine at the Universidad de Barcelona (UB), under the supervision of Dr. Manel Esteller, supported by an FPU fellowship. My research, which earned the Extraordinary Doctoral Prize, focused on the epigenetic changes driving the progression of tumors from primary to metastatic stages, resulting in 14 original articles, including 3 as first author. A landmark study (Vizoso et al., 2015 Nature Medicine) highlighted the clinical significance of a DNA methylation marker in predicting poor survival and treatment response, receiving distinction from the SEBBM society and funding from the WCR Foundation.

Since my PhD, I have been collaborating with Dr. Jordi Alcaraz at UB, studying the epigenetic landscape of the tumor microenvironment, which resulted in impactful publications. Furthermore, additional collaborations expanded my expertise in various cancers and molecular processes, leading to additional publications with roles as first, second, or third author.

To broaden my epigenetics expertise, I won a competitive PhD mobility grant to learn advanced techniques at Dr. Bing Ren's lab at UCSD. During my PhD, I also developed leadership and teaching skills by supervising a master's thesis, leading to a PhD at the IRB in Barcelona.

After my PhD, I participated in an international congress that inspired me to focus on cancer biophysics, leading to postdoctoral training at the Hubrecht Institute and The Netherlands Cancer Institute under Dr. Jacco v. Rhee en as an EMBO fellow. There, I specialized in advanced multiphoton microscopy, optogenetics, and CRISPR-Cas editing, resulting in 5 original articles (one in preparation), including publications as first and corresponding author. Notably, I developed a pioneering optogenetic mouse model for studying early tumorigenesis (Vizoso et al., 2022 Nat Commun), which will also appear in the book of Methods in Cell Biology. During my postdoc, I co-supervised a doctoral thesis, which culminated in several publications and a new position at the Institute of Cancer Research (UK).

After my postdoc, I secured a permanent position at Uppsala University (UU), obtaining €200K in funding as the main applicant. My independent research focuses on endometrial cancer dynamics and involves developing a xenotransplantation model and intravital imaging methods. Additionally, I direct a doctoral thesis and have supervised 3 master's theses that achieved top qualifications, one leading to the hiring of the student in my research group. At UU, I also lead seminars for the "Human Anatomy and Physiology" course, mentoring first-year medical students.

Throughout my career, I have pursued continuous education in animal research (FELASA Function A&B accreditations). I have also presented at international conferences, contributed to book chapters, and engaged in outreach activities, including media interviews. I received invitations to present my work at one international conference and at the Center for Applied Medical Research in Spain, with support for my candidature in the 'Grupos Emergentes' program.

I have authored 26 original articles. H-index:17/17; Citations:1082/1607 (WoS/Google Scho.)

Resumen del Currículum Vitae:

I have dedicated my scientific career to understanding the molecular and cellular mechanisms underlying cancer initiation, progression and metastasis. My research on cancer epigenetics and cellular dynamics in vivo have contributed significantly to the field, revealing insights into how specific genetic mutations and epigenetic changes equip cells with novel phenotypes that promote tumorigenesis, cell dissemination and resistance to therapies. I have presented most of my research in open access journals and at international conferences, including one invited presentation, while also engaging in outreach activities.

Earlier in my career, I developed a strong interest in conducting comprehensive research that bridges mechanistic insights with clinical applied research. As a PhD FPU fellow, I explored how changes in DNA methylation affect signaling pathways, promoting skin cancer progression and metastasis (Vizoso et al., 2015 Nature Medicine; Wouters, Vizoso et al., 2017 BMC Medicine). This work proposes new melanoma treatment and stratification strategies, a concept that was granted funding from the WCR Foundation in collaboration with clinicians, underscoring the potential societal impact of my research. Notably, our major findings have been consistently confirmed by other researchers (Yan et al 2021 Front Immunol; Rodger et al., 2019 Clin Epigenetics; Kutt et al., 2021 Front Genet) and cited in 76 indexed original articles. As my understanding of cancer deepened, I decided to establish a collaboration with tumor microenvironment specialist Dr. Jordi Alcaraz (Universidad de Barcelona), examining the epigenomic changes in tumor-associated fibroblasts (Vizoso et al., 2015 Carcinogenesis). Notably, our main discoveries have been replicated by other researchers (Fang Su et al., 2021 J Clin Invest) and cited in 44 indexed original articles. Our long-standing collaboration has led to various publications, providing a strong foundation for proposing antifibrotic therapies in lung cancer. Through collaborative work with other researchers, I explored the epigenetic alterations across a wide range of cancers and related processes, including epithelial-to-mesenchymal transition (EMT).

During my postdoc, I further explored cancer complexity by delving into cancer biophysics and conducting advanced microscopy in vivo at leading international institutes in The Netherlands. As an EMBO fellow, I optimized CRISPR-Cas9 tools to target DNA methylation in cancer cells and developed a novel optogenetic mouse model to study early tumorigenesis through the precise spatio-temporal activation of specific oncogenes at single-cell resolution in living animals using light (Vizoso et al., 2022 Nat Commun). I co-supervised a doctoral thesis that culminated in several publications, including one as corresponding author about EMT in vivo (Margarido et al., 2022 Cancers). Other collaborations included the study of stem cell trafficking in vivo (Azkanaz et al., 2022, Nature).

At Uppsala University (UU), I secured a permanent position and significant funding to pursue independent research on endometrial cancer cell dynamics. While establishing my group, I am developing a xenotransplantation model and in vivo imaging methods to study the dynamics of the endometrial stem cell niches and their contribution to endometrial regeneration during homeostasis and in cancer models.



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Turno General

Área Temática: Biomedicina
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Título: Mecanismo de regulación de lípidos y esteroides en hígado graso y enfermedades cardiometabólicas

Resumen de la Memoria:

Obesity and overnutrition have reached pandemic levels in Western populations and developing countries. These conditions can lead to chronic inflammation in several tissues where lipid accumulation over the time contributes to oxidative stress and metabolic dysfunctions. In the liver, this is commonly manifested as fatty liver, and fatty liver with inflammation and fibrosis, or MASH.

Throughout my career, I have sought to understand the role of immunometabolism in metabolic and inflammatory diseases. Since my early training, I have been passionate about the intersection of metabolism and inflammation and how these two factors have parallelly endangered human health over the last decades. During my PhD and postdoctoral training, I investigated the role of microRNAs in regulating metabolic pathways in liver disease progression. Under the mentorship of Dr. Carlos Fernández-Hernando at Yale University, I focused on the tissue- and cell- specific functions of miR-33 in metabolism. My work contributed to the fundamental understanding of this microRNA in atherosclerosis, fatty liver disease, liver cancer and obesity, resolving detrimental metabolic effects previously observed in whole-body deficient models.

Recently awarded with a Career Development Award to establish as an independent investigator, my research program studies the interplay between lipid metabolism and macrophages in MAFLD and MASH progression. My research has linked desmosterol metabolism (a precursor of cholesterol biosynthesis) to the regulation of immunometabolic functions of liver resident and recruited macrophages and their contribution to inflammation and MAFLD/MASH progression. Similarly, other lipids and sterols are known to regulate macrophage function in cell culture and atherosclerosis, but their role in macrophages during MAFLD and its progression to MASH are poorly described.

My proposal aims to determine the roles of different macrophages and lipids in the regulation of metabolism and inflammation in the liver in MAFLD and MASH. The long-term goal of my research will be to identify strategies to attenuate inflammation and fibrosis during the progression of the disease. This research will identify and investigate how specific lipids influence macrophage populations during MAFLD and MASH progression. To this end I will focus on: i) characterizing lipid profiles of liver resident macrophages (Kupffer cells) and infiltrated monocyte-derived macrophages (MoMs) under MAFLD/MASH conditions; ii) identifying transcriptional factors and pathways regulated by specific lipids associated to macrophage identity and function, as well as their role in Kupffer cell replacement by MoMs; and iii) exploring how manipulating lipid and sterols accumulation in macrophages modulates their inflammatory or restorative function and the cell-fate decision of recruited macrophages.

The final goal of the proposal is to propose new therapeutic strategies through the targeting of macrophage-lipid axis in MAFLD and MASH, which potentially could benefit other metabolic inflammatory conditions.

Resumen del Currículum Vitae:

My career focuses on the study of mechanisms involved in the regulation of metabolism and inflammation in obesity and cardiometabolic diseases. I started my scientific career at CIC bioGUNE, where I studied my PhD (2013-2018) with Dr. María Luz Martínez-Chantar, studying microRNAs involved in the regulation of methionine metabolism and liver disease. My studies resulted in 3 first-author publications and several co-authorships in high-profile journals and were presented at 6 national and international conferences.

After my PhD, I joined Dr. Fernández-Hernando's lab at Yale University to complete my postdoctoral training (2019-2023) in the field of microRNAs and lipid metabolism and mitochondrial functions in the regulation of obesity and fatty liver disease. This work yielded three first-author publications in PNAS, Nat Comms, JCI Insights* (*corresponding author). In these studies, I described the role of miR-33 in a cell-specific manner (hepatocytes, macrophages, adipocytes and neurons), identifying its metabolic functions and clarifying the discrepancies previously observed in miR-33 whole-body deficient mice. The evidence derived from my work was of utmost relevance to understand the promiscuous nature of miRNAs, and particularly, to overcome detrimental issues raised by therapeutic approaches targeting miR-33 in a non-cell-specific manner.

In 2023, I received a Career Development Award, as Principal Investigator, from the American Heart Association (2023-2026) to promote my transition as an independent investigator at Yale University and to establish my own research line, studying the role of sterols and lipids in immunometabolism and cardiometabolic diseases. This award grants me a faculty position at the Department of Comparative Medicine at the Yale University School of Medicine

My studies in lipid metabolism were recognized with the Roger Davis Award Lecturer, by the Kern Lipid Conference in 2024.

My work has been published in high profile journals, accounting 22 articles, including 6 first-author papers, 1 corresponding author paper, 1 first-author review and 15 co-authors papers.

I have received grants and awards from different sources during my PhD and postdoctoral studies, Overall, during my career I have received funds over \$370000 to support my research and independency.

My leadership and independency are acknowledged by my record of funding acquisition and my first and corresponding author publications, which reflects my capacity to design and succeed in my scientific projects. Moreover, I have mentored and supervised 2 PhD students and a postdoctoral trainee, as well as several undergraduate students.



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Turno General

Área Temática: Biomedicina
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Título: Deciphering the Immunopathology of Stroke: from biomarkers to therapies
Resumen de la Memoria:

Throughout my scientific journey, I have dedicated myself to the study of stroke, a prevalent cause of mortality and disability worldwide. Recognizing the urgent need for approaches to mitigate stroke progression and rescue the ischemic tissue, my research has been driven by a threefold focus: the identification of blood biomarkers, the discovery of neuroprotective strategies, and the understanding of the stroke-induced immunological consequences aiming at improving stroke recovery.

During my tenure at Vall d'Hebron Institute of Research, I led independent projects aimed at identifying candidate blood biomarkers for the diagnosis and prognosis of stroke – still a very unmet need –, resulting in notable publications as first author (J Intern Med 2018; Sci Rep 2018; Mol Cell Proteomics 2020). These studies not only yielded promising candidate biomarkers but also significantly contributed to the understanding of the complex pathobiological events triggered by stroke – an intricacy that is not yet clearly elucidated. This was achieved, in part, by using innovative and cutting-edge -omics technologies. Moreover, this period also includes a noteworthy project where we identified a synergistic drug combination that exhibited robust neuroprotective effects post-stroke (Neurotherapeutics 2022). This success fostered a collaborative partnership with Grifols S.A., leading to ongoing support for further experiments and the generation of 2 co-invented patents.

Transitioning to the Institute for Stroke and Dementia Research (Germany), I delved into the immunological aspects of stroke. My contributions to this field include the demonstration that stroke-induced neuroinflammation influences microglial polarization and dysfunction and compromise stroke recovery, suggesting a promising therapeutic avenue to enhance stroke outcomes (Elife 2022; Nat Neurosci 2024). Beyond neuroinflammation, my research expanded to explore the long-term consequences of stroke on systemic immunity (EMBO Mol Med 2022). We published the first-ever demonstration of innate immune memory after stroke, featured in the journal Cell (Cell 2024). I particularly described how stroke induces epigenetic immune reprogramming of myeloid cells, and shed light on the interplay between such myeloid immune memory and subsequent cardiac dysfunction (Cell 2024, Cardiovasc Res 2024).

In the next phase of my scientific career as a Ramón y Cajal researcher, I am dedicated to advancing my research to new heights. This prestigious position provides a unique opportunity to establish an innovative research program building on my recent discoveries about post-injury peripheral innate memory as a key driver of secondary complications and poor outcomes in stroke patients. Based on promising preliminary data, I will focus on unraveling the intricate relationship between changes in cellular metabolism, innate immune memory, brain recovery and the occurrence of secondary complications, including recurrent strokes. By dissecting this immunometabolic interplay, my work aims to identify novel strategies to mitigate innate immunity and significantly enhance clinical outcomes for stroke patients.

All these efforts reflect my dedication to contributing impactful insights and innovative approaches to the field of stroke research. Thus, I am ready to continue my scientific career as a Ramón y Cajal research.

Resumen del Currículum Vitae:

My primary research focus has always been on ischemic stroke. Beginning with investigations into stroke biomarkers and neuroprotection studies, bridging basic and clinical research, my trajectory now evolved to delve into the immunological consequences of ischemic stroke, elucidating how they compromise stroke recovery and even lead to secondary complications and life-threatening comorbidities.

In 2014, I completed my PhD at the Vall d'Hebron Institute of Research (Barcelona), under the guidance of Dr. Montaner, and received the PhD Excellence award from the Universitat Autònoma de Barcelona (Spain). Transitioning to a postdoctoral position in 2018, I continued my stroke-related investigations, laying the groundwork for my career as an independent researcher. In 2019, I joined Prof. Liesz's lab, in the Institute of Stroke and Dementia Research (Munich), diversifying my expertise. After four years of fruitful scientific endeavors abroad, I returned to Barcelona in 2023 as a fully mature researcher, poised to embark on my independent career as a stroke immunology scientist.

My career is marked by a robust publication record (38 + 2 under review), including impactful contributions with 2 patents and an impressive H-index of 20 (>1630 citations). Throughout, I've generated extensive data for multiple awarded national and international competitive projects. My abilities to secure financial support from both private and public organizations underscores my leadership skills, evident in collaborations with esteemed institutions globally – US, Germany, Hungary, China, Spain, France, Japan. These collaborations have not only resulted in productive partnerships but also in prestigious publications in high-impact journals such as Cell and Nature Neuroscience.

Scientific communication has been central to my career, sharing knowledge and engaging globally. I have presented at international conferences, contributing to advancements in stroke immunology and building a robust collaboration network. Recently, invited as a renowned speaker at several prestigious events, including seminars and conferences, I have further solidified my reputation, amplifying the impact of my research and strengthening my leadership in the field. Also, my commitment to scientific outreach includes public engagement and mentoring activities, raising public awareness of the importance of stroke research.

In pursuit of professional development, I've not only developed innovative ideas and embraced cutting-edge technologies, such as single-cell transcriptomics, epigenomics, and full-spectrum flow cytometry, but I have also taken on an active teaching and mentoring role. I have shared my expertise in these advanced techniques with students and colleagues, fostering their skill development and contributing to the growth of our research team. My mentoring skills have been also honed by guiding 2 undergraduate students, 2 master's students and 2 Ph.D. students, and by leading my own research sub-team within the larger group. My active role as a reviewer for high-impact journals and scientific conferences underscores my commitment to contributing to high-quality research and the peer-review process.

This multifaceted journey has honed my autonomy and expertise, preparing me for next steps in my career. Therefore, I am confident in my qualifications to advance as a Ramón y Cajal researcher.



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Turno General

Área Temática: Biomedicina
Nombre: STRATAKIS, NIKOLAOS
Referencia: RYC2024-048611-I
Correo Electrónico: nikos.stratakis@isglobal.org
Título: Assessing the impact of pervasive environmental exposures on metabolic health across the life course using innovative epidemiological approaches

Resumen de la Memoria:

My research lies at the intersection of Environmental Epidemiology and Molecular Biology, employing a multidisciplinary approach that integrates advanced exposure modeling methods with biological ("omics") data to uncover the metabolic health effects of pervasive environmental exposures and their underlying pathophysiological mechanisms.

Through participation in international research initiatives, I have demonstrated the ability to conceptualize, design, and execute complex studies while fostering collaborations across multidisciplinary teams. My work has yielded groundbreaking findings on the effects of early-life diet and chemical pollutants, such as PFAS ("Forever Chemicals") and mercury, on pediatric metabolic health, providing critical insights into environmental factors that influence disease risk and informing policy actions. Notably, one of my studies on PFAS was recognized as NIEHS Paper of the Year, highlighting its public health significance. My contributions to the field have been recognized through several prestigious fellowships, including the Marie Skłodowska-Curie Fellowship, the Juan de la Cierva-Incorporación Fellowship, and the Beatriu de Pinós Fellowship (renounced).

The publication of my research in high-impact journals such as Nature Communications, JAMA Pediatrics, JAMA Network Open, and Hepatology underscores its scientific rigor and importance. Currently, I lead the LIVER-X project, which leverages exposome data and multi-omics profiling (metabolomics, proteomics, DNA methylation, transcriptomics, and genomics) from multiple European birth cohorts to investigate the role of environmental exposures in pediatric metabolic dysfunction and liver injury. This project utilizes advanced statistical methodologies to identify mechanistic pathways and inform targeted strategies for disease prevention.

Through my commitment to multidisciplinary research, my goal is to create actionable insights to inform the development of proactive environmental health strategies that promote health and well-being across the population.

Resumen del Currículum Vitae:

I have developed a strong academic trajectory in the field of Environmental Epidemiology, with over a decade of experience contributing to high-impact research. I have had a highly international trajectory, with over 12 years spent abroad across multiple countries. I obtained my BSc in Nutritional Science in Greece (Harokopio University), graduating in the top 5% of my class. Then, I completed my MSc in Nutritional Medicine in the UK (University of Surrey), where I was recognized as Master Student of the Year, and undertook my PhD in Epidemiology in the Netherlands (Faculty of Health and Life Sciences, Maastricht University).

During my PhD, I built on my nutritional sciences background and used biomarker- and questionnaire-based exposure assessment methods across international cohorts to examine the influence of early-life dietary factors on major child health outcomes, including obesity and asthma. These experiences provided me with a robust foundation in epidemiological methods, public health research, and interdisciplinary collaboration. Following my PhD, I undertook a postdoctoral position at the Keck School of Medicine of the University of Southern California (USC) in the United States, a leading institution in environmental epidemiology. There, I broadened my expertise by integrating molecular biology and advanced exposure assessment techniques to study the metabolic impacts of ubiquitous chemical pollutants, such as PFAS and mercury. My research at USC contributed to major NIH-funded projects and fostered collaborations with world-renowned experts across various disciplines. Currently, I am based in Spain at ISGlobal, a leading research institution in exposome research, where I continue to develop my research as a Marie Skłodowska-Curie Fellow. Having a central role in multidisciplinary projects, such as the EU-funded LIVER-X and ATHLETE projects, my work in Spain focuses on leveraging exposome data and multi-omics approaches to uncover the biological mechanisms underlying environmental exposures and their impact on pediatric metabolic health. These experiences have enabled me to build a strong network of collaborations across Europe and the US, enhancing my ability to tackle critical environmental health challenges.

I have authored 49 scientific articles (41 of which are open-access), including publications in Nature Communications, JAMA Pediatrics, JAMA Network Open, and Hepatology, with my work having garnered over 1750 citations (h-index: 21, i10-index: 33). My active commitment to open science ensures that my findings, methodologies, and metadata are accessible to the wider research community. Beyond research, I have actively contributed to mentoring of students and designing and delivering courses in epidemiology at all academic levels.

Building on a foundation of innovative research and multidisciplinary collaboration, my work strives to uncover how pervasive environmental exposures shape chronic and metabolic disease trajectories, with the ultimate aim to inform public health policies and prevention strategies to promote lifelong health.



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Turno General

Área Temática: Biomedicina
Nombre: MAIQUES DIAZ, ALBA
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Título: Functional dissection of oncogenic transcription factors and associated epigenetic alterations driving leukemia

Resumen de la Memoria:

I obtained my PhD in 2014 under the supervision of Dr Juan C Cigudosa at the National Cancer Research Centre (CNIO, Madrid, Spain), with Cum Laude and Extraordinary Award. I then joined the laboratory of Prof Tim Somervaille at Cancer Research UK Manchester Institute (CRUK-MI, Manchester, UK), as a postdoctoral researcher. In 2019 I joined the Dr Jose I Martin-Subero group at Fundació de Recerca Clínic Barcelona-IDIBAPS (FRCB-IDIBAPS, Barcelona, Spain) as senior postdoc with a Lady TATA Foundation International award. In 2020 I refused the Juan de la Cierva-Incorporación fellowship as I got awarded with a Beatrui de Pinós fellowship (2020-2023), from the Generalitat de Catalunya and co-funded by the European Commission. I also got the Translational Research Training in Hematology Award of the American and European Hematology Association (2019). I have recently been awarded an EHA Advanced Research Grant (240.000 €, 2024-2027). Thanks to different grants awarded on a competitive basis, I have funded my salary and partially my research 10 out of my 15 years of scientific career. Moreover, I hold I3 certification (from Secretaría General de Universidades) and Lecturer accreditation (from Generalitat de Catalunya).

My research focuses on the onco-epigenetic mechanisms driving hematological cancers, with an emphasis on deciphering the factors responsible for the transcriptional and epigenetic plasticity of tumor cells. I have worked on leukemia and epigenetics throughout my career. I have a total of 21 peer-reviewed publications, (18 research articles, 2 reviews), including 7 as first author and 3 as senior author. 95.2% of them in Q1. With a total number of 592 citations, 62.5% (10 documents) percent of documents in the top 25% most cited documents worldwide, and H-index: 13 (Scopus, 17/01/2025).

The proposed aims to delve into the mechanisms behind chronic lymphocytic leukemia proliferation, in response to signals coming from the tumor microenvironment. The goal of this project is to investigate the role of transcription factors as non-genetic drivers of leukemogenesis and evaluate their potential as therapeutic targets. I plan to identify essential transcription factor networks driving CLL proliferation and elucidate their individual contribution on disease progression and response to current treatments. I will also determine subclonal dynamics of CLL proliferation using single-cell technologies. Data generated will be valuable to determine new therapeutic avenues. Experiments will be done using patient samples. Studying CLL using primary cells is challenging due to their extensive dependency on external signals, but this proposal is based on solid preliminary data and robust technical developments that I have generated in the last few years. These will allow me to study CLL progression using the appropriate cellular models, ensuring its clinical applicability. The overarching goal of my research is to understand the mechanisms behind the onco-epigenetic dependency of hematological tumors. My extensive experience using cutting-edge techniques in hematological tumors will be applied to this study. This project constitutes a novel strategy to identify mechanisms involved in the proliferation and relapse of CLL, will add key information on the factors behind CLL pathogenesis and identify TF and epigenetic regulators involved in progression.

Resumen del Currículum Vitae:

As a PhD student at the Spanish National Cancer Center (CNIO, Madrid, 2009-2014), I was instrumental in elucidating the epigenetic modifications and transcriptional dysregulation driven by fusion proteins in acute myeloid leukemia initiation (Leukemia 2012; BrJ Hematol 2016). During a research stay at Dr. Mulloy's group (CCHMC, USA), I developed inducible human systems using stem cells from normal cord blood, used in subsequent collaborative studies (Leukemia 2017; Blood 2016). I obtained my PhD with cum laude and extraordinary award.

I furthered my expertise in epigenetic therapies as a postdoctoral fellow in Prof Somervaille's group (CRUK-Manchester Institute, UK; 2014-2019). My work revealed the mechanism of action of LSD1 inhibitors in clinical trials, showing how they trigger transcriptional and epigenetic changes by altering GFI1 transcription factor repressor capacity, and identified key components of the LSD1:GFI1 complex involved in leukemia differentiation blockage (Oncogene 2022, Cell Reports 2018, Epigenetics 2016). My work was selected for oral presentation at the 24th European Hematology Association meeting (Stockholm, 2018), and I was an invited speaker at the 8th acute leukemia treatment workshop at MD Anderson Cancer Center Madrid (2018).

In 2019, I obtained my own funding to join Dr. Jose I. Martin-Subero's group at FRCB-IDIBAPS (Barcelona, Spain; 2019-2024), including the Lady TATA Foundation international award (2019-2020), MSCA-cofund Beatrui de Pinos Postdoctoral Fellowship (2020-2023) and the EHA Advanced grant (2024-2027). I was also selected for the Translational Research Training in Hematology (EHA/ASH-TRTH2019), a competitive program for early career scholars. I set up research on the molecular mechanisms behind the epigenetic dysregulation of mature B cell malignancies and developed CRISPR-Cas9 genome editing methods using patient-derived material (HemaSphere 2023, senior authorship). These developments were key in studying the oncogenic role of LEF1 in CLL pathogenesis (Blood, under revision, senior authorship) a study presented as an oral communication at the 29th Annual Congress of the European Hematology Association, (Madrid 2024).

Demonstrating my capacity to lead projects as an independent PI, I have published as corresponding author (Blood, under revision, HemaSphere 2023, 2021, 2020), acquired international funding (EHA Advanced grant 2024-2027, Lady TATA international Award 2019-2020). Further supporting my international leadership, I co-organized international meetings (e.g., Young Experimental Research Meeting, EHA 2022; Research conference on Transcriptional control and chromatin alterations in normal and abnormal hematopoiesis, EHA ReCon 2025); regularly serve as an evaluator for national calls (e.g., ISCIII-FIS, AEI-Plan estratégico), and as reviewer (e.g., Scientific Reports, Frontiers in Oncology).



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I am also committed to training the next generation of scientists. At FCRB-IDIBAPS I was co-director of a PhD student (UAB, 31/09/2024, Excellent cum laude, starting a post-doc at Cornell University (US) in May 2025). I have directed one Master thesis; three undergraduate student internships; and I have served as the Thesis Advisory Committee for 3 students at U. Barcelona. I also actively organize and participate in science outreach and initiatives tackling diversity issues (e.g., #100tifiques 2021, 2022).



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Turno General

Área Temática: Biomedicina
Nombre: MORÓN LÓPEZ, SARA
Referencia: RYC2024-048369-I
Correo Electrónico: smoron@irsicaixa.es
Título: Viral immunopathogenesis, persistence and post-acute infection syndromes

Resumen de la Memoria:

I am a biotechnologist, with more than 12 years of academic research experience in the field of HIV-1 pathogenesis, persistence, and strategies to cure HIV, and lately experience in new emerging viruses, such as SARS-CoV-2, and post-viral or post-acute infection syndromes. My scientific career has specifically focused on the study of potential strategies aimed at reducing the HIV reservoir and the mechanisms that regulate HIV transcription and latency with the ultimate goal of achieving a definitive cure for people living with HIV, and more recently, on the biological mechanisms underlying post-COVID-19 condition (PCC) in pediatric population.

I obtained my PhD in Biochemistry, Molecular Biology and Biomedicine program by the Autonomous University of Barcelona in 2016 with Cum Laude Honors and an Excellence Award. In 2017, I decided to expand my knowledge of the mechanisms that control HIV transcription in a 3.5 years postdoc fellowship at University of California San Francisco (USA). In 2021, I moved to IrsiCaixa, where in 2023 I gained my position of Senior Researcher (R3 certificate awarded in 2024), to open my own research lines, focused on modulating viral transcription as a strategy to cure HIV and on deciphering the mechanisms underlying PCC.

My previous work suggests that HIV latency in blood circulating CD4+ T cells is likely due to a series of reversible blocks to HIV transcription (elongation, distal transcription, polyadenylation, and especially splicing), and that while existing [latency reversing agents] (LRAs) have shown modest increases in cell-associated HIV transcripts in vivo, they failed to increase multiply spliced HIV transcripts, which are a marker of productive infection, in vitro and in vivo. These results may be explained because HIV expression is also further restricted by inefficient splicing and other post-transcriptional steps, such as nuclear export. Thus, there is a critical need to characterize the human cellular factors that regulate the reversible blockage to HIV multiple splicing and nuclear export, and to identify new classes of compounds that can increase or completely silence HIV transcription and viral production. This line of research aims to identify and validate cellular genes that regulate HIV latency, and to evaluate the effect of new compounds that may efficiently reactivate or block the expression of HIV.

The SARS-CoV-2 pandemic generated an epidemiological scenario in which we can observe cases of complications associated with viral infections, such as PCC, whose incidence is around 10%, affects adults and pediatric population and makes it impossible to carry out their daily routine. Currently, the etiopathogenesis of PCC is unknown, we lack predictive biomarkers, and the few studies published showed potential similarities with other post-acute infection syndromes (PAISs). Most studies published to date evaluate adults, so knowledge of PCC is extremely scarce in the pediatric population. The central hypothesis of this line of research is that PCC has its own pathophysiological entity and that there are predictive biomarkers of this condition. This project aims to increase scientific knowledge of PCC and propose predictive analytical tools, which would lead to better diagnosis and personalized treatment strategies for PAISs with an international impact on improving clinical practice.

Resumen del Currículum Vitae:

I have demonstrated a continued interest in immunology and virology, specifically HIV and SARS-CoV-2 biology throughout my career. During my PhD, I focused on the impact of different HIV cure strategies on the HIV reservoir, and on the association of epigenetic cellular host factors and HIV disease progression. My PhD studies were conducted at IrsiCaixa, under the supervision of ICREA Prof Javier Martínez-Picado. I collaborated with multiple researchers in Europe (Oxford University, Ghent University Hospital, IJC). This stage culminated in eleven publications as first, co-first and co-author, in outstanding journals (Lancet HIV, JID, CMI, JIAS, JAC and CID). I obtained my PhD in 2016 with a Cum Laude Honors and an Excellence Award 2015/16 by Autonomous University of Barcelona.

During my postdoctoral training in the laboratory of Prof Steven Yukl (University of California San Francisco, CA, USA), my work focused on understanding the mechanisms that regulate HIV latency in in vitro models and in tissues from ART-treated women, and the effect of latency-reversing agents on HIV transcription in vivo. I also helped to develop detection assays to analyze HIV-2 latency and HIV-1 intact RNA. This stage culminated with five first, one second and two co-author publications in prominent journals (CID, AIDS, PLoS Path, JIAS, J Immunol and Retrovirology). I increased my international networking by collaborating with recognized researchers in the HIV field, including Prof WGreene (Gladstone Institutes), Prof Everdin (Buck Institute), AssocProf ABosque (Washington University), and OSøgaard (Aarhus University). I was awarded with a CFAR Mentored Scientist Award by the NIH as a Principal Investigator.

Since 2021, I joined IrsiCaixa as a Senior Postdoc, currently a Senior Researcher (Jan.2023, R3 certificate 2024). I have been awarded three project grants as a Principal Investigator: a European Gilead Research Scholars Program Award, an Early Stage Investigator Grant (Barcelona City Council) and a PID (Science, Innovation and Universities Ministry of Spain), and two personal grants: a Juan de la Cierva fellowship (Science and Innovation Ministry of Spain) and a Beatriz de Pinós fellowship (AGAUR, Catalan Government). My most recent work has focused on how viral splicing might be modulated to cure HIV, how HIV infection alters cellular features at the single-cell level, and why acute SARS-CoV-2 infection causes persistent symptoms in children and adolescents, culminating in five first, senior or co-author publications, three as corresponding (FrontPed, Children, MicrobSpect, WJoP and Microorg). Currently, I am also an affiliate researcher of the CIBERINFEC; a member of GeSIDA-SEIMC, GeSIDA No(b)vel, Alumni UAB and International AIDS Society, a mentee of CFAR-UCSF, a committee member of the Women for equity in Science working group (Can Rutí) and a member of the scientific committee of GeSIDA. I have mentored several students, being co-director of a Master Thesis and currently a co-director of the Doctoral



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Thesis of a PhD student (Jon Izquierdo-Pujol). I have participated as reviewer of several journals and I was guest-editor of an special issue of the journal Microorganisms. Given my previous training and experience, I am well positioned to successfully continue my research career.



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Turno General

Área Temática: Biomedicina
Nombre: MARTINEZ GARCIA, JUAN JOSE
Referencia: RYC2024-050799-I
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Título: Immunometabolism and physiopathology of inflammatory diseases

Resumen de la Memoria:

My scientific contributions include an international patent (WO2020/182964), the founding of a spin-off company (Viva In Vitro Diagnostics SL), high-impact publications (Nature Communications, PMID: 31221993; and Gut, PMID: 36175116), articles as senior and corresponding author (PMID: 38094297, 39639164), a Book Chapter (PMID: 31646503), my involvement in six projects, including one project as a principal investigator, and reviews (PMID: 35629894, 37855750). I've secured prestigious fellowships, including the French Foundation of Medical Research (FRM, 2020) and the Maria Zambrano Distinguished Researcher fellowship (2022), and achieved top scores in Marie Curie (90/100) and EMBO fellowship evaluations, reflecting my commitment to international collaboration.

I have presented at 13 national and international conferences, including the EMERGENCE Mini-Symposium (2020), the FIRST PRESTO COST Action Meeting (2023), and a seminar at the French CNRS (2024). Awards include the COVIDIEN prize (2017) and recognition at the 39th Spanish Society of Immunology Congress (2016). My outreach efforts involve engaging with media (La Verdad, 2024) and platforms like SciTube, LinkedIn, and ResearchGate, ensuring the broad dissemination of my work.

Internationalization has been a cornerstone of my career. During a 3-year postdoctoral stay in Lille, France (INSERM), I contributed to projects at the Pasteur Institute and the University of Lille, supported by the FRM fellowship. I collaborated with prominent researchers, including Grace Chen (University of Michigan), and trained in advanced techniques at the University Clinical Hospital of Nantes. My EMBO fellowship proposal allowed me to defend my research at IGBMC in Strasbourg, and I further collaborated at BioMed X Institute in Heidelberg. During my PhD, I completed a three-month Short-Term Mission at the University Medical Center of Eppendorf in Hamburg, resulting in a publication in Nature Communications (PMID: 31221993). During my last experience as Maria Zambrano Fellow in Murcia, I co-organised experimental tasks for the RESIST-PP project with collaborators like Dr. Mathias Chamillard and Dr. Philippe Lesnik. I also serve as Vice-leader of Working Group 3 in the PRESTO COST Action CA 21130, where I chaired sessions at the 2023 Ferrara conference and organized the Third PRESTO Meeting in Murcia (2024), introducing innovative round-table discussions. In April 2025, I will start a third postdoctoral position at the Immunology Research Frontiers Centre (IFReC) in Osaka, Japan, as part of the Advanced Postdoc Program.

I aim to establish a strong international research line, ultimately consolidating my career as a Principal Investigator in Spain. I propose to establish a research line titled Immunometabolism and Physiopathology of Inflammatory Diseases in a Spanish host institution, focusing on the interaction of inflammasomes (NLRP3 and NLRP6) in regulating the Gut-Liver-Brain axis under inflammatory conditions. Using advanced techniques like 3D cultures, intestinal organoids, and "organ-on-a-chip," this project will bridge observational and mechanistic studies, reducing animal model reliance and enhancing translational biomedical research.

Resumen del Currículum Vitae:

I completed my PhD at the Biomedical Research Institute of Murcia (IMIB) and the University of Murcia, supervised by Prof. Pablo Pelegrin. Graduating with "CUM LAUDE" in 2018, I authored six high-impact papers, including a Nature Communications article (PMID: 31221993; IF: 14.7 Q1, IF: 14.7) with two F100 Prime recommendations. This work led to an international patent in 2020, forming the basis of the spin-off company VIVA IN VITRO Diagnostics SL. I also contributed to journals like (IF: 8.1) and Annals of Rheumatic Diseases (IF: 20.3).

My postdoctoral journey began in 2018 at the Pasteur Institute of Lille (INSERM, France), where I studied the circadian regulation of gut microbiota and metabolic diseases, publishing in Gut (PMID: 36175116; IF: 23.0 Q1, IF: 23). I received a national FRM fellowship and collaborated with several European labs.

Since 2022, I have held a "Distinguished Researcher" Maria Zambrano fellowship at the University of Murcia, focusing on pyroptotic cell death and metabolic diseases. Supported by the prestigious SENECA Grant, I published as a senior and corresponding author (Frontiers in Immunology, IF: 5.7; EmboMolMED, IF: 9) and contributed to a video for science outreach. I co-lead a European grant work package (JPI HDHL Nutrimune) and serve as Vice-leader of the PRESTO COST Action, organizing its 2024 meeting. I have presented at over 10 conferences, supervised students, lectured 180 hours, and served on academic evaluation panels.



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Turno General

Área Temática: Biomedicina
Nombre: OCÓN MORENO, BORJA
Referencia: RYC2024-049759-I
Correo Electrónico: borjaconel@gmail.com
Título: Research trajectory and research proposal summary, Borja Ocon Moreno
Resumen de la Memoria:

I have produced 24 publications, 7 of them as first author and 2 of them as first and corresponding author in Nature (IF=50.1) and Nature Immunology (IF=31.2). I have a H-index=17 and i10 index=19, 1939 citations and four articles with more than 100 citations. My PhD Thesis was awarded the Modesto Laza Palacios Prize and I have participated in many international conferences being recently invited as a speaker to the Gordon Research Conference; Chemotactic Cytokines Meeting, USA (2024). I have generated 2 patents, and participated as a reviewer of several journals, including Cellular and Molecular Immunology with an IF=20.1. I have also been awarded several research fellowships, including the competitive Research Fellow Award from the Crohn's and Colitis Foundation of America as a principal investigator (2018-2021).

During my PhD stage in 2013 I did my first international stay in the Dr. T. Steiner lab (UBC, Vancouver, Canada). I obtained my PhD in 2015 with the title Glucocorticoid-induced modulation on the intestinal barrier function (Sobresaliente cum laude, international mention) at the University of Granada.

In 2016 I received a Ramón Areces fellowship to join the Butcher lab at Stanford University, where I work on the discovery of novel receptors expressed on immune cells and their unique chemotactic ligands that control organ- and T/B cell subset-specific immune cell trafficking to mucosal surfaces. Here I have so far published 4 articles in Nature (1), Nature Immunology (2) and Frontiers of Immunology (1), 3 of them as first and corresponding author. I have also established many international collaborations, some of which are close to produce publications in Nature and Gastroenterology. My contribution to projects grew as a postdoc in the USA, playing a key role to obtain: i) an Atlassian Grant of the Gut Cell Atlas from the Helmsley Charitable Trust; ii) two R01 grants funded by the National Institutes of Health of the USA; iii) a Research Award from the TRDRP foundation (27IR-0054).

My most relevant scientific contribution is the deorphanization of GPR25 with the discovery of its chemotactic ligand CXCL17. In this work published as an article in Nature on 12/09/24, I have discovered and functionally profiled the GPR25-CXCL17 axis as a key driver of the organ-specific lymphocyte trafficking to the non-intestinal mucosal tissues (airways, bronchi, stomach and female GU tract). This landmark paper has revolutionized the mucosal immunology field by filling a deep and long-standing gap of knowledge, the nature and regulation of the common mucosal immune system.

As I approach the independent stage of my career, the supervision and mentorship of my students will be critical. These years at Stanford I have supervised 2 undergrad students from UCSC and Northwestern University, 2 MDs during their research training, 1 master student from San Jose State University, and I am currently mentoring Mohammed Gaafarekhalifa, a PhD candidate in the Stanford Biology Program.

The comprehensive scientific and technical expertise acquired, my success designing competitive grants and patents internationally, training in science communication at Stanford, teaching experience in Spain (175 ECTS credits), as well as my hands-on experience mentoring international students, taken together, make me feel ready to transition towards independence.

Resumen del Currículum Vitae:

At the beginning of my PhD, we studied the outcome of the DSS colitis model in germ-free and antibiotic-treated mice. We found that the absence of microbiota worsened the disease inducing massive colonic bleeding due to a huge barrier function defect. As a side project we studied the immunomodulatory effect of calprotectin on the intestinal barrier function in steady-state and inflammation via signaling through the intestinal epithelia. My PhD thesis research focused on the effect of glucocorticoids in gut homeostasis and colitis, with and without the deletion of NR3C1 (glucocorticoid receptor) in the epithelium. We showed that glucocorticoids (specifically budesonide) play a dual role in experimental colitis and exert a deleterious effect on animals overshadowing the expected anti-inflammatory effect. This finding led us to generate the NR3C1-Vil-CreERT2 mice to evaluate the specific role of the glucocorticoid receptor on the intestinal epithelium. In June 2015 I defended my PhD titled: Glucocorticoid-induced modulation on the intestinal barrier function.

In October 2016 I joined the Eugene Butcher lab at Stanford University where I study the regulation of immune homeostasis in several mucosal surfaces (intestines, upper GI tract, airways and female genitourinary tract) from a leukocyte trafficking perspective. My research has primarily focused on the discovery of novel chemoattractant receptors (GPCR) and their unique mucosal chemotactic ligands, that control subset-specific T/B lymphocyte recruitment and/or retention to these epithelial surfaces to strike the delicate balance between active immunity against pathogens and tolerance.

My most relevant scientific contribution to date is the de-orphanization of GPR25 by discovering CXCL17 as its specific functional chemotactic ligand. In this work published as an article in Nature in September 2024, I functionally profiled the GPR25-CXCL17 chemotactic axis as an essential driver of the organ-specific lymphocyte trafficking to the non-intestinal mucosal tissues (NIMT) (airways, bronchi, stomach and female genitourinary tract). With this study, I filled a big and long-standing gap of knowledge in the mucosal immunology field, the existence per se, the nature and regulation of the common mucosal immune system. This concept had been proposed for decades, but it's been now when I have discovered, understood at least in part and presented it to the scientific community in this landmark paper that has revolutionized the mucosal immunology field.

This work has opened many future research lines that should explore in the next 10-20 years the role of the GPR25-CXCL17 axis in homeostasis and disease in all the organs comprised under the NIMT umbrella, as well as the central nervous system. In aims 1 through 4 of my research proposal, I outline the different GPR25-CXCL17-focused research lines that I have designed to start my independent career. In aim 5, I present my



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Turno General

"immunometabolism research line" where I propose to leverage my expertise in leukocyte trafficking studies to understand how our largest T cell pool (gut IEL) physiologically calibrates our response to feeding and fasting.

I want to establish an internationally competitive "mucosal immunology lab" back in my home country, Spain, and the Ramon y Cajal program offers the perfect opportunity to get this journey started.



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Turno General

Área Temática: Biomedicina
Nombre: MONTERO VALDERRAMA, JUAN JOSÉ
Referencia: RYC2024-048995-I
Correo Electrónico: jjmontero1991@gmail.com
Título: Functional genomics for high-throughput study of structure-to-function relationships in lncRNAs involved in major cancer processes.

Resumen de la Memoria:

From the start of my academic career, I have been deeply interested in genome biology and functional genomics. I obtained my PhD in 2018 under Prof. Maria Blasco at CNIO, supported by the FPI-Severo Ochoa fellowship. Prof. Blasco's lab is renowned for its work on telomeres in cancer and aging, including the discovery of TERRA, a family of lncRNAs. My research focused on TERRA, where I identified a major transcriptional locus and developed the first knockout model for this gene. Using this model, I demonstrated TERRA's essential role in telomere stability, telomeric heterochromatin establishment, and its extratelomeric function in maintaining pluripotency. In 2020, I joined Prof. Roland Rad's lab at the Institute of Molecular Oncology and Functional Genomics (IMO) as an EMBO postdoctoral fellow, where I developed CRISPR technologies to uncover cancer vulnerabilities. My main research lines included: Pan-cancer interrogation of lncRNA dependencies using CasRx: Using the Cas13d RNA nuclease, I developed genome-wide pooled CRISPR screens to systematically identify lncRNA vulnerabilities across different tumor types, providing insights into lncRNA biology and disease relevance. Mapping drug synergy landscapes through Cas13d genetic interaction screening: I developed a method to map genetic interactions within the druggable genome, identifying novel synergies in cancers like PDAC and creating a repository of genetic interactions that can be repurposed for new therapies development. CRISPR screens for the discovery of EMT modulators in PDAC: Using a FACS-based screening approach, I identified hundreds of EMT modulators, validated key mechanisms, and demonstrated that targeting EMT can sensitize PDAC tumors to chemotherapy and prevent resistance. As a Principal Investigator, I plan to use the expertise that I have developed in lncRNA biology and in the development of novel screening methodologies to extend this research to explore the structure-function relationships of lncRNAs in cancer. Specifically, I plan to repurpose my lncRNA screening methodology and the cell lines already established to study not just fitness but also more complex cellular and molecular mechanisms relevant to cancer including apoptosis, senescence, DNA damage repair, autophagy, and EMT. For the most promising lncRNAs identified, I will determine their secondary structures using RNA footprinting in collaboration with RNA structure experts. I will then investigate the relationship between structure and function using secondary saturation mutagenesis screens with Cas9 base editors to pinpoint structural elements critical to their biological roles. For lncRNAs with identified functional structural domains, I will conduct detailed molecular validation to elucidate their mechanisms of action. In summary, the proposed work will systematically map the involvement of lncRNAs in key molecular and cellular processes, including apoptosis, senescence, DNA damage repair, autophagy, and EMT, with broad implications in physiology, disease pathogenesis and therapy. Likewise, my systematic efforts to decipher lncRNA structure/function relationships will address major unresolved questions in the field. My expertise, the own breakthrough technologies and the unique biological resources that I hold in hands put me in a privileged position to achieve these ambitious goals.

Resumen del Currículum Vitae:

In 2015, I began my PhD under the supervision of Prof. Maria Blasco at CNIO, focusing on a family of lncRNAs transcribed from telomeres, known as TERRA. I identified a major human TERRA locus, enabling the development of the first TERRA knockout models. This work demonstrated TERRA's roles in telomere stability and heterochromatin formation, as well as its broader function as a chromatin regulator influencing gene expression in embryonic stem cells. This research resulted in three first-author publications in Nature Communications and eLife and equipped me with extensive expertise in molecular biology and genomics. In 2020, I joined Prof. Roland Rad's lab at the Institute of Molecular Oncology, where I developed versatile CRISPR-based screening tools for basic and translational cancer research. This work has already resulted in a publication in Nature Methods, with another manuscript currently under review in Nature. My contributions included: i) Pan-cancer interrogation of lncRNA dependencies using CasRx. ii) Mapping drug synergy landscapes through Cas13d genetic interaction screening. iii) CRISPR screens for discovering EMT modulators in PDAC. My research trajectory has been scientifically recognized including multiple awards and fellowships, including the EMBO Postdoctoral and the FPI-Severo Ochoa PhD Fellowships. I also received the Antonia Nieto Award for Excellence in Research by Predoctoral Fellows, as well as the Health Sciences Award from the Caja Rural Foundation. My work has been also selected multiple times for oral presentations at renowned international meetings such as the Telomeres & Telomerase meeting at Cold Spring Harbor. Beyond conferences, I have made considerable efforts to communicate my research to non-specialized audiences through traditional and digital media, as well as to other scientists. To this end, I publish all of my first author papers with open access, maintain well-curated pipelines on GitHub, and deposit relevant materials on Addgene. I have also contributed to securing research funding, including the the Förderung der Corona-Forschungsanträge project. The unique technology and analytical methods I developed during my postdoc make my profile perfectly suited to synergize with other projects. As a result, and entirely based on my research, I have contributed to writing several successful grant proposals and projects to participate in multiple consortia, including the highly competitive Clusters4Future initiative. Altogether, these efforts have secured approximately one million euros for my host institute. My involvement in these consortia have expanded my collaborative network, resulting in contributions to high-impact publications such as Cancer Cell, Nature Cancer, and Cell Genomics. In 2024, these achievements granted me a position as principal investigator at the IMO, where I currently supervising a team of three PhD students which are developing their own projects. I am also coordinating a big effort to create a pan-cancer atlas of lncRNA vulnerabilities. Several of these students completed their master's theses under my guidance, and overall, I have supervised six master's students who have all secured PhD positions in reputable institutions. Collectively, this demonstrates my independence as a researcher and my capability to direct my own team and several lines of research in parallel.



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Turno General

Área Temática:

Biomedicina

Nombre:

IBAÑEZ GARIKANO, KRISTINA

Referencia:

RYC2024-049545-I

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Título:

Computational genomics across neurological disorders

Resumen de la Memoria:

I have been analysing human genomic sequences since 2010, combining over 15 years of industry and academic experience to advance research in clinical diagnostics and rare diseases. My career began with a strong foundation in Computational Biology, Bioinformatics, and Artificial Intelligence, leading to a PhD at the Spanish National Cancer Research Centre (CNIO, 2015).

Between 2013 and 2016, I developed bioinformatics tools and analysed over 4,000 samples, including targeted gene panels, some exomes, and a single genome, focusing solely on genomic data for variant annotation and interpretation. In 2015, I began integrating genomics with phenotypic data using Human Phenotype Ontology (HPO) terms, which describe phenotypic abnormalities and clinical features linked to genes that may underlie the phenotype. This approach was transformative in addressing the 'diagnostic odyssey' and inspired me to create solutions that combine genomics with HPO terms to improve diagnostic accuracy.

In 2016, I joined the 100,000 Genomes Project, driven by the opportunity to analyse whole genome sequences (WGS) from patients recruited across National Health System (NHS) England, complemented by comprehensive clinical metadata (HPO terms). I transitioned from analysing hundreds of genes per patient to examining entire genomes. Additionally, I began integrating clinical and genomic data while exploring various types of genetic variants. I was a lead developer of the core pipeline for detecting and interpreting small variants, which is currently the main software used across NHS England. I contributed to the development of PanelApp (Martin AR et al., 2019), a pivotal resource in clinical genomics for the annotation and curation of gene panels, essential for diagnosing rare diseases. I co-authored a 2021 NEJM study (Smedley D. et al.) reporting a 25% diagnostic yield for rare disease cases, leaving 75% unsolved due to limited variant-phenotype evidence. My subsequent work at Nostos Genomics and Fujitsu Research Europe focuses on improving diagnostic rates through advanced bioinformatics for gene-disease associations and variant interpretation. Addressing this challenge drives my research, which focuses on developing more accurate prioritisation pipelines to improve genomic diagnosis. Early and precise diagnoses are crucial, as they can significantly enhance health outcomes and quality of life.

I also led the development and implementation of a pipeline for detecting short tandem repeats (Ibañez K. et al., 2022), which became a cornerstone of NHS England's pipeline. My research has primarily focused on analysing repeat expansions in neurological disorders, culminating in the discovery of their increased frequency in society (Nature Medicine, Ibañez K. et al., 2024). Another key aspect of my research aims to identify novel short tandem repeat expansions in patients with undiagnosed neurological diseases, utilising data from external cohorts such as All of Us. This work promises to directly impact clinical practice by improving patient diagnostics and genetic counselling, while also contributing to broader advancements in human genetics research.

In addition to my research plan, my goal is to foster a collaborative work environment where technical expertise is shared openly, ensuring the team moves forward collectively rather than through individual efforts.

Resumen del Currículum Vitae:

Computer Science Engineer (UCM,2009), with specialisations in Computational Biology and Bioinformatics (UCM, 2010) and Artificial Intelligence (UCM,2011). I completed a PhD combining AI and Bioinformatics through a 'la Caixa-CNIO International PhD Programme' at the Spanish National Cancer Research (CNIO,2015). My research uncovered for the first time the molecular basis of the link between certain neurological disorders and cancer risk (Ibañez K. et al,2014) and I gained broad experience analysing diverse data through collaborations at CNIO.

In 2013, I co-founded the first bioinformatic group at Instituto de Genética Médica y Molecular (INGEMM) at Hospital la Paz. I was the lead developer of bioinformatics tools designed to analyse Next Generation Sequencing data, supporting both clinical diagnostics and research efforts. I created and led the development of LACONv (for detecting large copy number variations) and mOsAiC (for identifying somatic mosaicism). Notably, using mOsAiC to analyse genomes from patients with a specific phenotype, I identified the gene responsible for CLAPO syndrome (Rodriguez-Laguna L. and Ibañez K. et al,2018).

In 2016 I moved to London (UK) to work as Senior Rare Disease Analyst in the 100,000 Genomes Project, led by Genomics England. The objective was to analyse for the first time Whole Genome Sequences (WGS) from 100,000 genomes recruited in cancer and rare diseases, and deploy the developed technology across the National Health System (NHS) England. I was a lead developer of the core pipeline for detecting and interpreting small variants from WGS, especially for rare disease families. Our preliminary report was published in The New England Journal of Medicine (Smedley D. et al,2021). I led the implementation of software for detecting short tandem repeats from WGS (Ibañez K. et al,2022). I also directed and executed the benchmark for small variant detection tools to select the optimal aligner and caller. This work became a key component of the current pipeline used across NHS England's Genomic Medicine Services. Additionally, I ensured adherence to best practices for regulatory compliance (ISO 13485) within the Rare Disease Group and between 2017-2019 I was Head of the Rare Disease group and managed a group of four scientists.

Since 2019, I work as Senior Data Scientist and Lecturer in Computational Genomics at Queen Mary University of London (QMUL) with Dr Arianna Tucci, analysing short tandem repeats in neurological disorders. I recently published in Nature Medicine (Ibañez K. et al,2024) our work showing an increased frequency of these expansions in our society.

In 2021, I began part-time work at QMUL and full-time at Nostos Genomics as Head of Computational Genomics. I led the implementation of the tertiary analysis pipeline for variant prioritisation from WGS in conjunction with clinical data. I also managed a team of four, oversaw regulatory processes, developed software, and presented our work at international conferences. In 2024, I transitioned to Principal Researcher at Fujitsu Research Europe, while continuing my roles as Lecturer and Data Scientist at QMUL, positions I have held since 2019.

Having spent most of my fifteen-year career in industry and six years in academia, I am now eager to dedicate myself full-time to advancing research in clinical diagnosis, drawing on my industry experience.



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Turno General

Área Temática:

Biomedicina

Nombre:

MARTIN FERNANDEZ, MARIO

Referencia:

RYC2024-048213-I

Correo Electrónico:

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Título:

Danger detection and the expression of defensive responses: insights from neurons and astrocytes

Resumen de la Memoria:

I aim to become a fully independent researcher to study the mechanisms underlying recognition of danger and the expression of defensive behaviors. I got my Master's degree at the Universidad Complutense de Madrid. I performed my Master's experimental work in the laboratory of Alfonso Araque at the Cajal Institute in Madrid and then I moved to the USA to obtain my PhD degree in the recently established lab of Alfonso Araque at the University of Minnesota (total length of my stay in USA: 4 years and 5 months). As a PhD student, I published in the journals Nature Neuroscience (first author), Glia (first author), Neuron, Elife and Cerebral Cortex.

For my postdoctoral period, I moved to the lab to Cyril Herry in Bordeaux (France). I funded this transition obtaining the postdoctoral fellowships EMBO and HFSP, which promote mobility and internationalization of researchers. During this period I published articles in Nature, Nature Neuroscience (first and co-corresponding author) and BioRxiv (co-corresponding and last author).

I have been invited to present my work as a speaker at domestic and international scientific meetings, organized and chaired a symposium in the IBRO world congress of neuroscience (2023) and in the FENS Forum (2024) and organized and taught a 3-day course at the University of Palermo. To further develop my supervision skills I have taken an EMBO course on "Laboratory leadership for postdocs" in Germany. I have reviewed scientific articles for prestigious scientific journals as Nature Communications, Communications Biology and Molecular Psychiatry, among others. I have received competitive funding as a principal investigator from the BBRF Young Investigator Grant

Research lines:

Research line 1: Role of distinct prefrontal populations in the generalization of emotional experiences.

I aim to study how different interneuronal populations interact to generate both specific and general representations of danger. I will investigate the causal role of distinct prefrontal cortex (PFC) neurons in the generation of these representations. Furthermore, I aim to investigate the importance of distinct inputs to the PFC for the generation of specific and general representations.

Research line 2: Consolidation of danger neuronal representations during learning.

How representations of danger arise during learning and how they are consolidated is unknown. For this purpose, I aim to investigate how either specific or general representations of danger emerge in the early days of training and the contributions of different neuronal populations

Research line 3: Astrocytic encoding of threat-related information

This is the main research line that I will establish as a fully independent researcher in my own team. My objective is to combine the expertise I acquired during both my PhD and my postdoctoral periods. I aim to decipher the encoding capabilities of the calcium activity in astrocytes to understand to what extent they provide specific representations of animal experiences. Then, I will investigate the causality of those representations by manipulating astrocyte activity and evaluating its consequences on neuronal representations and mice performance. I believe this work may provide critical insights into the role of astrocytes in the cognitive functions of neuronal populations.

Resumen del Currículum Vitae:

My research focuses on the mechanisms underlying the recognition of danger and the expression of defensive behaviours. I have used a multidisciplinary approach and addressed scientific questions from multiple angles in different laboratories of Europe and the US, publishing as first author in high profile journals in both my pre-doctoral and post-doctoral periods (Nature Neuroscience 2017 and Nature Neuroscience 2023).

I got my degree in Biochemistry by the Universidad de Granada, where I was awarded 2 undergraduate research fellowships in the department of Biochemistry. This work was published in an article in Biochim Biophys Acta.

Then I moved to Madrid for my Master's degree at the Universidad Complutense de Madrid (2012-2013). I did my Master's work in the laboratory of Dr. Alfonso Araque (Instituto Cajal) in a collaborative project later published in Glia (co-first author, 2017).

At the end of my Master's degree (2013), Dr. Alfonso Araque moved to the University of Minnesota. I decided to go there to pursue my PhD, becoming the first member of his laboratory in the US. Although engaged in the PhD program of the University Autonomo of Madrid, I spent the whole duration of my PhD period in Minnesota (2014-2018), hired as a Research Specialist and working on my PhD research.

Upon moving to Minnesota, I devised my research question. I studied the function of astrocyte-neuron interactions in the amygdala and their influence on defensive behaviors, establishing this research line in the laboratory. This work was published in Nature Neuroscience in 2017 (first author) in an article cited 302 times.

Moreover, during my PhD period I collaborated in projects published in Neuron, Cerebral cortex, Glia and Elife.

After obtaining my PhD I moved to the laboratory of Cyril Herry in Bordeaux (France) as a postdoctoral researcher. For this period, I earned prestigious support for the EMBO and HFSP fellowships to establish my own research lines. I studied the role of prefrontal neuronal populations in the encoding of both general and specific danger representations. This work has recently been published in Nature Neuroscience in 2023 (first and corresponding author). Another project, on which I have been working as supervisor, is published in BioRxiv (where I am last/senior and co-corresponding author). I have also collaborated in several projects, one of them published in Nature.

I have supervised a Master's student, as well as 3 students during their Master's and PhDs.

I have been invited to present my work as a speaker at domestic and international scientific meetings, I organized symposiums at the IBRO world congress of neuroscience (2023 and the FENS Forum (June 2024). I have organized and lectured a course at the University of Palermo. To further develop my supervision skills I took an EMBO course on "Laboratory leadership for postdocs" in 2022.

I have received competitive funding as a principal investigator from the BBRF Young Investigator Grant to undertake a two year project on the role of neuronal populations in threat representations.



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Turno General

I worked with high levels of independence at all stages of my career, developing my own ideas that have been published in high profile journals. I believe my technical expertise, leadership, publication record and international experience endorse my full transitions as an independent researcher.



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Turno General

Área Temática:

Biomedicina

Nombre:

HUERGA ENCABO, HECTOR

Referencia:

RYC2024-050908-I

Correo Electrónico:

hector_huerta@hotmail.com

Título:

Evolution of clonal hematopoiesis and diseases consequences

Resumen de la Memoria:

After my BSc and MSc, 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, the COVID19 pandemic started so I joined the Crick-Covid-19 Consortium to help setting up a testing facility at the Crick, leading to relevant publications in Nature Biotechnology (2020) and Lancet (2020) on which I was a co-author, as a contributing member of the Crick COVID-19 Consortium. 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, resulting in two publications on which I am first author, in Stem Cell Reports 2021 and STAR Protocols 2021. The experience during the Covid pandemic fostered my confidence and capabilities to adapt to new and demanding research questions and working together with different researchers and teams.

Returning to the focus of my postdoc, I received the Kay Kendall Leukaemia Foundation postdoctoral fellowship that allowed me to develop three main research projects with different perspectives on clonal haematopoiesis. We recently published in Cell Stem Cell (2023), showing that TET2 mutations influence human neutrophil development and function. Moreover, regarding TET2-derived clonal haematopoiesis we uncovered that HSCs bearing TET2 mutations are refractory to immune activation (this work is now in preparation for publication) and (2) regarding DNMT3A, we characterized how frequent blood donation in humans could favour non-malignant DNMT3A-derived clonal haematopoiesis via erythropoietin mediated mechanisms (this work now accepted in principle in Blood).

Over the last year I have been awarded with independent funding from European Hematology Association (EHA) and Cancer Research UK (CRUK) to start developing and supervise research projects for my future group. My lab will try to advance our understanding of how CH-associated diseases arise from alterations in innate immune cells. For example, dendritic cells (DCs) constitute an attractive cell player in the context of CH due to their role in antigen presentation, key for vaccine and cancer immunotherapy. Exploring how CH mutations impact on the role of DCs in mounting effective vaccine responses, which have been surprisingly unexplored, represent an innovative and relevant area of research. Uncovering how the frequent CH mutations accumulated in HSCs may influence vaccination efficacy could represent a major improvement of vaccine-based therapies, especially for the growing population with clonal haematopoiesis.

Resumen del Currículum Vitae:

ORCID: 0000-0002-3723-8624; Total Citations: 1071. H-Index: 13 (Google Scholar)

Publicaciones como primer autor:

- Huerga Encabo H, et al. Loss of TET2 in human hematopoietic stem cells alters the development and function of neutrophils. Cell Stem Cell. 2023 PMID: 37267914. (join first and corresponding author). Total Citations: 27
- Huerga Encabo H, et al. Infecting human hematopoietic stem and progenitor cells with SARS-CoV-2. STAR Protocols. 2021 PMID: 34632411. Total Citations: 4
- Huerga Encabo H, et al. Human Erythroid Progenitors Are Directly Infected by SARS-CoV-2: Implications for Emerging Erythropoiesis in Severe COVID-19 Patients. Stem Cell Reports. 2021 PMID: 33581053. Total Citations: 73
- Huerga Encabo H, et al. The transcription factor NFAT5 limits infection-induced type I interferon responses. J Exp Med. 2020 PMID: 31816635. Total Citations: 23

Colaboraciones relevantes:

- Minutti C, et al. Distinct ontogenetic lineages dictate cDC2 heterogeneity. Nature Immunology. 2024 PMID: 38351322. Total Citations: 14
- Cabeza-Cabrerizo M, et al. Recruitment of dendritic cell progenitors to foci of influenza A virus infection sustains immunity. Science Immunology. 2021 PMID: 34739343. Total Citations: 29
- Grey W, et al. Activation of the receptor tyrosine kinase RET improves long-term hematopoietic stem cell outgrowth and potency. Blood. 2020 PMID: 32589703. Total Citations: 35
- Adrover JM, et al. A Neutrophil Timer Coordinates Immune Defense and Vascular Protection. Immunity. 2019 PMID: 30709741. Total Citations: 424
- Buxadé M, et al. Macrophage-specific MHCII expression is regulated by a remote Ciita enhancer controlled by NFAT5. J Exp Med. 2018 PMID: 30327417. Total Citations: 79

Comunicaciones orales:

- European School of Hematology 5th Scientific Workshop: The Haematological Tumour Microenvironment and its Therapeutic Targeting (2025). [Inflammation favours human TET2-derived clonal haematopoiesis via cohabitation of resilient stem cells and hyperactivated myeloid progeny.](#)
- European Hematology Association annual congress (2024). [Impact of TET2 mutations on hematopoietic stem cell resilience to immune-related stress.](#)



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Turno General

- Stemness and Immunity Crick symposium
- London Stem Cell Network Annual Symposium (2023). "TET2-derived clonal haematopoiesis shapes the immune system".
- IRB Conference: Quantitative dynamics of aging and premalignancy (2022). "Clonal haematopoiesis shapes the immune system: the case of the preleukemic neutrophil".
- British Society of Haematology (BSH) Annual Scientific Meeting (2021). "Human erythroid progenitors are directly infected by SARS-Cov-2: implications for emerging erythropoiesis in severe covid-19 patients".
- London Infections and Immunity Symposium (2019). "New mechanism to balance the production of type I interferon and proinflammatory cytokines in response to viral infections".

Liderazgo y supervision:

- Royal Society of Biologist "Project Management for Biologists" course (2025).
- Supervisor of laboratory research scientist Amirtha Ramesh (since 2024).
- Organizer of the Postdoc Symposium at the Francis Crick Institute (2023, 2024).
- EMBO "Laboratory Leadership" course (2023).
- Founder of the FlowAfrica initiative (2020-2022): <https://trendinafrica.org/flowafrica/>
- Organizer of the Crick Stem Cell Forum (since 2021).
- MSc supervisor of three students (2017, 2020, 2021).



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Turno General

Área Temática:

Biomedicina

Nombre:

DA SILVA DIZ, MARÍA VICTORIA

Referencia:

RYC2024-048650-I

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Título:

Therapeutically targetable metabolic vulnerabilities in leukemias

Resumen de la Memoria:

Over the last 16 years, I have developed an interdisciplinary skill set in stem cell biology, cell signaling, and metabolism, generating and analyzing mouse models. In 2008, I joined the Aging and Cancer Group at IDIBELL (Spain) as a graduate student with a FPI fellowship, under the supervision of Dr. Muñoz. In 2014, I obtained my PhD in Biomedicine from the University of Barcelona. My research explored molecular and functional alterations of epithelial and cancer stem cells during tumor initiation and progression. In particular, my studies demonstrated that alterations in the homeostasis and dynamics of hair follicle stem cells have an impact on skin squamous cell carcinoma (SCC) development. During this time, I also generated orthotopic mouse models of SCCs establishing different tumor progression lineages. Using these models, I found that regulatory mechanisms that control cancer stem cell proliferation and dissemination change in advanced SCCs, correlating with an aggressive tumor growth and enhanced metastasis. Moreover, I described that the functional deficiency of DICER1, a major miRNA biogenesis protein, promotes the acquisition of cancer stem cell properties and metastatic capacity. In this lab, I contributed to 9 research articles (3 first authored) and 1 first-authored review. I participated in several international and national conferences and I was involved in 3 collaborative projects with pharmaceutical companies. During this period, I played a pivotal role on implementing techniques, generating mouse models, and supervising students, contributing to all research articles of the group.

In May 2018, I joined the laboratory of Dr. Herranz at Rutgers University. Here, I focused on the study of novel metabolic targets for the treatment of T-ALL. Specifically, I led three different projects that uncovered the role of mitochondrial oxidative phosphorylation; dissected the metabolic rewiring upon glutaminase loss and, identified ACLY as a novel therapeutic target in T-ALL. In addition, I made significant contributions to the identification of SHMT as a new target in T-ALL, the discovery of a novel enhancer region of PTEN and the oncogenic role of SIRT1 in T-ALL. To this date, I had contributed to 8 research articles (two as first and corresponding author, one as second author) and 2 first-authored editorials. My postdoctoral training at Rutgers has been supported by 2 NJCCR Postdoctoral Fellowships and it was recognized with the prestigious EHA-ASH Translational Research Training in Hematology (TRTH) Program Award. I was privileged to present my work at several international conferences (1 invited and 4 selected oral presentations). I have also contributed to multiple projects (securing >\$5M since 2021). My responsibilities in those projects include training postdocs, lab technicians, PhD, and undergraduate students, as well as writing grant proposals and manuscripts.

Since 2022, as a Research Associate, I established an independent research line on niche-specific dependencies of leukemic cells in pediatric T-ALL, successfully securing funding (2 projects as PI). The data generated from these grants are part of the foundation for my future research plans as an independent investigator focused on modeling pediatric leukemias and deciphering immune metabolic networks in order to discover and target novel therapeutic vulnerabilities.

Resumen del Currículum Vitae:

In 2008, I joined the Aging and Cancer Group as graduate student under the supervision of Dr. Purificación Muñoz at the PEBC at IDIBELL (Spain), supported by the FPI fellowship. In 2014, I obtained my PhD in Biomedicine from the University of Barcelona. My research focused on elucidating the molecular and functional alterations of epithelial and cancer stem cells during tumor initiation and progression. This work resulted in the publication of 3 first-author manuscripts in reputable journals (Oncogene, 2013; Oncogene, 2014; Cancer Research, 2016). Additionally, I published a first-author review (Seminars of Cancer Biology, 2018). In September 2017, I moved to Dr. Jeremy Rich's Lab at University of California San Diego (California, USA) as postdoctoral researcher. In May 2018, I relocated to New Jersey to join Dr. Herranz's Lab at Rutgers University (New Jersey, USA). As a postdoctoral researcher, I uncovered a critical role for mitochondrial oxidative phosphorylation in T-ALL (Blood, 2021) and ACLY as a novel therapeutic target in this disease (Blood Neoplasia, 2025). In addition, I significantly contributed to other projects including: i) the identification of SHMT as a novel therapeutic target for the treatment of T-ALL (Leukemia, 2020); ii) the discovery of a novel tumor suppressor enhancer region of PTEN in T-cell leukemia (Blood Cancer Discovery, 2021); and iii) the description of SIRT1 oncogenic role via deacetylation of KAT7 (Blood Cancer Discovery, 2023). Collaborations with other labs revealed dietary manipulation effects on T cell lineage commitment (Nature Commun, 2022) and slow TCA flux in solid tumors in vivo (Nature, 2023).

Overall, I have published 16 peer-reviewed scientific manuscripts and 1 preprint (5 as a first author and 2 as a corresponding author) and 3 first-authored reviews/editorials. I have supervised and mentored postdocs, technicians and students (2 PhD students, 3 rotating students, 3 master students and 5 undergraduate students). I had the privilege of participating in 23 different international and national research projects (4 of them as principal investigator). In addition, I collaborated in 1 clinical trial and 3 contracts with pharmaceutical companies. My work has been recognized with 2 NJCCR Postdoctoral Fellowships (2019&2021) and the competitive EHA-ASH TRTH Mentoring Program Award.

In 2022, I was promoted to Research Associate. In this role, I have established an independent research line focused on dissecting the niche-specific dependencies of leukemic cells in T-ALL. Since my promotion, I have started collaborations with Dr Bartman (UPenn), Dr Vento-Tormo (Wellcome Sanger Institute), Dr Ballestar and Dr Vaquero (Josep Carreras Institute), Dr Stuari (IRCM), Dr Glytsou (Rutgers), Dr Cole (Rutgers) and Dr Martínez de Paz (Weill Cornell Medicine).

My unique background reflects my dedication to becoming a leader in the field, contributing to the development of new targeted therapies in pediatric leukemias.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Biomedicina
Nombre: BONÀS GUARCH, SÍLVIA
Referencia: RYC2024-049299-I
Correo Electrónico: silvia.bonas@crg.eu
Título: Advancing the genetic understanding of Type 2 Diabetes and leveraging pancreatic islet epigenomics for precision medicine strategies

Resumen de la Memoria:

My research career has focused on elucidating the genetic mechanisms underlying complex diseases, particularly type 2 diabetes (T2D), to advance precision medicine. With 21 publications in Q1 journals (three as first author and two as corresponding author), my work has significantly contributed to the understanding of genetics of T2D, earning over 2,133 citations and an H-index of 15 (WoS, H-index 17 Google Scholar). During my PhD at the Barcelona Supercomputing Centre (2012-2017, Spain), I specialized in genome-wide association studies (GWAS) and genotype imputation, contributing to consortia projects exploring complex trait genetics. A key achievement was identifying a rare X-chromosome variant associated with T2D risk, presenting AGTR2 as a potential therapeutic target, published in Nature Communications (first author, 2018). I deepened my expertise in gene-based association analyses through a PhD stay at the Broad Institute of MIT and Harvard, where I fostered collaborations and contributed to identifying genetically defined T2D subtypes to guide personalized interventions, published in PLOS Medicine (co-author) and led by Dr. M. Udler. As a postdoctoral fellow at J. Ferrer Lab (Centre for Genomic Regulation, CRG, 2017-2023), I studied the functional impact of T2D GWAS signals in non-coding regions. I co-led a pivotal project on pancreatic islet epigenomics, resulting in a co-first author publication in Nature Genetics (2019). There, I developed T2D genetic risk models for insulin secretory dysfunction. I also co-supervised a PhD student, whose thesis included mapping genetic effects on pancreatic islet alternative splicing, leading to a Genome Biology publication where I am co-corresponding author. These studies expanded the T2DSysTems project, which produced the TIGER biobank, a critical resource for T2D research. I am actively involved in international collaborations, such as co-leading a study with the Novo Nordisk Foundation Center for Basic Metabolic Research to map the polygenic architecture of insulin secretion, published in Nat Metab. in 2024 (co-first author). Building on this, I co-developed a proposal for a Novo Nordisk Foundation DD2 Research Grant (2024), focusing on beta-cell function polygenic scores to guide T2D management. During my time as a visiting scholar at Imperial College London (2022-2024), I co-led a study on the regulation of SLC30A8 by non-coding T2D risk variants, leading to a co-corresponding authorship in the FASEB J in 2024. Currently, as a Staff Scientist at CRG, I lead genetic analyses for the ISCIII-funded IMPaCT-T2D project, coordinating the development of patient stratification methods using genomic and AI tools to integrate precision medicine into the Spanish National Health System. My contributions have been recognized through awards, including FI-2013 (FI-DGR 2013) and a Juan de la Cierva-Formación (FJCI-2017-32090) grants. Beyond research, I am committed to mentoring and teaching, having lectured on bioinformatics applied to biomedicine at the University of Barcelona and co-authored a book chapter on diabetes genetics. I also support early-career researcher training through the Marie Skłodowska-Curie ENHPATHY network. Through my work, I aim to advance precision medicine for T2D by leveraging cutting-edge genetic and epigenetic insights to improve disease diagnosis and treatment strategies.

Resumen del Currículum Vitae:

My career has focused on advancing human genetics and precision medicine, with key contributions to the understanding of type 2 diabetes (T2D) genetics and patient care improvements. This includes 21 publications in Q1 journals (3 first author, 2 corresponding) with 2,133 citations, WoS H-index of 15 (Google Scholar H-index 17). My PhD at the Barcelona Supercomputing Center (2012-2017) established my expertise in genome-wide association studies (GWAS) and genotype imputation. Attending the Leena Peltonen School of Human Genomics (2013) shaped collaborations and technical skills. I contributed to high-impact publications on asthma (Nat Genet. 2014), birth weight (Nature 2016) and allergic rhinitis (Nat Genet. 2016), strengthening my disease genetics expertise. A key PhD achievement was my first-author Nat. Commun. (2018) publication identifying a rare X-chromosomal variant linked to T2D, proposing AGTR2 as a therapeutic target. This work addressed major gaps in complex disease genetics and was presented at major international congresses. My international exposure grew with a 3-month stay at the Broad Institute of MIT and Harvard (2015), where I contributed to Dr. Udler's work on T2D genetically-defined subtypes (PLOS Med., 2019), solidifying my global profile. As a postdoctoral researcher at the Centre for Genomic Regulation (CRG, 2017-2022), I transitioned to functional genomics, focusing on non-coding T2D GWAS signals. As co-first author in a Nat. Genet. (2019) publication, I developed T2D genetic risk models integrating epigenomics to assess pancreatic islet dysfunction. I contributed significantly to the EU-funded T2DSysTems project, which established a new platform to foster global T2D research. I led research on pancreatic islet splicing in T2D, published in Genome Biol. (2022) as co-corresponding author, central to Goutham Atluri's PhD thesis, which I co-supervised. This mentoring extended into guiding other young researchers and co-authoring a book chapter on T2D genetic advances accessible for healthcare practitioners. To further delve into the regulatory mechanisms behind T2D risk signals, I pursued a visiting scholar position at Imperial College London (2022-2024). Collaboration with Profs. Rutter and Froguel led to a co-corresponding authorship in a FASEB J. (2024) publication on beta-cell dysfunction mechanisms and new therapeutic avenues. Currently, as Staff Scientist at CRG (2023-), I lead the WP4 of the IMPaCT-T2D project (ISCIII), overseeing genetic analyses for T2D patient stratification and precision medicine. This work builds on tools from the ERC-funded DecodeDiabetes project, where I actively contribute to extend our genetic understanding of monogenic diabetes. My future research will focus on advancing precision medicine for T2D by developing (a) biologically-informed polygenic scores. This work, building on my co-first author Nat Metab. 2024 publication, will refine the understanding of beta-cell dysfunction in T2D, integrating genetic and single-cell



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epigenomics data. The Novo Nordisk-funded DD2 Research Grant (resolution May 2025) will support this, aiming to improve T2D patient classification and treatment. Additionally, leveraging my leadership in the IMPaCT-T2D project, I aim to (b) develop comprehensive genetic risk models integrating rare variants, enhancing T2D outcome prediction and optimizing management.



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Turno General

Área Temática: Biomedicina
Nombre: ARECHEDERRA CALDERON, MARIA
Referencia: RYC2024-048676-I
Correo Electrónico: macalderon@unav.es
Título: Study of the molecular mechanisms and development of diagnostic strategies for the management of patients with liver cancer

Resumen de la Memoria:

Over the past 14 years, my research has focused on elucidating the molecular mechanisms underlying liver cancer progression and identifying novel diagnostic and therapeutic strategies to improve patient care. During my PhD under the supervision of Prof A Porras, I investigated the role of p38 α ; MAPK and C3G in regulating cell survival, migration, and invasion, which earned me the Extraordinary Doctoral Award. My postdoctoral work at the laboratory of Dr F Maina at the Developmental Biology Institute of Marseille expanded my research scope to epigenetics, uncovering the role of gene body DNA hypermethylation in hepatocarcinogenesis and identifying ADAMTSL5 as a novel biomarker and therapeutic target for liver cancer. This work led to an international patent and recognition with the City of Marseille Prize for Foreign Researchers.

In 2018, I joined Prof. Carmen Berasain's group at CIMA-University of Navarra. During this period, I have contributed to elucidating the role of the splicing factor SLU7 in liver chronic disease and tumorigenesis. Moreover, I have led a new research line focused on the seeking of new liquid biopsy strategies, resulting in the development of two innovative tools: (1) a bile-based assay for detecting malignancies associated with biliary strictures, and (2) a plasma-based methylation marker panel for management of patients with hepatocellular carcinoma. These projects have fostered national and international collaborations, secured competitive funding, and established my independence as a principal investigator.

Throughout my career, I have been deeply committed to mentorship and training, having supervised three completed PhD theses (three ongoing), multiple undergraduate and Master's students, and contributing to teaching activities, such as the "Basic Methodology in Translational Liver Research" module in the Master's Program at the Complutense University of Madrid. I actively participate in peer review and evaluation processes, including doctoral and Master's thesis evaluations, AEI grant evaluations, and editorial responsibilities as a member of the Exploration of Digestive Diseases Editorial Board and a guest editor for a special issue on liver cancer.

Additionally, I am a member of the Steering Committee of CIBERehd, where I contribute to strategic planning and decision-making processes. I co-founded The Bilebank Project, an international biobank supporting liquid biopsy research and personalized medicine for hepatobiliopancreatic diseases. My research and dissemination activities are complemented by invited talks and active participation in national and international collaborations, ensuring a translational and interdisciplinary approach.

My current research focuses on elucidating the epigenetic mechanisms driving liver tumorigenesis and advancing liquid biopsy strategies for hepatobiliary cancers. These projects aim to improve early diagnosis and treatment, directly addressing unmet clinical needs in liver cancer. My work integrates basic and translational research, leveraging interdisciplinary collaborations and innovative approaches to bring scientific discoveries closer to clinical application.

Resumen del Currículum Vitae:

I graduated in Pharmacy from the Complutense University of Madrid (2008) and earned my PhD (full marks/honours) in Biochemistry and Molecular Biology (2014), funded by a competitive FPU fellowship. During my PhD, I studied the role of p38 α ; MAPK and C3G in regulating cancer cell migration, invasion, and survival. Key contributions include demonstrating that p38 α ; MAPK protects cells from oxidative stress-induced death and promotes invasion via Fibulin3 downregulation through DNA hypermethylation, and that C3G negatively regulates these processes through Rap1-mediated mechanisms. This research resulted in 4 first-author publications, two research stays in the USA and France, and recognition with the Extraordinary Doctoral Award and the Juan Abelló Pascual II Prize.

As a postdoctoral researcher at the Developmental Biology Institute of Marseille (2015–2018), funded by a Fondation de France fellowship, I explored the epigenetic regulation of hepatocellular carcinoma (HCC). I uncovered that gene body hypermethylation predicts oncogene dosage in liver cancer, characterizing its role in transcriptional reprogramming. I also identified ADAMTSL5 as an epigenetically activated oncogene promoting tumor growth, metastasis, and drug resistance, establishing its clinical relevance as a biomarker and therapeutic target. This work led to an international patent, 3 first-author papers, and recognition with the City of Marseille Prize for Foreign Researchers.

Since 2018, I have worked at CIMA-University of Navarra, initially as an AECC postdoctoral fellow and currently as an AECC Investigator. My research has yielded over 30 publications. Highlights include the discovery that SLU7 is essential for preserving DNA methylation and hepatic identity, and for protecting against liver damage during hepatocarcinogenesis. Additionally, I developed a bile-based liquid biopsy assay for detecting malignancies associated with biliary strictures and I am a co-founder of The Bilebank Project, an international biobank supporting translational research. Moreover, I developed and patented a plasma-based DNA methylation tool for early HCC diagnosis and prognosis. These projects have strengthened international collaborations and resulted in competitive funding.

I have supervised three completed PhD theses (three ongoing) and multiple undergraduate and Master's students. I am a member of the CIBERehd Steering Committee, contributing to the strategic planning, with a key role in bridging science and society. I actively participate in peer review and evaluation for funding agencies, and academic theses. Passionate about science communication, I co-founded in 2012 the outreach blog Dciencia, awarded the 2023 Science in Spanish Prize by Fundación Madri+d. My career reflects a commitment to translational research, interdisciplinary collaboration, and science outreach.



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Turno General

Área Temática: Biomedicina
Nombre: ISMALAJ , ERMAL
Referencia: RYC2024-048323-I
Correo Electrónico: eismalaj@cicbiomagune.es
Título: Novel PET tracers targeting cardiac conduction

Resumen de la Memoria:

My research focuses on harnessing organic chemistry to develop unknown molecules principally applicable to materials science, drug discovery, chemical probes and diagnostic agents. Currently, I aim to employ these toolkits to elucidate the role of voltage-gated calcium channels in cardiology and neurodegeneration

Already as a Master's student, I dedicated to developing unknown molecules and the first-ever class of molecules that I created were capable of abolishing DNA double-strand break repair in cancer cells. This achievement led to my first-ever co-authored paper (Mol Cell 2014) achieved already during my Master's thesis.

Since then, I dedicated to discovering novel functional groups highly relevant for drug discovery such as the fluorinating motifs. To streamline their preparation and accessibility, I have developed multiple bench stable reagents that were successfully employed as difluoroalkylthiolating agents (Angew2016, JOC2016, OrgLett2018 etc). In addition, I have developed novel reactions to prepare pentafluorosulfanylated compounds (ChemEurJ2023, Org Lett2024), 2nd generation click handles (Angew2023; 2024) employable as biorthogonal toolkits for covalent drug discovery, far-red fluorescent ligands and PET tracers specific for calcium channels (JMedChem 2024).

In the next five years, I will implement an ambitious research program that aims to establish the role of voltage-gated ion channels (VGIC) in diseases via in vivo diagnostic imaging. This will be achieved via the development of novel positron emission tomography radiotracers, specific to key VGIC isoforms implicated in cardiovascular diseases (CVDs).

CVDs remain the leading cause of death globally, accounting for over 30% of all fatalities despite significant efforts of academic and industrial research in preventing, diagnosing and treating heart diseases. Sudden cardiac death (SCD), primarily associated with arrhythmias is responsible for approximately 20 % of all deaths. Arrhythmia-induced SCDs, in both structural and genetic origin, are strongly linked to dysfunctional cardiac conduction, where voltage-gated ion channels play a critical role. Currently, we lack in vivo imaging diagnostics able to interrogate VGICs at a molecular level and correlate changes in expression to diseases.

To bridge this gap, I will design first-in-class PET ligands specifically designed to selectively target distinct isoforms, marking a major advance in cardiac molecular imaging. The ligands will be synthesized using well-characterized lead compounds as a starting point. These lead compounds will be selected based on their known affinity and selectivity for each isoform, ensuring high specificity and minimal off-target interactions. To maintain the integrity of the lead compounds, site-specific incorporation of short-lived radioisotopes such as ¹¹-carbon and ¹⁸-fluorine will be employed, without altering parent's compound structure. After initial in vitro screening to assess binding affinity selectivity and metabolic stability, candidates with favorable pharmacokinetic profiles will then be tested in vivo to elucidate their biodistribution profile and target engagement.

Resumen del Currículum Vitae:

I am a highly experienced organic chemist carrying out interdisciplinary research at the interface of chemistry, biology and imaging.

Originally from Albania, I studied and carried out research in five different countries. I graduated in Pharmacy from the University of Siena, and defended my PhD thesis in organic chemistry from the University of Lyon. Throughout my career, I developed waste-minimized protocols for Miyama and Heck cross-coupling reactions. I designed innovative organofluorine chemistry approaches, including first-in-class bench-stable reagents, SuFEx-type next-generation click chemistry and novel pentafluorosulfanylation reactions. I also devised bioimaging toolkits such as fluorescent ligands for HDACs and VGICs.

I co-authored 24 publications, with many appearing in renowned journals like Angew Chem, Green Chem, ACS Sus Chem Eng, Org Lett, J Med Chem and Mol Cell. These works have accumulated around 1400 citations (Google Scholar).

During these years, my research has been supported by numerous prestigious grants including a Marie Curie-FWO individual fellowship, a Gipuzkoa Fellowship and very recently an Ikerbasque fellowship. Additionally, I have participated in several projects as a PI or team member both at a national as well as international level.

I have solid project management and leadership expertise, having led multiple research projects simultaneously. I have mentored and tutored a dozen of junior researchers, including Master's and PhD candidates. I have directed 5 Master's theses, 4 of whom joined PhD programs in prestigious institutions and one PhD thesis. Currently, I co-direct four PhD theses in organic chemistry/bioimaging.

I have presented my research at numerous international conferences, delivering both talks and posters, including two invited lectures. I also contribute to editorial activities by reviewing for leading journals (Angew Chem, Green Chem, Chem Sci etc), conference abstracts (EMIM), and prestigious grants as expert evaluator for prestigious European grants. I am a member of the training committee at CIC-biomaGUNE, coordinating internal PhD assessments, organising seminars and other related tasks. Finally, I am a member of the RSC, ACS and ESMI.



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Turno General

Área Temática:

Biomedicina

Nombre:

BARDINI BRESSAN, RAUL

Referencia:

RYC2024-048827-I

Correo Electrónico:

rbressan@cnio.es

Título:

Targeting neurodevelopmental pathways in paediatric brain tumours

Resumen de la Memoria:

My research vision encompasses overlapping aspects of cancer, stem cells and developmental biology. Throughout my scientific training, I have addressed important links among development, tissue repair and cancer in the context of the intestinal epithelium and the nervous system. These experiences provided me a broad view of the stem cell and cancer research fields (ranging from neurodevelopment and oncology to intestinal regeneration and inflammation) and equipped me with solid hands-on knowledge in a variety of model systems and state-of-art techniques.

Moving forward as an independent researcher, my goal is to develop effective therapies for patients with paediatric brain tumours via an enhanced understanding of normal brain development and underlying mechanisms of oncogenic competence. By establishing unique research niche at the intersection of neurodevelopment and cancer biology, I aim to capitalize on my solid background in stem cell and epigenetics research to explore how mechanisms of development are disrupted in aggressive paediatric brain tumours known as high-grade gliomas.

Using my experience in genome engineering and stem cell biology, my research will focus on the generation advanced human models of brain development and cancer to perform functional genetic studies for both exploration of fundamental disease biology and drug discovery purposes for this poorly understood and untreatable group of disease. More specifically, my immediate goal is to dissect cell-intrinsic mechanisms of oncogenic competence and explore the interplay between histone biology and transcriptional control of cell fate choices in brain development and paediatric tumorigenesis. Such mechanisms are likely to be involved in the control of cell fate decision and their disruption might be the at the root of tumour initiation and progression. In addition, using my experience in transcriptomic and chromatin profiling studies, another major focus of my research will be to dissect mechanisms of therapy resistance and relapse in paediatric brain tumours – an unmet need in the field of paediatric neuro-oncology. Finally, moving closer to translational application, I aim to capitalize on my expertise in cancer disease modelling and phenotypic screening in the search for novel therapeutic targets for paediatric brain tumours.

Altogether, my research will tackle fundamental questions in paediatric neuro-oncology and, ultimately, contribute to a better understanding of these devastating diseases. The translational-oriented aspects of the research line will allow the identification of novel targetable vulnerabilities and provide the basis for the development of novel therapeutic strategies. In the long term, I envisage that my research will provide a major milestone in the understanding of disease biology and assist the development of novel therapeutic modalities that can eventually lead to curative therapies for paediatric high-grade gliomas.

Resumen del Currículum Vitae:

I am a stem cell biologist with over fifteen-year hands-on experiences in the field of developmental and cancer biology, and a highly international research profile. Starting my academic career as an undergraduate research assistant at the Federal University of Santa Catarina (Brazil), I directly moved on to carry out my PhD studies at the Center for Regenerative Medicine at the University of Edinburgh (United Kingdom). I then I carried out my postdoctoral training at the Center for Stem Cell Medicine of the University of Copenhagen (Denmark), and later transition to an independent position as a staff scientist at the National Cancer Research Center in Spain.

My technical expertise include genome editing and CRISPR-Cas9 technology, organoid and stem cell culture, genome-wide transcriptomic and chromatin profiling approaches, proteomics, high-throughput imaging and drug screening, molecular cloning, and core molecular and cellular assays. Conceptually, my research vision encompasses overlapping aspects of regenerative medicine, developmental biology and oncology. I am particularly interested in understanding how fundamental principles or mechanisms of development are repurposed for tissue repair and during malignant transformation. During my PhD and postdoctoral training, I addressed this fundamental question specifically in the context of brain cancer and regeneration of the intestinal epithelium. Besides shedding light into basic biology, my worked has also provided avenues for therapeutic development for gliomas and inflammatory bowel diseases, in the latter case resulting in a patent application covering the novel use of a pharmacological inhibitors for the treatment of ulcerative conditions.

Professionally, throughout my academic career I have been capable of conceiving novel research ideas and securing independent grants, such as the Science Without Borders full PhD scholarship and the two highly prestigious postdoctoral fellowships from EMBO and MSCA fellowship schemes. Similarly, my research has been published in highly prestigious journals in the field, including Cell Stem Cell, Nature Genetics, and Development. Of note, these experiences have provided me the scientific maturity and soft skills required for a successful career as an independent researcher, including project management, task delegation, communication and teamwork skills.

Currently as a staff scientist in association with the Brain Metastasis group at the National Cancer Research Center (CNIO), I am using this expertise in genome engineering and stem cell biology to generate refined experimental models of paediatric brain tumours for exploration of fundamental disease biology and drug discovery purposes. In collaboration with the team at CNIO and other groups in Spain and abroad, my goal is to deploy these models to dissect and target mechanisms of therapy resistance and relapse, which represent a major unmet need for the management of aggressive paediatric brain tumours.



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Turno General

Área Temática: Biomedicina
Nombre: DE VIRGLIIS, FRANCESCO
Referencia: RYC2024-050395-I
Correo Electrónico: francesco.devir@gmail.com
Título: A comprehensive map of neuro-immune interactions in health and disease

Resumen de la Memoria:

My research plan builds upon my established expertise in neuroimmunology to investigate the intricate communication between the nervous and immune systems. My past achievements include demonstrating the role of reactive oxygen species in neuronal regeneration and the influence of circadian rhythms on axonal repair. His current research, funded by a prestigious HFSP Postdoctoral Fellowship, focuses on elucidating the neuronal pathways connecting the retina to lymph nodes and how environmental light influences immune responses. This involves advanced techniques like optogenetics, chemogenetics, and viral tracing. My future research will comprehensively map the anatomical and functional circuits linking the brain to peripheral immune organs, both in physiological and pathological conditions. This will involve identifying the specific neural pathways and molecular mechanisms mediating these connections. A key focus will be characterizing how the brain encodes and retrieves information about tissue-specific immune challenges, using innovative approaches like TRAP2 mice to identify activated neurons. Furthermore, my research will explore the novel concept of "social immunity," investigating how inter-individual communication of immune states occurs and its implications for disease spread and pandemic preparedness. The ultimate goal is to identify biomarkers and therapeutic targets for a wide range of inflammatory and autoimmune diseases, with the long-term vision encompassing the developmental and evolutionary aspects of neuro-immune interactions. My collaborative efforts with leading researchers in the field will significantly advance understanding and treatment of these complex interactions.

Resumen del Currículum Vitae:

My CV showcases a strong international research trajectory focused on neuroimmunology, culminating in a comprehensive research plan. My past work as MSc in Sapienza university of Rome established key findings on the impact of stress hormones on synaptic plasticity and later as post-graduate at the Hertie Institute for Brain research in Tuebingen, Germany, the crucial role of reactive oxygen species and exosomes in neuronal regeneration following injury. As PhD and later post-doc at Imperial College London, I further demonstrated the influence of circadian rhythms on axonal repair, showing that time-of-day dependent responses require a functional neuronal clock and can be modulated by chrono-active drugs. Currently, my research, supported by a prestigious Human Frontiers Science Program Fellowship and a Maître-Assistant position at the University of Geneva, centers on the intricate communication between the nervous and immune systems. I employ cutting-edge techniques including optogenetics and chemogenetics to investigate the neuronal pathways mediating the effects of environmental light on immune responses, specifically focusing on the retina-to-lymph node pathway. My work also includes studying circadian immune responses in a multiple sclerosis mouse model. My ambitious future research plan expands on this foundation, aiming to create a detailed map of the anatomical and functional neuro-immune circuits, both in healthy and pathological states. A key element is characterizing how the brain encodes and retrieves information about tissue-specific immune challenges. My extensive publication record and numerous collaborations solidify his position as a rising leader in the field, with a long-term vision encompassing the developmental and evolutionary aspects of neuro-immune interactions.



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Turno General

Área Temática: Biomedicina
Nombre: GARCIA MOURE, MARC
Referencia: RYC2024-048787-I
Correo Electrónico: marcgarciamoure@gmail.com
Título: VIROIMMUNOTHERAPY FOR PEDIATRIC BRAIN TUMORS

Resumen de la Memoria:

Pediatric high-grade gliomas (pHGGs) are among the most lethal childhood cancers, with survival rates remaining dismally low despite decades of research. These tumors are particularly challenging to treat due to their infiltrative nature, anatomical location, and the limitations of existing therapeutic options, which are often palliative and associated with significant morbidity.

Viroimmunotherapy has emerged as a promising approach to address these challenges. Oncolytic viruses, such as Delta-24-RGD, have shown potential by selectively targeting tumor cells and triggering immune responses capable of reshaping the tumor microenvironment. Clinical trials have demonstrated the safety and encouraging efficacy results of these therapies. However, the complex interplay between the tumor, the virus, and the immune system poses significant barriers to current approaches, limiting their long-term effectiveness in pediatric brain tumors.

My research line aims to overcome these limitations by addressing the mechanisms of resistance inherent to viroimmunotherapy. By prioritizing a deeper understanding of the tumor microenvironment and immune dynamics, the project seeks to pave the way for transformative advancements in the field. The overarching goal is to develop innovative strategies that enhance therapeutic responses, ensure durability, and expand the clinical applicability of virotherapy.

Beyond advancing the science of viroimmunotherapy, this research holds profound clinical implications. By addressing the pressing needs of underserved patient populations, such as children with malignant brain tumors, it seeks to bridge the gap between preclinical breakthroughs and meaningful clinical outcomes. Furthermore, this work has the potential to guide the design of future clinical trials and inform the development of next-generation virotherapies, ultimately advancing cancer treatment across diverse tumor types.

Resumen del Currículum Vitae:

My scientific career has been rooted in genetic engineering of viral particles to address unmet clinical needs. During my Ph.D. studies at the Autonomous University of Barcelona (UAB), I gained extensive knowledge of adenoviral vectors and how to modify them for therapeutic purposes. After completing my Ph.D., I joined the University of Navarra (UNAV) as a postdoctoral researcher to apply viroimmunotherapy for pediatric malignant brain tumors and other solid tumors. There, I developed nearly 20 novel oncolytic viruses encoding therapeutic molecules such as recombinant proteins, peptides, and non-coding RNAs, to potentiate the adaptive and innate anti-tumor immune responses, some of which have been submitted for patent evaluation. I contributed to the development of preclinical models to test viroimmunotherapy in pediatric brain tumors like DIPG (Nat Commun 2019; Acta Neuropathol 2019) and embryonal tumor models (Sci Rep 2019; Clin Cancer Res 2020) that generated data supporting clinical trials, including a first-in-human Phase I clinical trial for DIPG (NCT03178032). This study demonstrated the safety of the adenovirus Delta-24-RGD for brainstem gliomas, with evidence of clinical responses and correlative studies guiding future improvements, culminating in a first-author publication in The New England Journal of Medicine (2022). We further upgraded Delta-24-RGD by introducing T cell activator transgenes (JCI Insight 2022; Mol Cancer Ther 2022; JTC 2021) and through combinations with the imipridone ONC201 (Neuro Oncol 2024). Beyond virotherapy, I was involved in testing TIM3 immune checkpoint inhibition in DIPG (Can Cell 2023), where we reported a remarkable therapeutic effect and a novel mechanism of action of this molecule in tumor cells. Upon completing my stage at UNAV, I moved to MD Anderson Cancer Center for a second postdoctoral stage in the lab of Drs. Fueyo and Gomez-Manzano, a foundational lab in virotherapy. My research here focuses on understanding the interplay between viruses, the tumor, and the tumor microenvironment, aiming to improve viroimmunotherapy for pediatric brain tumors by addressing key pathways such as tryptophan metabolism.

Overall, my scientific contributions include 25 publications (Neuro Oncol, Can Cell, N Eng J Med, Clin Cancer Res, Nat Commun), which have collectively received over 500 citations. My research has been presented at major international meetings (SNO, ISPNO, AACR, IAM, SITC). Additional achievements include mentoring Ph.D. and M.S. students.

In summary, my research experience has fostered my leadership abilities, expanded my expertise in translational research, and prepared me to take the next step in my career as an independent researcher and to lead impactful projects that advance viroimmunotherapy for brain tumors.



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Turno General

Área Temática: Biomedicina
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Título: Neuroepigenetics: from Huntington's disease pathophysiology to the fundamental basis of cellular identity maintenance

Resumen de la Memoria:

I conducted my PhD in Biomedicine studying the role of nuclear lamina alterations in Huntington's disease (HD) pathophysiology. More specifically, I aimed to understand if altered levels of lamin B proteins could participate in transcriptional dysregulation observed in the hippocampus of HD mouse models due to alterations in lamin-associated domains. This brought me to conduct two secondments in the CRUK Cambridge Institute, where I initiated my formation in epigenetics and transcriptomics, being trained in advanced Next Generation Sequencing techniques such as RNA-seq, ChIP-seq and ATAC-seq, generating crucial data for my PhD project. Afterwards, I initiated my postdoctoral career focusing on the analysis of striatal epigenetic alterations in HD and their impact in behavioral alterations. During the first part of my postdoctoral career, I characterized age-related epigenetic alterations in HD models affecting striatal identity genes. In addition, thanks to a collaboration, I set up a chromatin architecture-based technique (4C-seq) that allowed us to characterize locus specific alterations in chromatin 3D spatial organization. The second project that I developed during my postdoctoral career was focused on the impact of deficient epigenetic and transcriptional adaptations in the striatum of an HD mouse model accompanying cognitive deficits in a striatal-dependent memory task. Finally, we have also recently characterized cell-specific epigenetic alterations in HD mouse leading to the de-repression of developmental genes, which resembles an acceleration of physiological epigenetic erosion mediated by polycomb repressive complexes 1 and 2 taking advantage of a recently developed technique, CUT&Tag, in combination with Fluorescence-activated nuclear sorting (FANS). Altogether, this research path grew my interest in the fundamental role of epigenetic adaptations regulating cell identity and memory processes in the adult brain. To pursue this interest, in 2022 I moved to the Institute of Neuroscience (CSIC-UMH), where thanks to a Juan de la Cierva Incorporación first, and a 'la Caixa' Junior Leader Postdoctoral fellowship and SEJIGENT project afterwards, I have recently initiated my own line of research studying the plasticity of neuronal identity and chromatin architecture in the adult brain. As a short-term goal of my independent line of research I am working in the development of a novel epigenetic approach for studying chromatin 3D organization genome-wide, inspired in the principle settled by the technique Genome Architecture Mapping (GAM) developed by Prof. Ana Pombo (Berlin Institute for Medical Systems Biology, MDC-BIMSB), with who I am actively collaborating thanks to my current 'la Caixa' project. Thanks to this approach and to the extensive skillset I have acquired in the field of epigenetics, the long-term goal of my line of research is studying the role of chromatin organization in different processes involving the CNS such as the perturbation of terminal cell identity, the creation and storage of long-term memory traces and its implication in distinct pathologies of the CNS such as HD or AD. I expect that my independence and leadership capabilities will allow me to establish a highly performing team working in the field of Neuroepigenetics, contributing to the Spanish representation in this emerging field of research.

Resumen del Currículum Vitae:

My scientific career started in the group of Dr. Esther Pérez Navarro (UB, Barcelona) investigating molecular mechanisms altered in Huntington's disease with the support of a Spanish FPI fellowship. During that period, I investigated the role of nuclear lamina alterations in the pathophysiology of the disease, receiving an extensive formation in biochemical, cellular and molecular biology techniques. During the last two years (2015-2016) of my PhD I conducted two stays of four and two and a half months in the laboratory of Dr. Masashi Narita in the Cancer Research UK Cambridge Institute to generate RNA-seq, ChIP-seq and ATAC-seq experiments, allowing our research to significantly improve and be published in EMBO Molecular Medicine. During my PhD, I also participated in other research projects conducted in our laboratory, leading to the authorship of six additional peer-reviewed publications. Afterwards, in January 2017, I joined the laboratory of Dr. Karine Merienne (LNCA, Strasbourg) as a postdoctoral fellow while finishing the submission of my PhD thesis. There, I investigated epigenetic alterations in Huntington's disease mouse models and their relevance in the cognitive impairment associated to the disease. In the five years that I worked as a postdoctoral researcher in Dr. Merienne's laboratory, I extended my training in the field of neuroepigenetics by improving my knowledge on previously used NGS techniques such as RNA-seq and ChIP-seq, but also got initiated in the field of chromatin architecture thanks to an active collaboration with Thomas Sexton (IGBMC, Strasbourg). The generated results during my postdoctoral career have been published in high impact factor journals, including a recently accepted Nature Communications (in press), a Progress in Neurobiology (2022) and an additional Nature Communications (2020) article. During that period, I also participated in additional projects carried out in the LNCA, leading to four additional peer-reviewed articles. In 2022 I joined the laboratory of Pr. Angel Barco, in the Institute of Neuroscience of Alicante thanks to the support of a 'Juan de la Cierva Incorporación' fellowship. I was posteriorly awarded with several other competitive fellowships including a Marie-Curie Postdoctoral Fellowship, a CDEIGENT Postdoctoral Fellowship and a Postdoctoral Junior Leader Incoming Fellowship from 'la Caixa Foundation'. In December 2022 I started my 'la Caixa' Postdoctoral Junior Leader fellowship as Principal Investigator of the project entitled "NeuroID3D: Assessing the impact of KAT3-mediated transient neuronal identity loss in chromatin 3D spatial organization and memory maintenance" (297.900€, 2022-2025) in the laboratory of Pr. Angel Barco. More recently, in 2023, I was awarded with a SEJIGENT project from the Generalitat Valenciana (320.000€, 2023-2026) to continue and extend the research line previously initiated by the 'la Caixa' Junior Leader project. Finally, in 2023 I obtained the R3 certification by the AEI as a recognition of the quality and research independence following the European profile of established researcher. Currently my team is composed by a PhD student and a laboratory technician funded by my own research projects, initiating the first steps in the creation of my independent research group.



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Turno General

Área Temática: Biomedicina
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Título: Neutrophils at the Clinic in Steady-State and Disease

Resumen de la Memoria:

Desde 2018, me incorporé al laboratorio del Prof. Francisco J. Tinahones (IBIMA, Málaga), bajo la supervisión del Dr. Manuel Macías, mediante un contrato predoctoral competitivo, para trabajar en la línea de vitamina D y cáncer, desde perspectivas epidemiológicas, celulares y moleculares. Concretamente, determinamos que la vitamina D reduce el riesgo de desarrollar CRC, al modular la metilación de DNA en genes asociados con la inflamación y carcinogénesis. Para profundizar en este mecanismo, realicé una estancia de 3 meses en el laboratorio del Dr. Alberto Dávalos (IMDEA Food, Madrid), donde estudié el impacto epigenético de otros compuestos nutricionales. En particular, encontramos que el hidroxitirosol, un potente antioxidante presente en el aceite de oliva, era capaz de inducir modificaciones epigenéticas en células tumorales. A finales de 2021, obtuve mi título de Doctor (Cum Laude), siendo reconocido con el Premio Extraordinario de Tesis en 2024, reflejo de mi significativa contribución científica. En 2022, inicié mi etapa posdoctoral, centrada en la reprogramación epigenética de células inmunes en enfermedades inflamatorias. Como parte de esta línea, realicé una estancia de 5 meses en el laboratorio del Prof. Lee Parry (Cardiff University, Reino Unido) gracias a la beca EMBO. Allí investigué la relación entre el sistema inmune y el epigenoma en células madre intestinales, en respuesta a diferentes nutrientes, como la vitamina D, en organoides. Descubrimos que la vitamina D tiene la capacidad de modular epigenéticamente a las células madre intestinales actuando sobre vías relacionadas con la proliferación celular.

Este periodo me permitió identificar componentes nutricionales aislados y su contribución a las enfermedades inflamatorias. Para profundizar en estos mecanismos, en 2023 me uní al laboratorio del Prof. José López-Miranda (IMIBIC, Córdoba) mediante un contrato Sara Borrell (CD22/00053), para estudiar la modulación del sistema inmune en el marco del estudio CORDIOPREV, un ensayo clínico con 1,002 pacientes intervenidos con dieta mediterránea y dieta baja en grasas. Específicamente, mi trabajo se ha centrado en estudiar los neutrófilos (los glóbulos blancos más abundantes en sangre) y su modulación por la dieta. Para perfeccionar mi conocimiento, realicé una estancia de 9.5 meses en el laboratorio del Prof. Oliver Soehnlein (Universidad de Münster, Alemania), financiada con una beca MAES (ISCIII), donde investigué el papel mecanístico de los neutrófilos en condiciones inflamatorias estériles. Cabe destacar que descubrimos que los neutrófilos desempeñan un papel crucial en la inflamación vascular y que la dieta mediterránea representa una estrategia terapéutica innovadora con impacto clínico inmediato, cuyos principales resultados se recogieron en la prestigiosa revista *European Heart Journal* (IF: 38.1). En resumen, tanto los nutrientes individuales como la dieta en su conjunto tienen la capacidad de modular la inflamación a través de diversos mecanismos, muchos de ellos aún desconocidos. Por ello, he iniciado mi propia línea denominada "Neutrófilos en la clínica, en la salud y en la enfermedad", enfocada en comprender cómo los neutrófilos contribuyen a la inflamación sistémica en diferentes escenarios, con el objetivo de identificar nuevas dianas terapéuticas para modular su acción y prevenir su impacto negativo.

Resumen del Currículum Vitae:

A lo largo de mi trayectoria científica y gracias a diversas estancias nacionales e internacionales, he consolidado mis conocimientos sobre enfermedades inflamatorias, tales como obesidad, diabetes y cáncer. Asimismo, he investigado el origen de esta inflamación en contextos estériles, estudiando los mecanismos moleculares y celulares implicados, e identificando actores clave como los neutrófilos. Este trabajo ha sido posible gracias al desarrollo de habilidades técnicas fundamentales en biología celular y molecular, nutrición, inmunología, epigenética, bioinformática y epidemiología. Mi producción científica incluye 38 artículos (23 como primer autor, 3 como último/autor de correspondencia; 5 en D1 y 18 en Q1, uno con IF = 38.1 y varios con IF por encima de 10) con un total de 539 citas (índices $h = 13$, $i10 = 16$), además de 3 capítulos de libro y más de 50 presentaciones en congresos nacionales e internacionales. Asimismo, soy Investigador Principal de un proyecto nacional financiado por el ISCIII (PI24/00061) y colaborador en otros 9 proyectos, incluyendo ensayos clínicos y patentes y colaboraciones con empresas privadas.

En el ámbito académico, soy docente en el II Máster en Investigación en Obesidad y Diabetes de la Universidad de Málaga, donde imparto el módulo "Nutrigenómica en el tratamiento personalizado de la obesidad y la diabetes". Durante este máster, supervisé el trabajo fin de máster del Zeniff Gómez. También fui supervisor del estudiante de doctorado Roberto de Paula do Nascimento (Cardiff University y Universidad de Campinas, Brasil) durante una estancia de investigación de un mes en junio de 2023, como parte de su formación doctoral. Además, he supervisado a cuatro estudiantes del programa de Técnico Superior del CESUR High School (Málaga, España). Recientemente, participé en la última convocatoria de Redes Doctorales Marie Curie (EpiImMet-CRC), en colaboración con instituciones de Alemania, Italia, Países Bajos y Letonia, para la captación de estudiantes de doctorado (actualmente en evaluación). Adicionalmente, soy Editor Invitado de un número especial en *Nutrients*, titulado "Nutritional Status and Lifestyle in Metabolic Disorders", que aborda la interacción entre el estado nutricional, los factores de estilo de vida y el desarrollo, prevención y manejo de trastornos metabólicos. También formé parte del comité organizador del evento conjunto CIBER-OBN y CIBER-ONC, VI Young Researchers Meeting, una plataforma para jóvenes científicos en los campos de oncología, nutrición y obesidad. Además, actué como Chair en la última edición del 15th IMIBIC Young Investigator Meeting, en la sesión dedicada a enfermedades crónicas e inflamatorias.

Por último, destaco mi colaboración con investigadores nacionales e internacionales de distintas áreas, como Pallavi Kompella (EE.UU.), Ivonne Botcher (Noruega), Akin Kayir (Turquía), Oliver Soehnlein (Alemania), Nerea Becerra-Tomás y Lee Parry (Reino Unido), entre otros. Soy miembro activo de COST CA21135, del grupo GC09 (IMIBIC), CIBEROBN (CB06/03/0018) y CTS560.



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Turno General

Área Temática: Biomedicina
Nombre: KOLLER KOLLER, DORA
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Correo Electrónico: dorakoller91@gmail.com
Título: Genomics and Clinical Pharmacology: Advancing Precision Medicine in Endometriosis and Mental Health

Resumen de la Memoria:

Besides my established expertise in epidemiological and genetic methods, I also have experience with clinical trials and patient recruitment. Despite my early career status in research, I have successfully led multiple multidisciplinary projects, integrating concepts from various fields. My interdisciplinary approach has enabled me to formulate and follow through on complex ideas, bridging knowledge across diverse domains. I joined my first research group as early as a Bachelor's student, where I was leading a collaboration with another department. During my doctoral training, I did clinical research, where I was the lead investigator of a phase I clinical trial from theory to finish (including ethical approval, patient recruitment, screening, writing informed consent forms, interacting with patients, data collection, sample preparation and processing, database entry, data analysis, publication). In addition to reporting the metabolic side effects of antipsychotic medication in both sexes, we also focused on antipsychotic-induced hyperprolactinemia and its pharmacogenetics. Hyperprolactinemia can lead to menstrual abnormalities like anovulation, and amenorrhea in women. These studies made me realize how medications affect males and females differently. This research and my own experience with endometriosis motivated me to do research in the field of women's health. Hence, during my postdoctoral work at Yale University, where I joined a highly successful and respected group led by Dr. Renato Polimanti, I led projects on the psychiatric comorbidities of endometriosis and the relationship between the disease and traumatic events in a large-scale dataset, including an epidemiological and genetic assessment. Because of this study, I established several new collaborations with internationally recognized scientists who were inspired by our research (e.g., Drs. Lea Davis, Laura Huckins, Karoline Kuchenbaecker, Karestan Koenen). While working on this study, I reviewed all available literature on the topic, and found that there are several gaps which still need to be filled. I have been working on multiple other projects as well (including the genetic overlap between chronic pain and substance use), published in high-impact journals such as Nature Genetics, Molecular Psychiatry, JAMA journals), served as corresponding author on my publications, learned to perform numerous analytical methods in epidemiology and genetic epidemiology (e.g., polygenic risk scoring, mendelian randomization, genetic correlation, pathway analysis, etc.), and obtained advanced coding skills in R, Linux, and python. Hence, given my advanced knowledge in statistics, clinical trials, and genetics, I believe I have the unique capacity to successfully lead my own research group. Furthermore, I have extensive experience in mentoring students, leading projects from idea to publication, forming international collaborations, participating as an analyst in several international consortia, and communicating my findings both inside and outside of the scientific community. Indeed, my publication about the psychiatric comorbidities of endometriosis reached significant media attention, appearing 17 times in the news, and was one of the most read publication at Yale School of Medicine this year (36 citations, more than 23,000 accesses, with an Altmetric score of 167).

Resumen del Currículum Vitae:

Dr. Dora Koller is a versatile researcher with a Ph.D. in Pharmacology and Physiology from the Autonomous University of Madrid. Her academic pursuits began very early, in genetics, investigating dog behavior and genetic polymorphisms in type 2 diabetes mellitus during her Bachelor's and Master's studies. As a Ph.D. student at Hospital Universitario de La Princesa, she worked on precision medicine of antipsychotic side effects. She was funded by a Marie Curie Ph.D. scholarship, and then a Marie Curie Individual Fellowship during her postdoctoral studies at Yale University and the University of Barcelona. Her postdoctoral research covered the genomic basis of psychiatric disorders, behavioral traits, and chronic-pain related conditions. She enriched her experience with short stays and research roles across institutions, including two continents, four countries, and five cities. Dr. Koller's contributions have earned her recognition, including awards for the best Ph.D. in Pharmacology, Excellence in Human Genetics Award from the American Society of Human Genetics, and several travel awards. Her extensive funding portfolio, exceeding €500,000, underscores her commitment to interdisciplinary research bridging genetics, pharmacology, and behavioral science. Dr. Koller published an extraordinary amount of papers for her career stage, with 66 papers of which 17 as first author, and 1 as last author. Dr. Koller is highly collaborative, working as a main analyst in several consortia, including the Psychiatric Genomics Consortium, and the Million Veteran Program. She presented her work 10 times in the most relevant international conferences in the field (e.g., World Congress of Psychiatric Genetics, American Society of Human Genetics conference, Society of Biological Psychiatry annual meeting) in the form of oral presentation, and also presented posters 13 times. She was invited for a talk several times in different groups looking for collaboration (e.g., Christine Sieberg's group at Harvard University, Karoline Kuchenbaecker's group at University College London, Serena Tucci's group at Yale University, Karestan Koenen's group at Harvard University). Dr. Koller has extensive experience in supervising and mentoring students and researchers across different institutions. At Yale University, Dr. Koller mentored 7 people in different career stages, including a research scientist, a postdoctoral associate, two PhD students, a postgraduate fellow, and a research associate. During her Ph.D. studies, she supervised three students, and already during her Master's project she supervised four students. This mentoring experience demonstrates Dr. Koller's commitment to nurturing the next generation of researchers across various educational levels and fields of study. Furthermore, she already has extensive teaching experience, although it was never a requirement by her fellowships. She taught several courses at Semmelweis University, the Autonomous University of Madrid, Eotvos Lorand University, Yale University, and the University of Barcelona. In summary, Dr. Koller has extensive experience in all areas required to succeed in a scientific career, including research output, grants, teaching, and mentoring.



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Turno General

Área Temática: Biomedicina
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Título: Decoding Neural and Neuroimmune Mechanisms of Addiction: From Behavioral Foundations to Microglia-Neuronal Interactions

Resumen de la Memoria:

Alcohol abuse is the seventh most prominent risk factor for death and burden of disease. Binge-like intoxication is a crucial stage in the development of addiction. The last decades have advanced our knowledge about brain circuits and molecular mechanisms implicated in this pattern of consumption. Unfortunately, the deeper knowledge of these processes has had a limited impact in the development of new treatments. Thus, there is a critical necessity to identify new, more specific molecular and cellular mechanisms underlying alcohol consumption. My previous work identified a new neuronal ensemble in the medial Orbitofrontal cortex (mOFC) that is activated after alcohol intoxication. Moreover, we established that the role of this ensemble is to limit alcohol consumption. This is the first instance of a neuronal ensemble acting as a suppressor of alcohol consumption, a novel insight in the addiction research landscape that offers promising avenues for the development of mOFC neuronal ensemble-targeted interventions. Still, the mechanism(s) that regulates the formation and stabilization of this ensemble to regulate alcohol consumption is unknown.

Microglia play a role in neuronal ensemble formation. Also, they become reactive and release pro-inflammatory mediators in response to alcohol. However, it remains unclear how these reactive microglia contribute to alcohol consumption and addiction. Most importantly, the goal of this proposal is to determine how microglia regulate the alcohol-evoked neuronal ensemble. Long-term, I aim to identify microglia-derived molecular pathways to regulate alcohol consumption, which could have significant therapeutic benefits. I will now test the role of microglia in regulating neuronal ensemble reactivation and alcohol consumption in the following aims:

Aim 1. Determine the mechanism by which microglia regulate the reactivation of the alcohol evoked ensemble. Our preliminary data demonstrate that ablating microglia in the mOFC results in a failure of ensemble neurons to stabilize during repeated DID episodes. Long term microglia ablation results in increased alcohol consumption. We further show that C1q is increased, and microglia engulf mOFC ensemble neuron processes during binge drinking. We will now test whether complement drives microglia to remodel mOFC neuronal ensemble synaptic connections through engulfment of synapses necessary to stabilize the neuronal ensemble during binge alcohol consumption.

Aim 2. Identify novel mechanisms necessary to maintain the stability of the alcohol evoked ensemble after binge alcohol consumption. The complete genetic program that is activated in the microglia in response to alcohol is unknown. I will now use single nucleus RNA-sequencing (snRNA-Seq) and spatial transcriptomics to identify novel genetic pathways in microglia keys to achieve the reactivation of the ensemble.

I hypothesize that in response to neuronal activity microglia regulate the reactivation of the neuronal ensemble to modulate alcohol consumption by complement-mediated engulfment of synapses on ensemble neurons. This mechanism allows the reactivation of the ensemble during subsequent drinking sessions limiting alcohol consumption even in the long term. If true, this would offer a paradigm-shifting new way in which alcohol consumption is regulated, which could have therapeutic implications.

Resumen del Currículum Vitae:

My long-term research goal is to elucidate the molecular mechanisms governing alcohol consumption, focusing on the unique interaction between microglia and a neuronal ensemble I identified in the mOFC. My research experience spanning addiction studies, neuronal ensembles, and microglial biology positions me to establish an innovative research program. Using advanced techniques such as optogenetics, fiber photometry, single-nucleus RNAseq, microglial biology, and behavioral analyses, I aim to demonstrate how microglia refine neuronal ensembles activated by alcohol consumption and mediate drinking behaviors.

My scientific career began during a master's degree in drug addiction research, culminating in key findings published in 2017. This foundation led to a PhD at Complutense University of Madrid, supported by a FPU fellowship, where I explored the Kynurenine pathway's potential as a treatment for alcohol intake. This research revealed how blocking a primary metabolite reduces dopamine release and alcohol consumption, earning multiple invitations as a keynote speaker. I authored seven publications during my PhD, six as first author, and was recognized with the extraordinary dissertation award.

Following my PhD, I joined UMass Medical School in 2020, working initially with Dr. Gilles Martin and later Dr. Dorothy Schafer, an expert in glial cells. My discovery of a neuronal ensemble acting as a brake for excessive alcohol consumption (Nature Neuroscience, in press) earned prestigious awards, including the YIEE Award (ASN) and Trainee Professional Development Award (SfN). My work yielded additional publications, including one in Nature Communications and a review. I further contributed as vice president of ECUSA and co-director of [Fostering Grads](#), a mentorship program supporting PhD students from Spain. My mentoring efforts earned me the UMass Faculty Award for Outstanding Contributions to Trainee Mentoring.

Since 2022, I have built collaborations in Schafer's lab, contributing to a study on pro-inflammatory microglia in aging, now under favorable review in Cell. My preliminary data, combined with recent findings and my new role at the Severo Ochoa center of excellence, form a strong foundation for launching my independent lab to investigate glial-neuronal interactions critical for alcohol consumption regulation. This grant will drive discovery at the intersection of glial biology and addiction neuroscience.



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Turno General

Área Temática: Biomedicina
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Título: Mitochondrial complex I phosphatase in astrocyte cannabinoid signaling
Resumen de la Memoria:

After the Biology and Biochemistry degrees, both at the University of Salamanca for which I received the Academic Excellence Award in 2010, and the Master's degree in Neurosciences, my scientific research career can be classified into the following phases:

i. Predoc (2010-2014) at Department of Biochemistry and Molecular Biology (University of Salamanca). My Ph.D. was funded by a PFIS Fellow (ISCIII) and was supervised by Dr. Bolaños. During this period, I gained experience in the mechanisms that regulate brain energy metabolism and redox homeostasis. We demonstrated that glutamatergic neurotransmission activates an antioxidant response in astrocytes resulting in Nrf2-mediated neuroprotection. This period led to 2 first-author articles (Cell Death Diff. 2015; Biochem. J. 2015) and 2 collaborations (Free Radic. Biol. Med. 2015; J. Neurosci. 2015).

ii. Postdoc (2015-2017) at IBFG (CSIC). During this period, I was funded by an (NIH/NIDA) grant aimed to investigate the impact of brain energy metabolism in cannabis abuse. This period was co-supervised by Dr. Marsicano (INSERM, France), where we found that mitochondrial CB1 receptors activation triggers the dephosphorylation of the mitochondrial subunit NDUFS4, leading to complex I inhibition and impaired lactate shuttle from astrocytes to neurons. This work led to an article (Nature. 2020), besides having had the opportunity to collaborate with other laboratories, resulting in a wider international recognition that has been verified by my participation in international courses as leader of a postdoctoral researcher's group (Cajal School on Bioenergetics for Brain Function, France, 2022) and scientific collaborations.

iii. Postdoc (2017-2022) at CIBERFES (ISCIII). The first phase of this period was devoted to end up the time-demanding experiments that led to a first-author Nature (2020) article. Then, I got fully involved in a 5-year project in which we deciphered the molecular mechanism that links neuronal glycolysis with behavior in mice, a work that ended up with the publication of a first-author article in Nature Metabolism, (2024). My strong participation in these works has made me deeply interested in establishing the connection between brain metabolism and clinical settings.

iv. Postdoc Juan de la Cierva-Incorporación (2022-2023) at the Institute of Biomedical Research of Salamanca (IBSAL). During this period, I moved to Dr. Almeida's lab, where I had the opportunity to acquire expertise in translational research in the field on brain energy metabolism. This period led me to publish 2 review articles in which I am co-corresponding author (Essays in Biochem. 2023, Neurobiol. of Dis. 2023).

v. Senior postdoc (2023-present) at CIBERFES (ISCIII). I am conducting a research project funded by La Caixa Research to understand the biochemical bases of mtCB1 signaling in astrocytes. In this period I have published an article as a first-author (Nat Metab. 2023) and several collaborations (Nat. Comms. 2022; Nature, 2023; Nat Neurosc. 2025).

I have participated in 10 international and national grants and applied to two grants as a Principal Investigator. I have participated in 20 conferences, presenting 6 oral communications. I have organized several meetings and supervised Doctoral Thesis and Master's students. I have taught 100 h. in Biochemistry Area at the University of Salamanca.

Resumen del Currículum Vitae:

My academic training and research experience have provided me with considerable background and leadership in the field of brain metabolism in connection with the endocannabinoid system. As a predoctoral student (2010-2013) at the University of Salamanca, my research focused on the regulation of astrocytic antioxidant response during neurotransmission, when I gained expertise in the regulation of the metabolism and redox system of the astrocyte-neuron metabolic unit. We found that the master regulator of the antioxidant response, Nrf2, was phosphorylated in specific residues, which we identified, upon glutamate-receptors activation in astrocytes to boost an antioxidant response. This work led us to propose the novel concept of the occurrence of an astrocyte-neuron glutathione shuttle (Jimenez-Blasco et al., Cell Death & Diff. 2015). After my PhD, I was engaged as a postdoctoral researcher funded by an NIH/NIDA grant (2014-2017) aimed to understand the impact of astrocytic mitochondrial complex I on the behavioral consequences of chronic cannabis use. This work, which was co-supervised by Giovanni Marsicano (INSERM, Bordeaux, France) and Juan P. Bolaños (University of Salamanca), led us to characterize the occurrence of the mitochondrial CB1 receptor in astrocytes that, upon its stimulation by tetrahydrocannabinol (THC), triggered mitochondrial complex I subunit NDUFS4 rapid dephosphorylation on its Ser173 residue causing complex I N-module disassembly and loss of electron transfer to ubiquinone. Moreover, the decreased NADH oxidation impaired reactive oxygen species (ROS) formation by astrocytic complex I, downregulating hypoxia-inducible factor-1 and glycolysis attenuation, disrupting the astrocyte-neuron lactate shuttle and loss of social interaction in mice (Jimenez-Blasco et al., Nature 2020). This postdoctoral period was crucial for my own personal career because I had the opportunity to establish an international active collaboration with the Marsicano group in Bordeaux. After this first post-doc, I was engaged as a post-doctoral researcher at CIBERFES (National Research Agency for Biomedical Research on Frailty and Healthy Aging; Carlos III Health Institute) for 5 years (2017-2022). During this period, we deciphered the mechanisms that connect neuronal glycolysis with cognition and organismal fitness (Jimenez-Blasco et al., Nature Metabolism. 2024). In 2022, I moved to the Institute of Biomedical Research of Salamanca (IBSAL), in the laboratory of Dr. Angeles Almeida under a Juan de la Cierva Incorporación post-doctoral researcher grant. During this period, I acquired expertise in translational research in the field of brain energy metabolism and I produced two articles in collaboration with Dr. Almeida as co-corresponding author. Before the Juan de la Cierva contract finished, I was offered a second CIBERFES contract, which I currently hold. Since then, I am conducting a research project funded by La Caixa Research to understand the biochemical bases of mitochondrial CB1 signaling in astrocytes. During my research career, I



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have supervised several Doctoral Theses and Master's students, and I have applied for two grants as Principal Investigator. Formation has also been an important aspect of my career. Thus, I have taught more than 100 hours in the Biochemistry Area at the Faculty of Pharmacy of the University of Salamanca.



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Turno General

Área Temática: Biomedicina
Nombre: FERNANDEZ MATEOS, JAVIER
Referencia: RYC2024-048746-I
Correo Electrónico: javierfermat@gmail.com
Título: Delving into tumour evolution and treatment optimisation

Resumen de la Memoria:

My multidisciplinary research career has focused on understanding and forecasting cancer evolution, leveraging expertise in multiomics, intratumour heterogeneity, and the tumour microenvironment.

As an undergraduate associate researcher, I joined the Genetic Counselling of Hereditary Cancer Team at the Cancer Research Institute of Salamanca (CIC). There, I identified pathogenic mutations in key genes responsible for hereditary syndromes such as breast, ovarian, colorectal, Li-Fraumeni, and Lynch syndromes. Later, as a research assistant in the Medical Oncology Service, I coordinated a multicentric observational clinical trial and conducted an epidemiological and a candidate gene association study to identify variants linked to susceptibility to Head and Neck Squamous Cell Carcinoma (HNSCC) in the Spanish population. Simultaneously, I explored the role of autophagy in HNSCC, identifying autophagy modulation as a potential novel therapeutic strategy. Additionally, I performed next-generation sequencing (NGS) on FFPE HNSCC samples and HPV subtyping to correlate the mutational profile with prognosis, advancing our understanding of intratumour heterogeneity in these tumours.

During the third year of my PhD, I was awarded an EMBO short-term fellowship at The Institute of Cancer Research (ICR) in London, where we demonstrated that patient-derived organoids (PDOs) can serve as reliable ex vivo models for predicting therapy responses. I mastered the establishment, handling, and drug screening of gastrointestinal PDOs, skills that have become foundational in my career. After earning an International-Cum Laude PhD, I returned to the ICR as a postdoctoral fellow at the Centre for Cancer Evolution. There, I expanded my expertise to cutting-edge genomic techniques, including single-cell sequencing and single-cell barcoding, enlarging my understanding of cancer evolutionary processes in prostate cancer and colorectal cancer. My background in NGS and PDOs enabled me to initiate independent projects, establishing collaboration across the UK, and mentor a PhD and master's students.

Currently, as a senior postdoctoral researcher at the University of Oviedo, I study the role of non-coding mutations in RNA splicing related genes and their impact on the tumour microenvironment in chronic lymphocytic leukaemia. I have implemented and now oversee single-cell sequencing at the University Institute of Oncology of Asturias (IUOPA), positioning myself to lead advanced research initiatives and collaborations, and equipping me with the skills necessary to pursue independent research.

My career trajectory reflects a sustained commitment to unravelling the mechanisms of cancer evolution and drug resistance. As I transition to lead my own research, I aim to focus on prostate cancer evolution and treatment resistance using PDOs as real-time ex vivo models. By integrating innovative methodologies such as single-cell tracking, single-cell sequencing, and loss-of-function CRISPR screens in PDOs treated alongside co-clinical trials, I will uncover the molecular mechanisms driving treatment resistance. The insights gained from this work will contribute to personalised medicine, optimising prostate cancer stratification and treatment strategies to improve patient outcomes.

Resumen del Currículum Vitae:

Since beginning my scientific career in 2010, supported by a Spanish Association Against Cancer (AECC) fellowship, I have focused on cancer research, contributing impactful knowledge and innovative ideas to the field. My work includes 25 publications (16 in Q1 journals), an H-index of 13, over 1,950 citations, and the development of a patent.

I studied two Bachelor's degrees in Biology and Biochemistry at the University of Salamanca, followed by two Master's degrees in Cancer Biology and Statistics. During my PhD, funded by a European Social Fund- Regional Government of Castile and León fellowship, I investigated the molecular basis of head and neck squamous cell carcinoma (HNSCC) in the Spanish population, mastering next-generation sequencing and classical molecular biology techniques while studying intratumour heterogeneity. During my PhD, I was awarded an EMBO short-term fellowship at the Institute of Cancer Research (ICR, London), where patient-derived organoids (PDOs) were first demonstrated as clinical predictors of therapy response, findings later published in Science. Following my Cum Laude International PhD, I expanded my expertise at the ICR's Centre for Evolution and Cancer as a postdoctoral fellow, including single-cell genomics, tumour evolution profiling, and bioinformatics. There, I led a study on locally-advanced prostate cancer evolution, identifying novel biomarkers for treatment stratification, a paper recently published in Nature Cancer as first author. In my current position at the University of Oviedo as a senior postdoc, I study the role of non-coding mutations in splicing-related genes and their impact on the tumour microenvironment in chronic lymphocytic leukaemia (CLL), leading a project that integrates single-cell sequencing, a technique I implemented and I am in charge of at the University Institute of Oncology of Asturias (IUOPA). Throughout my career, I have played a pivotal role in 13 competitive funded projects, contributing hypotheses, experimental designs, and applying innovative methodologies, securing funding opportunities for various laboratories, while establishing a robust worldwide network of experts in my research focus. My findings have been widely disseminated through 40 presentations at national and international conferences, and in high-impact journals. I have also prioritised science dissemination, participating in multiple events such as European Researchers' Night, University of Oviedo Science Week, and exhibitions in the Science Museums of Manchester and London.

I am deeply committed to mentoring and training the next generation of researchers, having supervised undergraduate, master's, PhD students, and postdoctoral fellows (two of them officially recognised), many of whom have pursued successful academic careers. With over 350 teaching hours in



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biochemistry and molecular biology at the Universities of Salamanca and Oviedo, my contributions have been recognised by ANECA PEP certification. Additionally, I have led workshops on molecular biology and genomics and served as a peer reviewer in several journals and numerous dissertation committees, ensuring high standards of research quality. Moreover, I have collaborated closely with industry, organising meetings and serving as an invited speaker at specialised workshops.



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Turno General

Área Temática: Biomedicina
Nombre: TORRENS FONTANALS, LAURA
Referencia: RYC2024-048520-I
Correo Electrónico: lauratf93@gmail.com
Título: Deciphering the molecular mechanisms of environmental exposures leading to upper aerodigestive tract cancers

Resumen de la Memoria:

At least half of all cancer cases are attributable to modifiable risk factors, emphasizing the urgent need to understand how environmental and lifestyle exposures drive cancer development. These exposures greatly differ across countries, however, non-western populations often remain understudied, contributing to the existing inequities in cancer prevention efforts. Genomic epidemiology studies integrating large-scale sequencing data with comprehensive epidemiological information now offer an unprecedented opportunity to identify the global drivers of cancer and their underlying oncogenic mechanisms.

This study will focus on uncovering the oncogenic mechanisms of exogenous exposures in upper aerodigestive tract (UADT) carcinomas, including oral, laryngeal, and esophageal cancers. Tobacco, a well-established mutagenic agent, is a major risk factor for UADT carcinoma; however, my recent work has identified significant variability in the mutational patterns across different anatomical sites, suggesting the presence of tissue-specific mechanisms influencing the response to exposures. Understanding these molecular differences across anatomical sites is key to underscoring the mechanisms related to tissue susceptibility to tobacco, one of the most prevalent cancer-causing agents worldwide. Conversely, other UADT cancer risk factors such as alcohol and consumption of hot beverages, have limited or no mutagenic potential, and their molecular mechanisms remain unclear. Additionally, a significant proportion of UADT carcinomas arise in the absence of known risk factors, yet exhibit distinct mutational patterns, pointing to unknown oncogenic processes that remain poorly understood.

To address these critical knowledge gaps, this project will explore the complex molecular mechanisms behind epidemiological exposures in UADT carcinoma, how those differ across anatomical sites, and whether these molecular alterations have prognostic implications. To achieve this, I will assess the transcriptomic dysregulation in exposed and unexposed UADT tumors and paired normal samples from a unique international collection of 400 samples with extensive exposure data. This information will then be integrated with whole-genome mutation profiles available in this dataset, which I generated in a prior study. My expertise in genomic epidemiology, acquired during my previous professional experiences in leading international research centers puts me in a unique position to undertake this challenge.

Ultimately, this research has the potential to bring important insights into cancer prevention and prognosis strategies. By uncovering the oncogenic exposures driving UADT cancers in diverse and often underserved populations, these findings can ultimately contribute to reducing global disparities in cancer risk and improving public health strategies worldwide.

Resumen del Currículum Vitae:

Laura Torrens is a cancer researcher with strong cancer genomics and molecular epidemiology expertise. She graduated at the top of her class with a BSc in Biomedical Sciences and an MSc in Translational Medicine from the University of Barcelona (Spain). This training fueled her interest in patient-centered research, a path she has followed throughout her career.

During her PhD, Dr Torrens conducted research under the mentorship of Prof. Josep M Llovet, recognized as one of the top 0.5% of most cited researchers, at the Barcelona Clinic Hospital (Spain) and at the Icahn School of Medicine at Mount Sinai (USA), where she worked as a visiting researcher for one year and a half. During this time, she led several projects aimed at understanding the molecular determinants of liver cancer to improve both treatment and prevention. In recognition of her work, her PhD was awarded with an Excellent Cum Laude distinction, Extraordinary Award, and International Mention.

Currently, as a postdoctoral scientist at the International Agency for Research on Cancer (IARC-WHO, France), under the guidance of Dr. Paul Brennan, Dr Torrens has continued to refine her expertise by participating in two major international Cancer Grand Challenges consortia, MUTOGRAPHS and PROMINENT, which have a combined budget of \$50 million. Her work, focused on identifying mutagenic and non-mutagenic oncogenic exposures across the world, has resulted in a first-author manuscript recently accepted in Nature Genetics, with 46 coauthors from 21 institutions worldwide. This leadership role in a high-impact international study highlights her capacity to succeed in cutting-edge research. She has also contributed to generating the MUTOGRAPHS biorepository, a key resource for ongoing and future research.

Throughout her career, Dr Torrens has cultivated a multidisciplinary skill set, spanning bioinformatics, clinical data analysis, and cancer biology. Her expertise, network of collaborators, and access to data resources position her well to succeed in future research, as proven by 1) a robust publication portfolio, with 10 papers in Q1 journals, 4 of which with first author role, and over 770 citations; 2) seventeen communications in national and international congresses, including oral presentations at leading cancer meetings; 3) over 4 years of international experience at highly competitive research centers; 4) participation in prestigious international research consortia, fostering a broad network of collaborators; 5) multiple awards and recognitions achieved during her career.

Beyond research, Dr Torrens participates in scientific outreach, from giving talks for high school students to writing two book chapters and participating in round tables about working on collaborative projects. She is committed to engaging with patient advocates to ensure research is aligned with patient needs, and with researchers around the world to achieve a global and inclusive representation of patients in our results. She also advocates for open-access research and data sharing.



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Turno General

Área Temática: Biomedicina
Nombre: GOIG SERRANO, GALO ADRIÁN
Referencia: RYC2024-050607-I
Correo Electrónico: galo.goig@swisstph.ch
Título: Microbial genomics, precision medicine and public health

Resumen de la Memoria:

My research trajectory has been focused on advancing genomics and computational analysis to address critical challenges in infectious disease research, particularly tuberculosis (TB). By analyzing large-scale datasets of genomic, clinical and epidemiological data, I have made significant scientific contributions including the development of novel diagnostics for TB, studies on precision medicine in TB, or the use of genomic epidemiology to understand how drug-resistant TB emerges and spreads, as well as to study the transmission dynamics of COVID-19 during the 2020 pandemic. I have developed my research career in a highly international environment working at, and collaborating with, multiple groups from many different countries worldwide. Despite my short scientific career, I have a track record of contributions in leading international journals with very high public health relevance, I have actively participated in several international scientific initiatives, trained new researchers, lectured at international universities, and received international awards in recognition of my work as an early career scientist. Throughout my career, I have demonstrated strong independence and leadership by leading multiple high-impact research projects and starting new research avenues, being the corresponding author of my most significant contributions.

In Spain, I will leverage my multidisciplinary background and my expertise in omic technologies and data science to establish a group on precision medicine and public health. In my research group I plan to analyze high-dimensional multi-modal multi-omic data to better understand heterogeneity in human diseases due to biological, clinical and demographic factors with the ultimate goal of optimizing treatments, improving disease prevention, and strengthening public health interventions.

Resumen del Currículum Vitae:

I am a bioinformatician with a background in biology. I obtained my BSc in Biology and MSc in Bioinformatics at the University of Valencia, followed by a PhD in 2020 under the supervision of Prof. Iñaki Comas at the Institute of Biomedicine of Valencia (CSIC). My PhD research focused on developing tools for tuberculosis (TB) diagnosis and surveillance using high-throughput sequencing. I identified novel *Mycobacterium tuberculosis* (MTB) diagnostic markers (Goig et al., *Bioinformatics* 2020), created analytical tools for sequencing data analysis (Goig et al., *BMC Biology* 2020), and developed a workflow for culture-free whole-genome sequencing of MTB (Goig et al., *The Lancet Microbe* 2020). I also completed an EMBO Short-Term Fellowship with Prof. Nicola Segata in Italy, where I gained experience in metagenomics.

During the COVID-19 pandemic, I contributed to the SeqCOVID-Spain consortium, which applied genomic epidemiology to track the spread of SARS-CoV-2, positioning Spain among the leading contributors of genomic data during the pandemic. I developed the bioinformatics pipeline of the consortium (Hodcroft et al., *Nature* 2021, López et al., *Nature Genetics* 2021).

Following my PhD, I pursued a postdoc with Prof. Sebastien Gagneux at the Swiss Tropical and Public Health Institute. My research integrated genomic data with clinical and demographic factors to explore antimicrobial resistance evolution, MTB transmission dynamics, and TB treatment outcomes. For example, we demonstrated how compensatory evolution enhances drug-resistant MTB transmissibility (Goig et al., *The Lancet Microbe* 2023). Recently, I led a large-scale genomic study revealing the global emergence of resistance to novel TB drugs (Goig et al., *The New England Journal of Medicine* 2025), which has significant public health implications and received extensive media coverage.

Despite my relatively short career, I have contributed to numerous international collaborations, publishing in leading journals with over 1,800 citations. As first author, I have published seven articles (four as corresponding author) in journals such as *The New England Journal of Medicine*, *The Lancet Microbe*, and *Nature Reviews Microbiology*. I have presented my work at 18 conferences, including two invited talks, and was honored with the 2024 Gertrud Meissner Award by the European Society of Mycobacteriology for my contributions to the field.

In addition to research, I am actively involved in education and mentoring. I lecture on Molecular Epidemiology at the University of Basel and co-supervise a Master's project developing a cloud-based MTB genomic analysis platform. I also co-created a free online MTB genomic workshop that has trained over 600 students worldwide. During my PhD, I was part of the scientific committee of the National Conference of Young Researchers in Biomedicine and have received several awards for best oral and poster presentations.

During my postdoc, I led two major research lines of an ERC Advanced Grant (ECOEVDRTB) awarded to Prof. Gagneux. I have participated in seven funded research projects, supported by agencies such as the Spanish Ministry of Science, the Institute of Health Carlos III, the European Research Council, and the Swiss National Science Foundation, with a combined funding exceeding €7.5 million.



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Área Temática: Biomedicina
Nombre: RUIZ TORRES, MIGUEL
Referencia: RYC2024-050117-I
Correo Electrónico: miguelrtbio@gmail.com
Título: Mechanisms of resistance and new therapeutic vulnerabilities in cancer
Resumen de la Memoria:

My name is Miguel Ruiz, and I am a Postdoctoral researcher in Dr. Luis Paz-Ares lab at the Spanish National Cancer Research Centre (CNIO) and the Unidad de Investigación Clínica at the Hospital 12 de Octubre. My scientific journey has covered many different areas, from basic biology to translational research, but always with the idea of understanding the mechanisms of cell cycle and their relevance for cancer. During my undergrad at the Malumbres lab at the CNIO, I focused my work on mitosis, on the metaphase to anaphase transition and in the characterization of Greatwall (Mastl) in chromosome segregation. For my PhD I joined Ana Losada's lab at the CNIO to study Pds5 proteins and their role in cohesin dynamics and function, focusing on sister chromatid cohesion, cohesin dynamics and genomic distribution. These two experiences are fundamental for my understanding of the basic mechanisms that regulate many processes regarding cell cycle, and represent the foundation for my next steps.

For my first postdoc I decided I wanted to apply my previous knowledge to a more translational and close to the patient type of research, so joined David Feldser lab at the University of Pennsylvania in 2018 to study the molecular mechanisms behind lung cancer. I investigated the role of Retinoblastoma (Rb) in KRas and p53 mutant lung adenocarcinoma. We found that loss of Rb1 function drives tumor progression and loss of lineage commitment. We showed that genetic reactivation of Rb temporarily halts tumor progression until the tumor re-inactivates Rb, highlighting the potential of therapies directed to maintain Rb activity.

In July 2021 I joined Marcos Malumbres lab with a Postdoctoral fellowship from the AECC to study resistance mechanisms to Cdk4/6 inhibitors in breast cancer. We hypothesized that Cdk6 overexpression plays a protective role, and sought to identify the underlying mechanisms. I also worked deciphering the role of B55 isoforms in regulating ki67 activity. Early in 2023 the lab relocated to Barcelona, and I joined L. Paz-Ares' lab at the CNIO-H12O while still directly involved in the breast project together with A. García, a PhD student under my supervision.

At the Paz-Ares lab, I focus on new therapeutic approaches for SCLC, one of the deadliest cancers with limited treatment options. I have been working on a new therapeutic strategy combining Irinotecan and Lurbinectedin for second-line treatment on SCLC, which has shown spectacular results in a clinical trial conducted by our group. I have also been exploring the potential use of Her2-directed therapies for a specific subgroup of SCLC.

My postdoctoral work has focused on new vulnerabilities and mechanisms of resistance using a hypothesis-driven approach, where we have explored pre-existing data to identify potential targets to study. While this is a successful strategy in most of the cases, it is limited to previous evidence, and our understanding of the mechanisms of tumor initiation, expansion and chemoresistance is, in many tumor types, superficial. For that reason, I would like to continue my career adopting a high throughput approach to identify new candidates for specific cancer scenarios, particularly drug screens that may help identify targets that are currently understudied or unknown.

Resumen del Currículum Vitae:

I studied Biology and a Master's in Molecular Biomedicine at the UAM. As an undergrad I joined M. Malumbres' lab at the CNIO to study metaphase to anaphase transition and the characterization of Greatwall (Álvarez-Fernández et al, PNAS 2013). For my PhD I joined A. Losada lab at the CNIO, funded by a FPI fellowship. My PhD explored Pds5 proteins and their role in cohesin dynamics and function. In 2014, I visited JM. Peters' lab at the IMP in Vienna thanks to a travel grant from BIF to learn CRISPR/Cas9 gene editing and FRAP. My thesis work led to three first-author publications (Carretero, Ruiz-Torres et al. 2013, EMBO J; Morales, Ruiz-Torres et al. 2020, J Bio Chem; Cuadrado, Giménez-Llorente, De Koninck, Ruiz-Torres et al. 2022, Epigenetics & Chromatin) and two third-author publications in EMBO Reports (2016, 2020). During my PhD, I presented posters at the EMBO Workshop "SMC proteins: Chromosomal organizers from bacteria to human" in Vienna (May 2015) and the "Second International Meeting on SMC proteins" organized in Nanyo, Japan in 2017. I also engaged in scientific outreach activities, such as the CNIO European researcher's night. Also, I assisted in teaching the "Advanced Lab in Molecular Biology and Biochemistry" at UAM, and gave a lecture entitled "Cell Cycle and Oncogenesis" in the Masters in Genetics and Cell Biology held by the UAM, UCM and UAH (2016).

For my first postdoc I switched to translational cancer research in D. Feldser's lab at UPenn in 2018. I investigated the role of Rb1 in KRas and p53 mutant lung adenocarcinoma. The work resulted in a Nature paper in which I am co-first author (Walter, Yates, Ruiz-Torres et al., 2019). I presented this work at the 5th International RB conference in Charleston, South Carolina (September 2019), and as selected speaker at the first AFCRI-Penn Cancer Research Postdoctoral Symposium (November 2019). I also collaborated studying the effects of restoring p53 in Small Cell Lung Cancer (SCLC) (Acosta et al., 2023).

In 2021 I joined M. Malumbres' lab with a Postdoctoral fellowship from the AECC to study resistance mechanisms to Cdk4/6 inhibitors in breast cancer. I co-directed I. Luna's Bachelor's thesis (grade 9.6/10). I also worked deciphering the role of B55 isoforms in regulating ki67 activity, published in Cell Rep. (2024). In 2021 I was invited to review a paper for Scientific Reports. Early in 2023 the lab relocated to Barcelona, and I joined L. Paz-Ares' lab at the CNIO-H12O while still directly involved in the breast project together with A. García, a PhD student.



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At the Paz-Ares lab I focus on new therapies for SCLC, one of the deadliest cancers with limited treatment options. In 2024 I directed P. Fernández's Master's project (9.4/10) and I am currently co-directing his PhD. I am also directing J. Rojo's Master's project. I attended the Conference "Targeting Ras: New Challenges and Avenues" in Salamanca (2023) and the CNIO-La Caixa Frontiers Meeting in Immunomodulation and Cancer Therapy (2024). I presented a poster at the 19th International ASEICA Congress. In 2023 I participated in the dissemination activities for the 50th anniversary of the Hospital 12 de Octubre. In 2024 and 25 I am guest speaker at the "Scientific vocations" cycle in the IES Príncipe Felipe and I was invited to a round-table for the World Breast Cancer Day at the Carrefour headquarters.



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Turno General

Área Temática: Biomedicina
Nombre: RODRÍGUEZ RODRÍGUEZ, PATRICIA
Referencia: RYC2024-048842-I
Correo Electrónico: patricia.rodriguez.rodriguez@ki.se
Título: Exploring the mechanisms that lead to neurodegeneration

Resumen de la Memoria:

PhD obtained in 2013 at the Institute of Neurosciences of Castilla y Leon (Spain), on a project focused on understanding how glucose metabolism is regulated in different brain cells under normal and excitotoxic conditions, an event that is common for many neurodegenerative disorders. This work resulted in 3 publications and first author, including one in the journal Cell death and differentiation (2012).

In 2014 joined The Karolinska Institute (Sweden) as a postdoctoral fellow. Due to my previous experience in metabolic regulation in neurons, I decided to focus on clarifying the mechanisms related to insulin resistance in Alzheimer's disease (AD). Part of the project's results, where we report that insulin is accumulated as oligomers in hyperphosphorylated tau-bearing neurons in AD and several tauopathies were published in the journal Brain (2017).

In 2018 I became assistant professor at The Karolinska Institute, and also was awarded an individual global Marie-Curie fellowship to join the late Nobel Laureate Professor Paul Greengard at The Rockefeller University in New York. There I started working on elucidating the mechanisms that contribute to the early degeneration of specific neuron subpopulations in AD. Results from this work have been published in the journals Neuron (2020) and Brain (2024).

In 2021, I returned to The Karolinska Institute, where I was promoted to Senior Research Specialist in the beginning of 2023, a permanent position. Here I have established an independent research line focused on identifying where different genetic and non-genetic risk factors converge to drive early neurodegeneration in AD (selective neuronal vulnerability). To do so, I employ a wide variety of cell-type specific approaches, including single-nuclei RNA sequencing and state-of-the-art methods for the analysis of the subproteome of specific cells in cell cultures, human iPSC-derived neurons, mouse models and human samples, with the final goal of identifying novel early AD drivers and potential therapeutic targets.

Resumen del Currículum Vitae:

I have more than 10 years of experience in the study of the mechanisms that lead to neurodegeneration and, since 2018, more specifically in the pathways contributing to selective neuronal vulnerability, this is, the degeneration of specific neuronal subpopulations at preclinical disease stages. The results derived from this work have been published in journals such as Brain (2017 and 2024, being first and corresponding author in both), Science advances (2024), Neuron (2020) or Cell Death and Differentiation (2012).

Since I was appointed assistant professor at Karolinska in the beginning of 2018, I have successfully obtained more than 850,000 euro in funding as principal investigator (Note that from October 2021-September 2022 I was on sick leave and could not apply for funding). This allowed me to join the Rockefeller University (NYC) in 2018, and, once back at Karolinska, to enroll a PhD student that I am main supervisor of and fully covering by my own research funds. I have also been the co-supervisor of another PhD student and supervise grad and master students every year. Besides my contributions to research, I also participate in the teaching activities in my department, and I am an organiser of the monthly PhD/postdoc seminars in the department.

I have an extended independent international network of collaborators that include researchers and The Karolinska Institute, The Rockefeller University, Boston University, Princeton or Rice University. I have also participated in several grant evaluations committees, including an evaluator of Marie-Curie fellowships for the European Commission in 2023 and 2024.

This has allowed me to be promoted to a permanent position as senior researcher at Karolinska, and to recently obtain the R3 certificate for established researchers in Spain.



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Turno General

Área Temática: Biomedicina
Nombre: DE SENA TOMÁS, CARMEN
Referencia: RYC2024-049844-I
Correo Electrónico: desenatc@hotmail.com
Título: Mechanisms driving central nervous system regeneration

Resumen de la Memoria:

My scientific journey has evolved from exploring cell cycle regulation and genome stability to investigating organ regeneration, demonstrating a curiosity for fundamental biological processes and translational research.

In my early work, I focused on cell cycle control using *Ustilago maydis* and *Coprinopsis cinerea* as model organisms. I uncovered how DNA damage response kinases, Atr1 and Chk1, regulate cell cycle progression by inducing arrest even in the absence of DNA damage, emphasizing the capacity of this conserved signaling axis in response to various stimuli. Additionally, I demonstrated the essential role of Ku proteins in preventing unwanted telomeric recombination in *U. maydis*, revealing parallels with human telomere biology. During my first postdoctoral position, I furthered my studies on genome stability, examining a LAMMER kinase's regulatory role in cell cycle.

Motivated by a fascination with developmental biology and its translational potential, I transitioned to zebrafish research during my second postdoc. I made significant contributions to understanding the role of NKX2-5, a key transcription factor frequently mutated in congenital heart defects. I conceptualized and led a project revealing Nkx2.5's essential role in heart regeneration, showing it drives cardiomyocyte proliferation by activating proteolytic pathways required for sarcomere disassembly.

Building on my interest in regeneration, I established an independent research line during my third postdoc, focusing on the immune system's role in spinal cord regeneration. I demonstrated that modulating neutrophil behavior through Cxcr1/2 and Cxcr4 signaling pathways reshapes the injury microenvironment, directing regenerative outcomes. Currently, I am extending this research by investigating microglial immunometabolism during brain regeneration.

My proposed research plan addresses critical aspects of central nervous system (CNS) regeneration, with a particular focus on innate immune mechanisms. Employing zebrafish as a model system allows us to study regenerative processes in a highly dynamic, transparent environment with translational relevance to mammalian CNS repair. The plan comprises two complementary research lines:

1. **Neutrophil Immune Profiling in Spinal Cord Regeneration:** Continuing my previous work, this line aims to pinpoint the transcriptional changes in neutrophils that enhance regeneration upon Cxcr4 inhibition. Additionally, I will explore how Cxcr1/2 blockade impairs regeneration, comparing zebrafish and mammalian models to identify shared pathways that could inform novel therapeutic strategies for improving mammalian CNS repair.
 2. **Lipid droplets in Macrophage/Microglia During Brain Regeneration:** Lipid droplets (LDs) are key regulators of cellular metabolism and inflammation. This line will investigate how disrupting LD formation affects brain regeneration, identifying how these metabolic pathways affect the microglial response. Understanding the shift from pro-inflammatory to reparative phenotypes will provide new insights into modulating CNS repair.
- This research framework integrates molecular and cellular mechanisms with translational applications, bridging fundamental discoveries and therapeutic innovations for CNS regeneration.

Resumen del Currículum Vitae:

I conducted my PhD studies at CNB-CSIC under the guidance of Prof. José Pérez Martín, supported by an FPI fellowship. During this time, I completed three international research stints: one at Weill Cornell Medicine in Prof. Holloman's lab (New York, USA) and two at the University of Göttingen in Prof. Kües' lab (Germany). These enriching experiences enhanced my scientific skills, fostered international collaborations, and contributed to impactful publications (de Sena-Tomás et al., *Plant Cell* 2011; *Genetics* 2013; *Nucleic Acids Res* 2015). These achievements, along with my international exposure, led to the distinction of earning a European PhD title.

Following my PhD, I pursued postdoctoral research in Prof. Holloman's lab (Weill Cornell Medicine, USA), resulting in a publication (de Sena-Tomás et al., *DNA Repair* 2015). In 2015, I joined Dr. Targoff's lab at Columbia University, producing significant findings (de Sena-Tomás et al., *Nat Commun* 2022) and receiving recognition with oral presentations at two conferences and an Honourable Mention award at an international meeting. I initiated three novel research lines that became major projects for a postdoc and two PhD students (Development under R2; *Nat Commun* in press). Additionally, my collaborative work with Dr. Wei Min, Dr. Masayuki Yazawa and Dr. Liliana Solnica-Krezel (*Nat Commun* 2018, 2020; *Dev Biol* 2020) broadened my research scope, while I gained valuable experience in lab management, financial oversight, and student mentorship.

In 2019, I joined Dr. Leonor Saúde's lab at IMM-João Lobo Antunes (Lisbon, Portugal), where I led a research subgroup of two master's students and a technician. I secured my first competitive funding as Principal Investigator (2022.02762.PTDC) and established productive collaborations with Dr. Sofia de Oliveira (Albert Einstein College of Medicine, New York) and Dr. Michael Orger (Champalimaud Foundation, Portugal), culminating in my first corresponding author publication (de Sena-Tomás et al., *Brain Behav Immun* 2024). I also launched a second research line supporting another master's thesis while contributing to ongoing projects. In 2024, I joined Prof. Albert Pol's lab, pioneering a zebrafish-based research line and establishing institutional agreements and collaborations to advance work in an environment with no previous experience nor installations for zebrafish. Since September 2024 I have also served as an adjunct professor in the Department of Genetics, Microbiology and Statistics at the University of Barcelona. Beyond research, I co-founded the Association of Spanish Scientists in the USA, New York chapter (ECUSA-NY), in 2014, serving as Advisory Director (2014 - 2017) and President (2017 - 2018). In these roles, I coordinated and promoted initiatives focused on career development, the visibility of women in STEM, science outreach, and professional networking. Additionally, I contributed to Neuropal, an educational computer game designed to raise awareness about spinal cord injuries.



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Turno General

Área Temática:

Biomedicina

Nombre:

GARCÍA RODRÍGUEZ, JUAN LUIS

Referencia:

RYC2024-048623-I

Correo Electrónico:

juanluisgrod@gmail.com

Título:

Decoding Cancer Progression: From Molecular Mechanisms to Spatial Precision

Resumen de la Memoria:**Trajectory**

I am an Assistant Professor in Spatial Cancer Biology at Aarhus University with significant experience in cutting-edge cancer research, particularly in Spatial and Single-Cell Omics. Over the course of my career, I have published 22 scientific articles (78% in the Top 10% of SCImago Journal Ranking and 86% in Q1), been cited >1,100 times, and achieved an h-index of 16. I have demonstrated a strong trajectory of research independence, obtaining competitive funding as a principal investigator and making substantial contributions to cancer biology.

My academic journey spans multiple institutions and countries including France, Canada, and Denmark. After earning the PhD at CIC bioGUNE in Spain, I pursued a postdoctoral fellowship at UPV/EHU, where I gained expertise in lipid metabolism research. Subsequently, I joined McMaster University in Canada for 5 years, where I contributed to high-impact leukemia and stem cell research, culminating in novel therapeutic approaches and a patent. Since 2021, I am based at Aarhus University, Denmark, focusing on Spatial Cancer Biology. The quality of my research has gathered recognition, including the Extraordinary Doctorate award of my PhD, 6 invitations to prestigious conferences as a speaker, and the successful supervision of >10 students including a PhD.

I have pioneered the use of Spatial genomics technologies, namely developing probes for circular RNA spatial detection, collaborating with industry leaders like Nanostring, and contributing to groundbreaking studies on tumor microenvironment (TME). I have also played a pivotal role in integrating advanced methodologies into my research, emphasizing open science and interdisciplinary collaboration.

Line of Research

My primary research focuses on identifying early biomarkers and molecular pathways linked to hepatocellular carcinoma (HCC) in patients with Metabolic Associated Steatotic Liver Disease (MASLD). My work leverages Spatial Omics to map complex molecular architectures and paracrine communications within the TME.

Key objectives:

1. Deciphering Tumor Microenvironment Communications: Characterizing intercellular signaling pathways and ligand-receptor pairs that drive HCC progression using Spatial transcriptomics and co-culturing and organoid models.
2. Investigating Non-Coding RNAs: Designing specific spatial custom spike-ins to explore the role of circular RNAs (circRNAs) in MASLD-related HCC and their potential as biomarkers.
3. Developing Early Diagnostic Tools: Utilizing RNA aptamers as cost-effective and precise alternatives to traditional antibodies for clinical implementation.

Anticipated outcomes include The knowledge generated through this research that will catalyze a paradigm shift on the current management of HCC, especially for this vulnerable group of patients with MASLD. In addition, the generation of an effective methodology for early diagnosis through the development of RNA aptamers used as chemical antibodies underscores the groundbreaking potential of this research in addressing such clinical challenge.

I aim to advance HCC basic research towards personalized medicine and address unmet clinical needs, positioning Spain as a leader in Spatial Biology through the Ramón y Cajal fellowship.

Resumen del Currículum Vitae:

I am an Assistant Professor in Spatial Cancer Biology at Aarhus University (AU), Denmark. With a career spanning over 15 years, I have developed a strong expertise in cancer research, integrating molecular signaling, metabolism, RNA biology, and epigenetics. My innovative work with Spatial and Single-Cell Omics has led to impactful discoveries in cancer biology, earning a robust international reputation. To date, I have published 22 articles (12 with IF > 10) with an h-index of 16 and >1,100 citations.

My academic journey includes a PhD performed at CIC bioGUNE in Molecular Biology and Biomedicine from the University of the Basque Country (2014), postdoctoral research at UPV/EHU and McMaster University, and my current leadership role (since 2022) at AU. I have successfully secured funding including my first grant as PI from prestigious institutions and foundations from different countries (Spanish Ministry, Canadian Cancer Society, Novo Nordisk, etc.). I have also mentored 1 PhD, 3 master's, and 9 bachelor's theses, demonstrating my commitment to education and leadership in academia.

My research has centered on degeneration-to-cancer transitions in liver, blood, and colon malignancies. My recent focus involves cutting-edge Spatial and Single-Cell technologies to uncover tumor microenvironment dynamics and cellular communications in cancer. Some of my major achievements include a patent for modeling leukemic progression using stem cells; high-impact publications, including leading articles in Gastroenterology (IF: 25.7), Journal of Hepatology (IF: 26.8), Hepatology (IF: 12.9) and Cancer Research (IF: 12.5), among others; or pioneering circular RNA studies in cancer,



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developing spatial detection methods with Nanostring Technologies, which highlights my involvement in translational research and innovation collaborating with industry partners.

As a dedicated educator, I have lectured in Spain, Canada, and Denmark. Currently, I teach Genetics and Personalized Medicine at Aarhus University and have developed PhD courses in Spatial and Single-cell Omics. My dedication to open science is evident in my publications and public outreach through social media and press releases.

I have contributed to the scientific community as a reviewer for high-impact journals, as a committee member for hiring scientific personnel, or as board member of AU's Junior Researcher Association.

Throughout my career, I have consistently received recognition for the quality of my research, including the Extraordinary PhD Award (UPV/EHU, 2016), several travel and young investigator awards, prizes in congresses for best posters and oral presentations like the one in 2022 at the Danish Pathology Meeting in Denmark.

I aim to advance the field of Spatial Biology through groundbreaking research in liver cancer, fostering collaborations, and mentoring the next generation of scientists. My contributions exemplify a commitment to basic research, innovation, education, and societal impact.



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Turno General

Área Temática: Biomedicina
Nombre: BLANCO MARTÍNEZ DE MORENTIN, PABLO
Referencia: RYC2024-048308-I
Correo Electrónico: pablo.blanco.mdm@gmail.com
Título: Circuitos neuronales en la regulación del apetito

Resumen de la Memoria:

I have over 15 years of experience investigating the central mechanisms governing energy balance from my initial PhD training to my current position as Group Leader. In 2008, I started my scientific career as a PhD student in Endocrinology under the supervision of Dr Miguel Lopez and Dr Carlos Dieguez at the University of Santiago de Compostela. In 2009, I was awarded a FPI fellowship to study the role of a protein kinase in the regulation food intake and energy expenditure. During that time, I described for the first time the molecular mechanisms mediating the central effects nicotine and oestrogens in the modulation of food intake and in the regulation of the thermogenic programme in the brown adipose tissue (BAT). This exciting period guided my research interests into the understanding of the brain networks regulating energy intake.

In 2014 I joined Prof Lora K Heisler's team at The Rowett Institute (University of Aberdeen, UK) to develop my skills beyond the study of molecular biology and gather experience on the interrogation of neuronal circuits governing appetite. I was awarded individual fellowships including Beca Postdoctoral (Xunta de Galicia, 2014-2016) and the Marie-Curie Individual Fellowship (ERC, 2016-2018) and I later secured a Research Fellow position (2018-2023). During this stage, I leverage new understanding of the brain networks regulating food intake. I studied neuronal populations across the brain targeted by anti-obesity medications such as lorcaserin and GLP-1 analogues and the networks activating the pre-sympathetic neurons innervating the BAT. At the same time, I developed and lead my own research projects to untangle neuronal pathways communicating energy needs through the gut-brain axis and circuits involved in the age-related metabolic decline. I acquired resources from different funding bodies in the UK as lead and co-lead applicant, including the Wellcome Trust, Medical Research Council and the Royal Society of Edinburgh. This stage was instrumental in my career development and shaped my future scientific vision.

In 2023, I secured a tenure track position at the University of Leeds (UK) (15th/UK, 125th/World, THE Ranking 2025), a research-intensive university, as a Lecturer in Systems Neurobiology, where I lead a research team as Principal Investigator. My research focuses on untangling the brain connections responsible for integrating the internal nutrient signalling with the cognitive perception of the obesogenic environment. I unveiled a brainstem circuitry inducing satiety upon sensing ingested food that mediates the therapeutic effects of anti-obesity medications. Our goal is to decipher the neuronal mechanisms driving specific eating patterns so we can narrow down the combination and efficacy of obesity and appetite medication to lead precision medicine.

In summary, my research path has provided me with a skillset and profile to be lead my own research group in a world top institution in the UK and the Ramon y Cajal award will consolidate my scientific career in the Spanish Science, Technology and Innovation System (SECTI).

Resumen del Currículum Vitae:

I am Lecturer in Systems Neurobiology and leading my own research group supported by the best possible international environment as part of the Neuroscience team at the University of Leeds (15th/UK; 123rd/World, Ranking THE 2025). My track record with a H-index 17, >2000 citations, 27 research outputs, 182 co-authors and a Field-Weighted Citation Impact FWCI=2.97 (Scopus, 01/2025) and several individual awards and invited talks, highlights a scientific recognition of my work by the metabolism and neuroscience scientific community. This displays an active recognition of my work from the scientific community.

I have contributed to the generation of knowledge with 18 original papers (5 first author with 1 lead and corresponding), 6 reviews, (5 first author), 1 editorial (last author) and a book chapter (first author). I have been invited speaker in several international conferences and secured support from diverse funding bodies as lead, co-lead and named researcher (over 560.000 EUR from MICINN, ERC, UKRI, WT, RSE). I continually contribute to the wider scientific community by peer-reviewing papers (Molecular Metabolism, Cell Reports, Journal of Endocrinology among others) and collaborating with state research agencies like UKRI and enrolled in the AEI. I have been international examiner of 2 PhD thesis, sit in institutional committees and member of grant review panels for research charities (Society of Endocrinology). Moreover, I have active collaborations with industry (Metofico Inc.). This outlines my successful career development and my understanding and involvement in the scientific environment.

I have engaged with scientific audiences participating in conferences, supporting their organisation (Keystone2016 Copenhagen, NOS2018 Aberdeen) or being a member of the scientific organising committees (BSN2024 Aberdeen, ICN2026 Nagoya). In addition, I have contributed to the dissemination of this knowledge to the wider public community by participating in public engagement events (PechaKucha, European Researcher Night), workshops (Institute Open Doors Day) and designing and supervising undergraduate projects to engage with primary and secondary schools. This depicts my commitment and abilities to share the value of science to a wide range of communities.

I have excelled in the transfer of knowledge delivering laboratory practical during my PhD training and workshops and laboratory teaching sessions during my post-doc stage. Since 2023, I deliver lectures and workshops in the Neuroscience, Biomedical Sciences and Pharmacology degrees. I have also supervised research projects; including main supervisor of 5 Undergraduate (UG) projects and 2 Masters in Science (MSc) projects (one was awarded number 1 in the 2023/24 Neuroscience cohort) and co-supervised 1 MSc. I have co-directed PhD projects. One has already secured a track tenured position (dissertation 08/2023) and the second is expected to submit the Thesis in early 2027. In addition, I have supported the career



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development of others by mentoring UGs, PhDs and post-docs at different stages. Overall, this shows my dedication to the career development of the future generations.

Since my PhD dissertation I have had two paternity breaks in 2013 and 2015.



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Turno General

Área Temática:

Biomedicina

Nombre:

DA SILVA LIMA, NATALIA

Referencia:

RYC2024-050185-I

Correo Electrónico:

lima.nat@gmail.com

Título:

More Than Two Decades of Scientific Pursuits: Driving Innovation and Advancing Research

Resumen de la Memoria:

Internationalization and Mobility

From an early age, I displayed an innate curiosity for scientific discovery, which has shaped my 19-year scientific trajectory focused on obesity, metabolic alterations, and currently, NAFLD. Over this period, I have authored 42 papers, including publications in top journals such as Journal of Hepatology, Nature Communications, and Cell Metabolism (H-index: 35, 1594 citations). I've received awards like the FAPERJ "grade 10" fellowship and contributed to three undergraduate Final Degree Projects as a supervisor. My academic journey includes appointments at State University of Rio de Janeiro (UERJ), the Federal University of Rio de Janeiro (UFRJ), Brazil, University of San Francisco (USF), São Paulo - Brazil and University of Santiago de Compostela (USC), Spain.

Early Research and Master's Degree

My scientific career began in 2004 during my undergraduate studies at Rio de Janeiro State University, working on the DOHaD hypothesis with the support of a FAPERJ fellowship. My master's research (2008-2010), supported by a CNPq fellowship, explored the impact of early weaning on metabolic and hormonal alterations. I independently mastered key molecular biology techniques and authored two papers while collaborating on projects that yielded five additional co-authored publications.

Ph.D. and International Collaboration

During my Ph.D. (2010-2014), under Dr. Patricia Lisboa, I investigated the antioxidant properties of *Ilex paraguariensis* in metabolic dysfunctions induced by early weaning. My research earned the prestigious FAPERJ "grade 10" fellowship. I published three papers, supervised two undergraduate projects, and gained teaching experience. In 2014, I transitioned to a postdoctoral position at the Nutritional Observatory of the Federal University of Rio de Janeiro, supported by FAPERJ. Collaborating with Dr. Pam Factor Litvak (Columbia University) and Dr. Amanda Rodrigues Amorim Adegboye (University of Westminster), I co-authored three papers and gained valuable experience in human cohort studies.

Advanced Research and Global Mobility

In 2015, I moved to São Paulo to advance my expertise in molecular techniques at São Francisco University, publishing three corresponding-author papers on obesity and metabolic disorders. In 2018, I joined the Molecular Metabolism Group at CIMUS, University of Santiago de Compostela, Dr. Rubén Nogueiras. Collaborating with researchers across Europe, I published 12 papers in high-impact journals, including Journal of Hepatology, Hepatology, Cell Metabolism and GUT, and supervised a Final Degree Project.

Leadership and Current Research

Throughout my career, I've demonstrated leadership by mentoring students, presenting at national and international conferences, and driving collaborative research. Additionally, I have led research projects and collaborated with master's and Ph.D. students, guiding and supporting them in the development of their theses. Currently, my focus is on understanding the long-term effects of GLP-1 and GIP agonists on metabolic health, combining preclinical studies with translational research to address critical gaps in obesity and NAFLD treatment.

Resumen del Currículum Vitae:

I earned my Master's degree in Biosciences in 2010 under the mentorship of Dr. Patricia C. Lisboa, supported by the National Council for Scientific and Technological Development (CNPq). My research focused on the effects of early weaning on metabolic, hormonal, and body composition alterations, culminating in two first-author publications. I also contributed as a co-author to five additional papers, collaborating on projects examining neonatal nicotine exposure, hyperleptinemia, and prolactin inhibition.

In 2010, I began my Ph.D. under the joint supervision of Dr. Patricia C. Lisboa and Dr. Elaine de Oliveira. My research centered on the antioxidant and anti-inflammatory properties of *Ilex paraguariensis* (Yerba mate), exploring its effects on obesity, leptin resistance, and inflammation associated with early weaning. I was awarded a prestigious "nota 10" fellowship by the Foundation for Research Support of the State of Rio de Janeiro (FAPERJ-Brazil) during my second year. Over the course of my Ph.D., I published two first-author papers and co-authored nine others. Additionally, I supervised two undergraduate final degree projects, demonstrating my dedication to mentoring young researchers. My academic achievements enabled me to secure two professorship positions in Brazil through competitive public calls.

Following my Ph.D., I pursued a postdoctoral fellowship at the Federal University of Rio de Janeiro (UFRJ), funded by FAPERJ-Brazil, under the guidance of Dr. Gilberto Kac. During this period, I collaborated with renowned researchers such as Dr. Pam Factor Litvak (Columbia University) and Dr. Amanda Rodrigues Amorim Adegboye (University of Westminster, London), resulting in three co-authored publications. In 2014, we secured funding for a collaborative project with Columbia University. That same year, Dr. Pam Factor Litvak welcomed us into her research group at Columbia University in New York, providing an invaluable opportunity to strengthen our collaboration and advance our research.



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Subsequently, I relocated to São Paulo, where I initiated a project with Dr. Marcelo Lima Ribeiro investigating the effects of Paullinia cupana (Guaraná) on obesity and metabolic disorders stemming from maternal obesity. This work led to three publications, with me as the corresponding author, and included mentoring a master's student, Érica de Paula Numata.

In 2018, I moved to Spain to join Dr. Rubén Nogueiras's research group at The Center for Research in Molecular Medicine and Chronic Diseases (CIMUS), University of Santiago de Compostela. During this time, I developed and refined advanced research techniques, leading to significant contributions in high-impact journals. I published as a first author in Journal of Hepatology and Cellular and Molecular Life Sciences and as a corresponding author in Hepatology. I co-authored ten additional papers in prestigious journals, including Nature Metabolism, Nature Communications, Cell Metabolism, Journal of Clinical Investigation, and GUT. I also supervised Jacobo López Panadero's final degree project in Biology at the University of Santiago de Compostela and collaborated closely with master's and Ph.D. students.



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Turno General

Área Temática: Biomedicina
Nombre: BELTRÀ BACH, MARC
Referencia: RYC2024-048191-I
Correo Electrónico: mbeltrab@gmail.com
Título: Exploring the Metabolic Landscape and Therapeutic Opportunities in Wasting Diseases

Resumen de la Memoria:

I have dedicated most of my scientific career to studying the molecular drivers governing muscle wasting and mitochondrial dysfunction leading to cachexia. I was introduced to the study of cachexia during my Bachelor's final project before graduating in Biochemistry from the University of Barcelona (2014). Captivated by this concept, I did an ERASMUS internship at the University of Torino to study the role of microRNAs in muscle wasting. Shortly after finishing my Master's in Molecular Biotechnology from the University of Barcelona (2015), I was awarded a PhD scholarship to remain in Italy and continue my work on small non-coding RNAs (sncRNAs) and cachexia.

As a PhD candidate at the University of Turin (Italy), I investigated how tumor-derived microvesicles, containing specific microRNAs, impair oxidative metabolism in the skeletal muscle. We also identified alterations in the expression of sncRNAs in the skeletal muscle of sarcopenic oncology patients (Journal of Cachexia, Sarcopenia and Muscle 2022, 2023). I spent the last year of my PhD at the Stem Cell Institute of Leuven (Belgium), where I studied the impact of PGC-1 α on adult muscle stem cells during skeletal muscle regeneration (iScience 2022).

After defending my PhD (2019), I enrolled as a postdoctoral researcher in a project dedicated to studying NAD metabolism, discovering that metabolic disarrangements in cachexia are intimately associated with NRK2 repression. We successfully tested a therapeutic strategy by employing niacin, demonstrating an evident improvement in muscle and liver NAD⁺ levels and boosting oxidative metabolism (Nature Communications 2023).

Supported by two highly competitive postdoctoral individual grants (AIRC and MSCA Postdoctoral Fellowships), I joined the Complex Metabolic Diseases and Mitochondria lab at the IRB Barcelona (2023), representing a great opportunity to learn from experts in liver metabolism. My current focus is to unveil the role of FATP2 in liver autophagy and its implications in fatty liver progression. In parallel, I am conducting research on MFN2 on two fronts: 1) the characterization of a new Charcot-Marie-Tooth 2A model; 2) the study of MFN2 implication in ASNS-GABA Shunt pathway activation during tumor growth (manuscript under consideration in Nature Communications).

As a Ramon y Cajal Researcher, I want to implement my accumulated insight to investigate the physiopathology of complex metabolic diseases with emphasis on the effects on catabolism and oxidative metabolism, particularly focusing on the study of cancer cachexia. My previous work established that alterations in protein and mitochondrial metabolism are not limited to the skeletal muscle and involve other organs, and demonstrated that targeting energy metabolism in the liver consequently improves muscle condition. Building on my previous observations, my main scope will be to define the full metabolic landscape of cancer cachexia, identify tissue interactions, and develop therapeutic strategies to alleviate the host's condition.

Resumen del Currículum Vitae:

I have a PhD in Experimental Medicine and Therapy from the University of Torino (2019). As research indicators, I have published 15 papers in high-impact journals (11 in Q1 and 5 in D1), with a total of 6 first/co-first authorships including a publication in Nature Communications (IF=14,7). My work has achieved an h-index of 10 with 368 citations, reflecting its positive reception within the scientific community. I have presented my work at 16 scientific meetings, mostly international. Attesting to the excellence of my research, I have been selected for short talks at five international conferences and invited as a speaker in three scientific symposiums.

My commitment to science is evidenced by my proactive pursuit of collaborations, leading me to work in three countries (Italy, Belgium, and Spain) and work alongside several top research teams, each contributing to my exposure to diverse research methodologies, approaches, and best practices. I have consistently secured personal funding and engaged in collaborative grant opportunities to advance my research goals. During my internships in Belgium and Spain, I have been supported by competitive travel grants. Recognition of my dedication to scientific independence and excellence is evident through prestigious grants such as the "AIRC Fellowships for Abroad Post-Doc" and the "MSCA Postdoctoral Fellowship", which have empowered me to pursue my research interests by joining a first-rate institution (IRB Barcelona) with increased autonomy. My commitment to achieving scientific independence is reflected in my applications to early-career grants such as the "AFM-Telethon Trampoline Grant".

In addition to individual accomplishments, I mentored several undergraduates and co-supervised five Master's students. Beyond research, I have embraced opportunities to teach University courses in Italy and Spain. My commitment to teaching is further underscored after obtaining a position as an Adjunct Professor at the University of Barcelona, and recently requesting the accreditation of "Profesor Contratado Doctor" by the ANECA to certify my credentials as an assistant professor. I have also participated in outreach activities such as the "Batx2lab program" and regularly review manuscripts focused on muscle metabolism and mitochondrial biology (18 rounds of peer review of 13 manuscripts, Web of Science registry).



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Turno General

Área Temática: Biomedicina
Nombre: RISSO BALLESTER, JENNIFER
Referencia: RYC2024-048294-I
Correo Electrónico: jennifer.risso-ballester@tum.de
Título: Study of the interplay between RNA viruses and the human host

Resumen de la Memoria:

My long-standing research interests focus on the study of the complex interplay viruses and human host. My group will be thus focused on the research of Respiratory Syncytial Virus (RSV)-host interactions to identify host-dependency factors amenable for therapeutic intervention. After obtaining my degree in Biotechnology, I started a Master's degree in Research in Molecular, Cellular and Genetics Biology at University of Valencia (UV). In 2015, I obtained a MEC Predoctoral Fellowship and started my Ph.D. in Prof. Rafael Sanjuán's group focused on the study of the origin of genetic diversity in DNA viruses. My Ph.D. led to two first-author manuscripts and one book chapter. During this period, I acquired distinctive skills in virology, genomics, next generation sequencing, programming or experimental evolution. Besides routinely supervising Bachelor's and Master's students, I taught classes of "Laboratory practices: Criminal Analysis Techniques" at UV. After my Ph.D. I felt an overwhelming ambition to lead projects and to run my own group and prepared for this challenge. Once completing my Ph.D., I joined Prof. Rameix Welti's group as a postdoc, where I was leading four research lines focused on the study of different aspects of RSV inclusion bodies (IBs). This stage resulted in one first-author publication in Nature, two second-author publications and two first and corresponding -author book chapters. Our findings published in Nature were of great significance for the field of virology, especially for the antiviral research area. We underlined the importance of virus condensates in infectivity and reported the ability of a small drug-like molecule to disrupt material properties of a virus condensate and block virus infection in vivo. The COVID-19 global pandemic prevented the external dissemination of our results, but I tried to search for alternatives and I recorded a talk for the JRNclub platform. In 2022, I gave a talk to the virologist community at the NSV meeting (Braga, Portugal). I developed very valuable approaches that were decisive for the publication of manuscripts or the obtention of funding. Results from my investigations led to new hypothesis and to the beginning of new research lines, now being addressed by new PhD students. I co-supervised six Master's students and gave them feedback on written works and oral presentations. I acquired distinctive skills in molecular biology, microscopy, and knowledge of the reverse genetics systems. In 2023, I was awarded a MSCA Postdoctoral fellowship and joined Prof. Pichlmair's group. This was an important recognition of the quality of my previous research and a pivotal step forward of my development as a future independent researcher. I am also currently involved in two other projects focused in the study of virus host-interactions. I am currently co-supervising the practical course "Classical and Molecular Virology Course" at TUM and recently co-evaluated a grant proposal from the Personal Research Program of The Israel Science Foundation. I also participated in peer-review processes of manuscripts submitted to Nat. Commun., thanks to the Early Career Researcher Co-Review Initiative promoted by this journal. I am thus acquiring new tools for efficiently implement systems biology and proteomics approaches as well as valuable skills related to project management and leadership. During

Resumen del Currículum Vitae:

-Current position:
MSCA Postdoctoral Researcher
Department of Virology, Prof. Andreas Pichlmair's group.
Technical University of Munich (TUM, Germany)
-Relevant previous professional status:
01/02/2022-31/01/2023: Fondation Simone et Cino Del Duca Postdoctoral Fellowship. Molecular mechanisms of multiplication of Pneumoviruses (Prof. Rameix-Welti). Institut national de la santé et de la recherche médicale (INSERM), University of Versailles, France.
01/11/2019-31/01/2022: ATIP-AVENIR Postdoctoral Fellowship. Molecular mechanisms of multiplication of Pneumoviruses (Prof. Rameix-Welti). Université de Versailles-Saint-Quentin-en-Yvelines, France.
01/04/2015-01/09/2019: PhD Fellowship FPI (Ministry of Science, Innovation and Universities) Virus Evolution Lab (Prof. Rafael Sanjuán Verdeguer). Institute for Integrative Systems Biology (University of Valencia-CSIC), Spain.
01/01/2014-31/06/2014: Master's Thesis Student. Physiopathology of Rare Diseases (Prof. Federico V. Pallardó Calatayud). University of Valencia, Spain.
01/02/2013-31/05/2013: Final Undergraduate Project's Student. The Genetic Medicine Unit Sistemas Genómicos Company, Valencia, Spain.
Publications and conferences:
An important aspect in my past work was to successfully conclude the projects I was managing. Importantly, my published work features articles from every stage of my career, demonstrating my high level of productivity. PhD: 2 publications in highly-visible journals + 1 book Chapter. Postdoc stage: 1 publication as first author in the prestigious journal Nature + 2 publications as second author from collaborative projects + 2 book chapters as first and corresponding -author.
I participated in both national and international conferences to disseminate the results obtained during my stages as PhD and postdoctoral researcher. I also demonstrated my ability to collaborate with other researchers in the field in my publications, which were also multi-authored. During these years, I established several long-lasting national and international collaborations with outstanding researchers in the field of Virology.
Projects:
I participated in more than ten international and national research projects focused on the study of virus-host interactions.
In 2023, I was awarded a Marie Skłodowska-Curie Actions (MSCA) Postdoctoral fellowship, an important recognition of the quality of my previous research in the virology field, and a pivotal step forward of my professional development as a future independent and creative researcher. I am thus currently leading my own project titled: "Proteomics-based Analysis of RSV nucleic acid/protein Interactions" (PARIS) in Prof. Andreas Pichlmair lab.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Biomedicina
Nombre: CEDÓ GINÉ, LÍDIA
Referencia: RYC2024-049349-I
Correo Electrónico: lidia.cedo@gmail.com
Título: Metabolic Dysregulation in Obesity: Investigating the Impact of Gut Microbial Metabolites on Intestinal Physiology

Resumen de la Memoria:

Dr. Lidia Cedó did the PhD in the group of Nutrigenomics, in the department of Bioquímica i Biologia Molecular, from Universitat Rovira i Virgili. She got her doctorate in the PhD program of Nutrition and Metabolism in January 2013, focused on the study of the effects of grape seed procyanidins on proliferation and apoptosis of pancreatic cells, particularly in the context of metabolic syndrome and pancreatic cancer. During the thesis, she did an international stay in 2011 at Université Paris DIDEROT.

In March 2013 she joined the group Bases Metabòliques del Risc Cardiovascular at IIB-Sant Pau (Barcelona) and obtained a postdoctoral researcher contract funded by CIBERDEM, which ended in May 2020. Her main line of research focused on the metabolic characterization of genetically modified mice as models of dyslipidemia (and more specifically in HDL alterations), obesity, diabetes, and atherosclerosis, and in applied studies of nutritional interventions and pharmacological treatments.

In November 2020 she obtained a contract as a researcher in the DIAMET group, at IISPV in Tarragona. The actual main line of research of Dr. Cedó focuses on the study of succinate as a hormone-like metabolite. In 2021 she obtained a project "Retos Investigación" JIN allotted to young investigators, from AEI, as principal investigator, studying the role of succinate/SUCNR1 axis on atherosclerosis.

From her scientific activity, Dr. Cedó has published 47 international publications (20 as first author and 1 as corresponding author), collaborating with numerous national and international investigators; she has participated in 14 competitive research projects (1 as principal investigator), with integrative approaches that combined in vivo models, in vitro experiments, and human clinical studies; and has presented 42 works at national and international meetings. Moreover, she has supervised 3 final degree projects, 2 MSc's projects, a doctoral thesis, and currently she supervises a final degree project and a PhD student.

Dr. Cedó has centered her research on various aspects of metabolism. As a recipient of the RyC fellowship, her research endeavors will be dedicated to advancing the understanding of the extracellular functions of gut microbiota-derived metabolites with implications in cell physiology. Leveraging her existing expertise, her initial investigations will concentrate on succinate and its receptor, SUCNR1, in intestinal physiology and gut microbiota composition. However, she intends to broaden her investigations, seeking to identify other metabolites derived from the gut microbiota that may act similarly to succinate, such as lactate and its membrane receptor HCAR1. Her hypothesis postulates that a bidirectional interaction exists between gut microbiota-derived metabolites-sensing GPCRs and gut microbiota composition and function. This scientific endeavor could reveal key insights into the host-microbiota communication or the modulation of immune responses, which may have implications for understanding and managing microbiota-related conditions.

Resumen del Currículum Vitae:

Scientific Contributions: Dr. Lidia Cedó's doctoral research (R1 period) in Nutrigenomics group (URV) focused on investigating the effects of grape seed procyanidins on pancreatic cell proliferation and apoptosis. During her PhD studies, she participated as an associate researcher in 2 national competitive projects, undertook an international stay in 2011 at Université Paris DIDEROT, presented 15 works at national and international meetings, and authored 6 articles as the first author and 10 papers as a co-author. She received her doctorate in the PhD program of Nutrition and Metabolism in January 2013 with a Cum Laude distinction.

Then, she joined the group Bases Metabòliques del Risc Cardiovascular (2013-2020, R2 period) at IIB-Sant Pau (Barcelona). Her primary research focused on the metabolic characterization of genetically modified mice as models of dyslipidemia, obesity, diabetes, and atherosclerosis, as well as applied studies of nutritional interventions and pharmacological treatments. During this period, Dr. Cedó served as an associate researcher in 6 national competitive projects, presented 21 works at national and international meetings, published 13 articles as the first author (1 as the corresponding author), and co-authored 16 publications.

Since November 2020, Dr. Cedó has been a senior researcher (R3) in the DIAMET group at IISPV (Tarragona). She serves as the PI for a "Retos Investigación" JIN project, allocated to young investigators by AEI and has actively participated in 5 national competitive projects as an associated researcher. Her work delves into understanding the role of the succinate/SUCNR1 axis in atherosclerosis development. Additionally, she has presented 6 works at national and international meetings, published 1 high-impact publication as the first author, and co-authored 3 publications.

Research Fellowships: Dr. Cedó's academic journey has been supported by competitive research grants and scholarships, showcasing her ability to secure funding for her scientific endeavors. She earned a competitive pre-doctoral FI grant from AGAUR, secured a post-doctoral contract funded by CIBERDEM and, more recently, was granted a JIN project, which finances the contract of young investigators.

Scientific Responsibilities & Leadership: Dr. Cedó has gradually assumed scientific responsibilities, both at a research and training level. During her predoctoral stage, she actively contributed to experimental design and results analysis. In her postdoctoral stage, she began leading specific tasks within funded projects and played a decisive role in project development. Currently, she serves as the PI for a project financed by AEI. Moreover, she has co-supervised 2 final degree projects, 2 MSc's projects, and a PhD thesis. Currently she supervises 1 PhD student.

International Collaborations: She has actively collaborated with renowned researchers on an international scale, fostering global scientific cooperation. In fact, 53% of her publications (65% as the first author) have been part of collaborative projects with international investigators.

Peer Review Activities: Dr. Cedó's recent appointment as an Expert Project Evaluator by AEI highlights her esteemed position within the scientific community and her ability to effectively evaluate research projects. Moreover, she has been a reviewer of international scientific journals.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: PIERELLA KARLUSICH , JUAN JOSE
Referencia: RYC2024-050080-I
Correo Electrónico: juan.pierella.karlusich@gmail.com
Título: Innovative Research in Photosynthetic Organism

Resumen de la Memoria:

As part of my PhD in Nestor Carrillo's lab in Argentina, I investigated the role of redox and iron in managing environmental stress by terrestrial plants. As part of the Tara Oceans consortium in Chris Bowler's lab at ENS-Paris, France, my work transitioned to the marine realm addressing biogeographical surveys and iron responses by phytoplankton and nitrogen-fixers. Currently, I work in Sergey Ovchinnikov's group, first located at Harvard and now at MIT, and I am mainly dealing with protein remote homology detection to address the evolutionary origin of eukaryotes. As a Ramon y Cajal researcher, I would like to extend my current work to evaluate the translation of stress response strategies from microalgae and cyanobacteria into crops. This involves identifying stress-response genes present in cyanobacteria and algae (but absent in plants) through meta-analysis of publicly available genetic and expression datasets, and to assess the ability of selected genes to enhance stress tolerance in *A. thaliana* and crops through large-scale phenotypic and molecular characterization. This is an underutilized approach to improving crop resilience by harnessing stress-adaptive genes from evolutionarily distant, photosynthetic organisms. By integrating bioinformatics, artificial intelligence, genetic engineering, and large-scale phenotypic screening, this work has the potential to yield broadly applicable biotechnological tools for sustainable agriculture in the face of climate change.

Resumen del Currículum Vitae:

I received my PhD in Biology from National University of Rosario (UNR) in Argentina in 2015, conducting part of my PhD work at the Leibniz Institute of Plant Genetics and Crop Plant Research (IPK-Gatersleben) in Germany, and then extended my stay in the Argentinean lab as a postdoctoral fellow. I then moved to a postdoctoral position at the Ecole Normale Supérieure (ENS) de Paris, France. Currently, I am a postdoctoral researcher in a lab first located in the FAS Division of Science at Harvard University, and now relocated in the Biology Department at the Massachusetts Institute of Technology (MIT). My earlier works largely focused on the role of iron and redox responses in managing environmental stress by terrestrial plants, while more recent works have transitioned to the marine realm addressing biogeographical surveys and iron responses by phytoplankton and nitrogen-fixers, and I am currently dealing with deep learning to get insights into the evolutionary origin of eukaryotes. During all these years I became a broadly trained molecular biologist with expertise in computational biology, plant and algae biology, and environmental microbiology, and experience in machine learning and multidisciplinary collaborations. My technical skills include proficiency in R and Python, and I have leadership and management experience as an instructor and in the lab. My work involved in many cases leading roles in project management, mentoring, and interdisciplinary collaboration with professionals from diverse fields (e.g., ecologists, bioinformaticians, oceanographers, modellers, mathematicians). I contributed to 32 peer-reviewed international publications (including Nature, Science, Nat Comm, PNAS, ISME J, Mol Ecol Res, Ann Rev Mar Sci), with 14 as first/co-first or senior author (Google Scholar h-index = 19), as well as to 1 book chapter as first author and 2 preprints. I am also part of large international collaborations as a member or collaborator of the research consortiums Tara Oceans, Aquatic N₂-fixation network, and AtlantECO. I wrote and received several fellowships to support my research: CONICET PhD fellowship (Argentina), short-term DAAD (Germany) and EMBO fellowships, Bunge & Born postdoc fellowship (Argentina), and FFEM postdoc fellowship (France). Beyond research, I am committed to science education and outreach. I participated in the initiatives "Scientists go back to school" and "LibreCiencia" in Argentina, and contributed to the Tara Oceans Foundation's public awareness in France. I also wrote popular science articles in Spanish (Ciencia e Investigación, 2014; Ensemble, 2017) and English (under review in The International Microbiology Literacy Initiative), and a perspective about ocean microbiome protection (Nat Microbiol, 2022). As an educator, I mentored 10 students (undergraduate and PhD level), fostering their development in biological big data science. My teaching experience spans across 4 different courses at Harvard, ENS, and UNR, involving lecturing, discussion facilitation, and interactive learning. Additionally, I served as a reviewer for 10 scientific journals, 2 grants, and 3 undergraduate theses.



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Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: KOTB ABD ELGHANY ELMAHALLAWY, EHAB
Referencia: RYC2024-050423-I
Correo Electrónico: anasehab2010@gmail.com
Título: Zoonotic diseases and One Health approach

Resumen de la Memoria:

The candidate possesses vast expertise in the detection, isolation, characterization, treatment, and control of zoonotic pathogens. Beginning as a parasitologist, he broadened his research scope to encompass zoonoses, pharmacology, biochemistry, epidemiology, and microbiology, reflecting a commitment to the "One Health approach." His research interests span field and laboratory investigations into zoonotic disease distribution, with a focus on identifying novel drug targets and understanding host-pathogen interactions to inform control measures. His ultimate goal is to pioneer innovative diagnostic strategies and drug targets for these diseases, prioritizing interdisciplinary collaboration. Understanding the dynamics of pathogen persistence in multi-host communities is crucial to limiting zoonotic cross-species transmission to humans and livestock, ultimately protecting human health and saving lives. His long-term objective is to develop innovative diagnostic strategies and novel drug targets for this category of diseases. His research journey began in 2007, earning a bachelor's degree in veterinary medical sciences and subsequently receiving accolades for academic excellence. Following summer training in Egypt, he embarked on a career in research and teaching, starting as an assistant researcher in the Department of Zoonoses at Sohag University. He obtained master's degree from Benha University focused on epidemiological studies of zoonotic toxoplasmosis and the work was published in JCR indexed journal. A pivotal chapter in the applicant life unfolded during a Ph.D. fellowship at the University of Granada, funded by an Erasmus Mundus. The candidate earned his PhD on 2015 and thesis entitled "Epidemiological studies on zoonotic leishmaniasis and new trials for studying the effect of melatonin on the parasite". Crucially, his passion for research and teaching and comprehensive background in zoonotic diseases have been cultivated through extensive research, diagnostic and technical experience gained over several years of international exposure and various postdoctoral research stays across various institutions across several European countries, including Sohag University (Egypt), University (Univ.) of Turin (Italy), Univ. of León (Spain), Univ. of Glasgow (UK), Univ. of Liege (Belgium), Instituto Carlos III (Spain), Univ. of Cordoba (Spain) and recently he was awarded a competitive 'EMERGIA' grant from the Junta of Andalucía. In summary, collaborating with research centres and various experts in zoonotic diseases worldwide enriched the candidate's experience, fostering independence and leadership through exposure to diverse perspectives, interdisciplinary learning, and global impact. The applicant's overarching objective is to pioneer new diagnostic strategies and identify innovative drug targets for zoonotic diseases under "One Health" approach. His extensive experience and expertise will significantly contribute to combating such diseases, addressing challenges through interdisciplinary approaches. Collectively, this research trajectory promoted the leadership and independence of the candidate besides completion of the transfer of knowledge and extensive training in a wide variety of new molecule-diagnostic techniques across various Middle eastern and European countries, which benefited the applicant in his professional career.

Resumen del Currículum Vitae:

The applicant holds a research contract "EMERGIA" at the University of Córdoba (UCO). Starting as a parasitologist, he expanded his expertise across zoonoses, microbiology, and pharmacology, guided by the "One Health" approach. His main areas of work include: 1) research on epidemiology, diagnosis, and drug discovery for zoonotic diseases, and 2) teaching and supervising students at various levels. He earned his PhD in Parasitology with "Cum Laude" distinction in 2015 at the University of Granada, supported by an Erasmus Mundus scholarship. Following this, he served as an associate professor and researcher at Sohag University, establishing a unit for diagnosing zoonotic diseases. His international experience includes roles as a visiting researcher at the University of León, Research Fellow at the University of Glasgow, Senior Scientist at the University of Liège, and postdoctoral researcher at Instituto de Salud Carlos III. His research focuses on novel diagnostics, drug discovery, and zoonotic pathogen persistence in multi-host environments to mitigate cross-species transmission risks.

The candidate has demonstrated exceptional leadership, initiative, and international collaboration across multiple research projects, making significant contributions to the scientific community.

Research Excellence: With over 130 publications in high-impact, JCR-indexed journals. As a leading author and corresponding author for numerous studies, their involvement in hypothesis formulation, experimental design, drafting, and correspondence has been pivotal.

Commitment to Open Science: The candidate is dedicated to Open Science, ensuring widespread access to research through open access and subscription-based journals from renowned publishers like Elsevier, Wiley, and Springer.

Global Recognition & Collaborations: Ranked among the top 2% of scientists by Stanford University (2022-2024), the candidate has collaborated extensively with researchers from Egypt, Italy, Saudi Arabia, Spain, the UK, and the USA. These collaborations have advanced research on zoonotic diseases and public health.

Leadership & Community Engagement: The candidate has authored conference abstracts, secured numerous grants, and earned awards, including Best Presentation and Publication Excellence Awards. They are actively involved in editorial and review roles for leading JCR-indexed journals. Furthermore, the candidate has contributed to the teaching and research systems in Egypt and Spain, while coordinating Erasmus+ projects to foster international academic partnerships.

Research Stays & Project Leadership: The candidate has undertaken research and professorships in Belgium, Egypt, Italy, Spain, and the UK, leading independent research projects that have expanded their leadership capabilities and was principal or co-principal investigator for 12 international projects focused on zoonoses.

Mentorship & Societal Impact: The candidate has mentored numerous junior researchers and supervised several PhD students and master's theses. He also actively engaged in public outreach, raising awareness about zoonotic diseases, promoting the "One Health" approach.

In summary, the candidate's achievements showcase their leadership in research, international collaborations, education, and public engagement, contributing significantly to scientific knowledge and the fight against zoonotic diseases.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: ROMÁN DOBARCO, MERCEDES
Referencia: RYC2024-051381-I
Correo Electrónico: mercetadzio@gmail.com
Título: Sustainable forest management within the soil security framework

Resumen de la Memoria:

My research is focused on two main areas: 1) soil organic carbon (SOC) storage and stabilization in wildlands and agroecosystems, and 2) digital soil mapping (DSM) as a tool for sustainable management and soil security.

Aspen-conifer ecosystems constitute an ideal ground for investigating emerging theories on soil organic matter formation and SOC stabilization. At Utah State University I investigated the effects of overstory species on SOC storage and stability in semi-arid mixed aspen forests applying several SOC fractionation analyses. I applied mid-infrared spectroscopy to characterize the chemistry of SOC fractions to investigate whether higher stocks of mineral-associated SOC under aspen stands is caused by selective preservation of recalcitrant compounds.

In the field of DSM and pedometrics, I combine machine learning and geostatistics to predict the spatial distribution of soil properties and classes. Some of the most relevant outcomes from my postdoctoral research in the Infosol Unit at INRAE (Orléans, France) were a set of pedotransfer functions for estimating soil available water capacity (AWC) and producing the first AWC map with associated uncertainty for France (90 m grid) for GlobalSoilMap. These products have a relevant impact for agricultural management and land use planning. I also investigated methods for combining data from various sources (model ensemble of maps produced at different scale) and spatial support (e.g., area-to-point kriging).

As a Postdoctoral Research Associate at the Sydney Institute of Agriculture I developed an innovative DSM framework for stratifying the soil landscape over large areas based on a new conceptual soil taxon, the pedogenon. Pedogenon, genosoil, and phenosoil mapping was designed to for assessing changes in soil condition caused by anthropogenic activities. These are linked to concepts of soil security and applied to the quantitative assessment of soil security dimensions. My mission at SIA also consisted of creating publicly available, high-resolution maps of SOC fractions stocks and soil microbial biodiversity for the TERN Soil and Landscape Grid of Australia.

With SELVANS project I investigated the effects of forest management on soil condition. SELVANS has produced maps of soil monitoring units at regional scale and developed a method for setting site-specific thresholds for soil indicators that was applied for assessing and mapping the condition of forest plantations in the Basque Country (Spain) in the context of the EU Directive on Soil Monitoring and Resilience.

Resumen del Currículum Vitae:

I was awarded the Marie Skłodowska-Curie Actions European Postdoctoral Fellowship (MSCA-PF) as PI of the project SELVANS "Soil condition and capability mapping for sustainable forest management" (15/05/2023-15/05/2025) (181,152.96 €). As a researcher of the ECO2 group at BC3, I assessed forest soil condition in the Basque Country in the context of the EU Soil Monitoring and Resilience Directive. SELVANS is an international project with a secondment at CEREGE (Marseille, France), and collaborations with INRAE (Orléans, France) and the University of Sydney (Sydney, Australia).

I was awarded the R3 certificate by the AEI in the 2024 call.

I am member of the international Aroua Soil Security Think Tank (<https://arourasoil.com/>) as expert on Soil Security, participated at the first Global Soil Security Summit (October 2024, Sydney, Australia). Aroua aims to raise global awareness and foster effective soil policies.

I was a Postdoctoral Research Associate at the University of Sydney (USyd) (2019-2023) where I produced 7 datasets of high-resolution digital soil maps at continental scale for the Terrestrial Ecosystem Research Network Soil and Landscape Grid of Australia (TERN SLGA) in collaboration with CSIRO. Scripts and maps are available in an open repository following FAIR principles. Co-PI of the project "High-resolution evaluation and monitoring of soil change for the Australian continent" (1,671,418 AUD, approximately 1,036,000 €) in alignment with the Australian National Soil Strategy. I was a postdoctoral researcher at the INRAE Info&Sols unit (Orléans, France) (2014-2018) working on pedometrics and digital soil mapping, developing several products available for exploitation by end-users at the French Government Research Data Portal.

I hold a PhD in Ecology from Utah State University (USU) (USA) (2011-2014) with specialization on biogeochemistry of terrestrial ecosystems and soil organic matter. I enjoyed two short stays (2011, 2012) at the University of Freiburg (Germany).

Overall, I have over 11 years of international experience as part of groups of global recognition in the fields of soil science, DSM, forest soils and biogeochemistry. I have participated in 12 R&D projects granted through competitive calls (2 as PI and 1 as co-PI) and 4 contracts for technology transfer. I have disseminated the results in international and national conferences, workshops, and participated in outreach activities (European Researchers Night, World Soil Day etc.).

My mentoring and supervision experience began at USU Forest Soils lab where I trained and supervised 6 technicians and 2 undergraduate researchers. I co-directed the final dissertation of Manon Caubet MSc for the completion of the title Engineer Bordeaux Sciences Agro (France). I co-supervised Dr. Ho Jun Jang for the completion of the PhD in Soil Science at the University of Sydney (Australia), where he is now a postdoctoral researcher. In 2020 I was accredited as PhD lecturer by the ANECA. I am editor for the journal Soil Security and reviewer for 9 scientific journals.

Author of 33 peer-reviewed papers, 1 book-chapter. First author of 11 papers: 8 in Q1 journals, 1 in Q2 journals & 2 in non-indexed peer-reviewed journals. 22 papers as co-author: 17 in Q1 journals, 3 in Q2 journals & 2 in non-indexed journals (SJR). Last 5 years (2020-2024) h-index = 16 and i10-index = 22.



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Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: MANZANO BAENA, PABLO
Referencia: RYC2024-050958-I
Correo Electrónico: pablo.manzano@bc3research.org
Título: Understanding livestock sustainability through multidisciplinary research of global herbivory and livestock socioecosystems

Resumen de la Memoria:

Pablo Manzano is an international researcher on sustainability of grazed socio-ecosystems. Starting in 2002 with a PhD in Rangeland Ecology at the Department of Ecology, Universidad Autónoma de Madrid (UAM), with innovative analyses of seed dispersal associated with transhumant practices, in 2007 he taught at the Universidad Europea de Madrid and then switched to international development cooperation for several years. From 2007 to 2009, at the Black Vulture Conservation Foundation in Mostar, Bosnia and Herzegovina, he analysed why pastoralism had declined in Western Herzegovina, proposing recovery interventions. With such a professional turn he added sociology and economy to his environmental background, along with the communities he was working with, laying the foundations for an intercontinental career of truly transdisciplinary research.

In 2010 he moved to Nairobi, Kenya to coordinate the World Initiative for Sustainable Pastoralism, a global program of the International Union for Conservation of Nature (IUCN) dedicated to the synergies between sustainable land uses and biodiversity conservation, and produce research and knowledge products. In 2014 he joined the United Nations Food and Agriculture Organization (FAO) to set up the Pastoralist Knowledge Hub in Rome, Italy aimed as a node on pastoralism for the different FAO programmes. After fully setting the Hub, he returned to his family in Nairobi in late 2015, as international consultant. In parallel, he defended his PhD thesis and developed different research projects built on his global experience at IUCN and FAO. Most noteworthy, and based on his participation in the LEAP Partnership at FAO since 2012, he develops and publishes a critique to the current accountability of greenhouse gas (GHG) emissions by livestock that it has ignored fundamental aspects of wild herbivore ecology, also powerful GHG emitters, which show livestock contribution to anthropogenic climate change to be overstated.

In 2019 he joined the Global Change and Conservation (GCC) research group led by Mar Cabeza at the University of Helsinki, Finland as a visiting researcher and as a post-doc since 2020 funded by HELSUS, the Helsinki Institute for Sustainability Science. He applied transdisciplinary perspectives to study grazed socio-ecosystems, with special attention to cross-sectoral sustainability indicators. During his post-doc in Helsinki he starts collaborating with the Basque Centre for Climate Change (BC3) on livestock GHG emissions. This collaboration further continued by a tenure track as Ikerbasque Fellow since early 2022 at the AgroFood research group led by Agustín del Prado.

His research line examines the sustainability of livestock systems, particularly those dominated by ruminants, by applying a comparative framework with natural grazing ecosystems. The overall theoretical underpinning is that the most sustainable practices in livestock keeping will be those imitating the environmental outcomes of natural herbivory, which has dominated the Earth's continental ecosystems for 15 million years. Indicators to establish such comparisons are fundamental and multidisciplinary in nature, ranging from estimating GHG emissions to modelling natural herbivore biomass and ecological interactions, and properly describing and understanding both traditional pastoralist practices and modern livestock systems.

Resumen del Currículum Vitae:

Pablo Manzano's CV shows a clear capacity to implement transdisciplinary research, but also coherence and consistence around his main research topic namely the examination of sustainability in livestock systems through comparisons with ecosystems dominated by wild, functionally similar herbivores.

His beginnings in scientific research (2002-2007) were outstanding because of the originality of his research questions and experimental settings, with great advances in the understanding of seed dispersal (measuring a dispersal distance 2 orders of magnitude larger than previous measurements; discovering post-dispersal seed predation by insects on faeces for the first time outside the tropics). But they also set the scene for his entire career by using grazing livestock as an easy-to-handle model to monitor ecological interactions between ruminant herbivores and vegetation the similarities between natural grazing ecosystems and sustainable livestock grazing systems as a central working methodology being already present at such an early career stage.

The next phase of his professional career (2007-2019) switched to international development cooperation, with a very strong element of knowledge transfer to relevant international organizations IUCN and FAO at their respective Secretariats, other UN agencies such as IFAD, the World Bank or UNHCR through consultancy work, and a wide array of national cooperation agencies, governmental environment departments, NGOs and Civil Society. The publication of knowledge and research materials continued uninterruptedly during this phase, albeit at a lower pace due to the inevitable socio-political orientation of his professional duties. This career stage provided him, however, with an important sociology and economy background that strengthen his profile as an interdisciplinary researcher, while catalysing an extraordinary network of contacts, collaborators and producers that has facilitated the transdisciplinarity of his research. It also trained his skills in producing popular science materials that increase the societal impact of his scientific research. But it also has helped in choosing keystone research questions that are able to leverage change in the global political agenda, notably in the fields of GHG emissions, and conservation areas.

The latest phase of his career (2019-present) has seen the consolidation of a transdisciplinary scientific profile, with relevant publications in strong journals on GHG emissions by livestock but also on herbivore ecology and on pastoralist socio-ecosystems. The acceptance of his work by the research community and the effectiveness of his scientific work is shown by a sustained increase in citation trends of his works especially since 2019 at the time he could work full-time on research. This has been done in tandem with a sustained effort to devolve knowledge to society in form of popular science materials press articles, interviews in media and podcasts, and popular science videos. The disciplinary diversity yet strength of his publications about his central research subject livestock sustainability analysed by comparing it to environmental outcomes of wild grazing ecosystems shows his capacity to assimilate and combine knowledge, and the success of an innovative research strategy that can also inspire other relevant global sustainability questions.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: JÁUREGUI MOSQUERA, IVÁN
Referencia: RYC2024-050016-I
Correo Electrónico: ivan.jauregui.mosquera@hotmail.com
Título: Advancing sustainable agriculture: exploring biological nitrification inhibition through innovative phenotyping and research

Resumen de la Memoria:

I am Iván Jáuregui Mosquera, a researcher specializing in plant physiology, nitrogen (N) use efficiency, and biological nitrification inhibition (BNI). My career integrates plant physiology, plant phenotyping, and sustainable agricultural practices to enhance crop productivity and mitigate environmental impacts.

Throughout my international scientific career, which includes over six years of postdoctoral experience abroad, I have gained expertise that has enabled me to conduct groundbreaking interdisciplinary applied research in crop physiology. I have led innovative projects and developed advanced phenotyping platforms, securing competitive funding and establishing international collaborations to advance sustainable fertilization strategies.

Currently, I am the group leader at the Public University of Pamplona (UPNA). As a research leader, my participation in competitive calls has attracted 613.855 € in external funding.

☐ GENE-BNI (Spanish Research Council, Proyectos de Generación de Conocimiento 2023; 101.875€): I employ QTL mapping to validate a genetic region linked to BNI;

☐ NITROCOMPOST (Navarre Government 2023; 91.906€): focusing on stabilizing nitrogen in organic fertilizers using organic waste with BNI capacity.

☐ LEONUREASE (OTRI contract 2025; 10.074€): a collaboration with Forgasa on leonardite-based fertilizer solution.

☐ Atracción de Talento Senior ANDIA 2021, Navarre Government awarded me 240,000€ (salary 50.000€ and research funds 10.000€ per year, over 4 years): to lead research on genetic NUE improvement and sustainable fertilization.

☐ ReNEW. Belgian National Fund for Scientific Research awarded me 170.000€ (150.000€ for my salary and 20.000€ for research funds in total for the 3 years): to uncover genetic markers linked to ammonium use efficiency, combining genome-wide association studies.

Research focus

BNI research is now a core focus of my work. The GENE-BNI project aims to validate GWAS findings by studying wheat parental lines with contrasting BNI capacity through QTL analysis. Preliminary results indicate a gene region on chromosome 5 associated with BNI capacity in wheat. GENE-BNI's objectives include QTL analysis, gene expression integration, studying BNI impacts on microbial populations and wheat yield, and disseminating findings through various platforms, within an international team led by Dr. Jáuregui.

In addition to leading the GENE-BNI project, my international collaborations include partnerships with CIMMYT's CropSustain, BNI Mission, and Prof. Kristian Koefoed Brandt (University of Copenhagen). This network strategically positions my research within global initiatives addressing wheat productivity and sustainability.

Resumen del Currículum Vitae:

Currently, I am a researcher at UPNA, leading a laboratory of new formation, until 2027.

I am the direct supervisor for three research associates including a postdoctoral researcher within the GENE-BNI project, demonstrating my ability to build and manage dynamic research teams.

I have published over 20 publications. I have a h-index of 10-12. Recently, I have been the corresponding author for my leading research.

I possess a strong ability to conceptualize unexplored plant characteristics for sustainable agriculture. Throughout my career, I have developed innovative tools for phenotyping that reveal hidden physiological responses in plants. These tools have attracted significant funding for my postdoctoral supervisors. Most notably, I have created a phenotyping pipeline that accurately characterizes the capacity of specific wheat genotypes to inhibit the microbial populations responsible for nitrification in the agrosystem. By utilizing these tools to explore genetic variation, I can identify the specific genetic factors in plants that contribute to these traits.

Doctoral and postdoctoral research outputs

I completed my Ph.D. with a Formación de Personal Investigador (FPI) fellowship (under the guidance of Prof. Aparicio-Tejo and Dr. Aranjuelo. My thesis, titled "Nitrogen source as a key factor conditioning Arabidopsis thaliana responsiveness to elevated CO₂ conditions," provided new insights into nitrogen metabolism and carbon assimilation. I proposed a mechanistic explanation for the recurrent observation of leaf nitrogen (N) depletion under elevated CO₂ in model plants (Jauregui et al. 2015a; 2016; 2018), indicating how nitrate nutrition, elevated CO₂, and transpiration influence nitrate assimilation. Besides, my contributions spanned crop research: in Physiologia Plantarum (Jauregui et al., 2015a), I explored wheat's responsiveness to elevated CO₂ and temperature, revealing the interaction of these factors with photosynthesis and nitrogen assimilation. Furthermore, I played a key role in a landmark study (Aranjuelo et al., 2013) and have contributed to several others on urease, a field of knowledge I am currently expanding as PI (Ariz et al., 2012; Cruchaga et al., 2013). I defended my Ph.D. on December 15th 2014.

My international experience includes more than 6 years of postdoctoral experience in Europe, and research visits to France, Lithuania, and Mexico. At Lancaster University, I developed an innovative whole-plant chamber for analyzing gas exchange and VPD effects on cereals. This work, published in Plant Methods (Jauregui et al., 2018), resolved a long-standing question about VPD's role in photosynthesis and identified drought-tolerant wheat genotypes. Further, I contributed to high-impact publications (MacAusland et al., 2020). At the University of Liege, I developed a bioassay-based hydroponic system to identify wheat genotypes with high BNI capacity under diverse environmental conditions. This system, detailed in New Phytologist (Jauregui et al., 2023), has been crucial in advancing breeding programs. I led my postdoc for 3 out of 4 years in Belgium.

Back at UPNA, my research provides essential insights into the metabolic and physiological trade-offs of plant exposure to elevated CO₂, with contributions as both a collaborator (Tcherket et al., 2024; Ancin et al., 2024) and a research leader (Jauregui et al., 2025).



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Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: FALAGÁN SAMA, NATALIA
Referencia: RYC2024-050404-I
Correo Electrónico: natalia.falagan@gmail.com
Título: Food loss reduction for sustainable and resilient supply chains

Resumen de la Memoria:

My research aims to integrate physiological, biochemical, and molecular studies to reveal the mechanisms underlying the fresh produce response to preharvest conditions and diverse supply chain environments (e.g. quality parameters and gas exchange, health-promoting compounds, transcriptomics). I have now secured a position as Senior Lecturer (Associate Professor) in Food Science and Technology at Cranfield University (UK), consolidating the research line I have led since my PhD. If successful in this application, I will bring a novel approach to postharvest biology and technology as, traditionally, research on metabolic pathways and regulatory mechanisms of fresh produce stops once the fruit or vegetable has been harvested. A better insight of the metabolic and transcriptomic processes that occur during postharvest will: i) develop fundamental science in a field that is not deeply explored; ii) optimise current harvest, transport, storage and packaging solutions, attracting industry engagement; and iii) impact on society, reducing food losses from both physiological and nutritional perspectives. Food loss reduction is urgent given the pressure climate change is putting on our production systems, making food saved as important as food produced, to feed the global growing population. We also face a lack of postharvest specialists worldwide; my drive is to build capacity to sustainably implement advanced postharvest biology and technology into global food systems with the support of my current and increasing network of academic partners, governments, and industry. The technology I develop to achieve this goal will be sustainable, avoiding unnecessary emissions linked to e.g. cold chains. This vision has development cooperation at the core of my work, making Spain one of the key countries contributing to sustainable global supply chains, reducing inequalities and complying with the United Nations Sustainable Development Goals. I have developed a research grant strategy. For basic science I will work towards funding applications through i) government schemes (e.g. Agencia Estatal de Investigación; Spain); ii) European calls; and iii) international collaborations to access further funding schemes. I am particularly interested in those calls that will allow me to focus on the mechanisms behind fresh produce ripening and senescence processes that I base my research on, in order to ensure food and nutrition security. My research is a key area for funding as it aligns with international and national priorities, as policy makers, supply chain stakeholders, society and the economy will benefit from the reduction of food loss and waste. For applied science, I will continue with my work towards implementing sustainable solutions for food loss reduction at a national and global level. I will also build capacity within my group by attracting PhD students, through doctoral training partnerships, and government schemes (e.g. Ayudas para contratos predoctorales para la formación de doctores). As a recipient of the Ramón y Cajal fellowship, my goal is to become a leading global expert in the sustainability of food systems, I aim to enhance my independent research strategy by securing funding to advance both fundamental and applied science, fostering talent through PhD studentships, and influencing food supply chains through consultancy.

Resumen del Currículum Vitae:

My personal scholarship focuses on reducing food loss and waste through a better understanding of the ripening and senescence mechanisms of fresh produce during postharvest from a physiological, biochemical, and molecular perspective. I bring this knowledge to food systems to increase sustainability and resilience of global supply chains. My key achievements to date include: i) new knowledge around adaptive respiration of fresh produce to low oxygen environments; ii) development of a novel approach to controlled atmospheres (graduated controlled atmosphere); iii) design of packaging materials as alternative to plastics; and iv) co-created the Africa Centre of Excellence for Sustainable Cooling and Cold Chain, for which I am the Director of the Agrifood strategy. My work is disseminated by publishing in peer-reviewed journals and policy briefings as well as non-academic journals, interviews, podcasts, and videos to reach the wider society. My current h-index is 16 for Google Scholar and 15 for Scopus, with over eight years of postdoctoral experience in United Kingdom. In the last five years I have led and co-led projects that contributed to an income of £5,065,810 million (over 6 million euros) from public (governments of UK, Rwanda, Kenya and India, plus European and United Nations calls) and private (e.g. World Bank, Samworth Brothers, J. Sainsbury's Plc.) funding, which I have used to support my research, develop my team, and translate fundamental science into positive impact in the real-world. I also contribute towards building networks for FLW reduction. For example, we secured funding for Sustainable Network for agrifood loss and waste prevention, management, quantification, and valorisation (FoodWaStop) COST Action with 33 participants countries, for which I lead the Working Group III, Quantification of food loss and food waste, with 100+ members from more than 20 countries. I have successfully run an international course on food waste quantification with 25 researchers from 23 European Universities, who were fully funded by this project (2024). I am the co-director of the UK National Horticultural Quality and Food Loss Network, which serve as the leading collective voice for the UK horticultural and postharvest community. I lead a team of three postdoctoral researchers and three PhD students, which I have built through direct funding to realise the aims of my research. I mentor other researchers through programmes like Aurora (Advance Higher Education's leadership development initiative for women) and I am part of the organising committee of Soapbox Science, a platform that promotes women and non-binary scientists. I have recently won two prestigious awards: 'TOP50 Women in Engineering: Engineering Heroes' in 2021 (UK) and a medal awarded by the Royal Academy of Engineering (Spain) in 2022 for my work towards FLW reduction and the impact of my research has been recognised with a nomination to the Earthshot prize in 2024. I am course director for MSc Future Food Sustainability and lead the module Postharvest Technology. I incorporate my research into my academic practice (e.g. group projects, individual MSc theses, PhDs), aligning teaching with real-world scenarios for a better learning experience. I have supervised to completion one PhD thesis and 20+ MSc theses, for which I have developed the research idea, obtained the funding, and supported the students.



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Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: BUENO FERNÁNDEZ, MÓNICA
Referencia: RYC2024-051239-I
Correo Electrónico: monibuenofdez@gmail.com
Título: Metabolomics and sensobolomics strategies for the identification and characterization of food flavors, their precursors and bioactive compounds in technological processes

Resumen de la Memoria:

The line of research of the candidate has been focused on Metabolomics and sensobolomics strategies for the identification and characterization of food flavors, their precursors and bioactive compounds in technological processes. The understanding of sensory properties or bioactivities has been approached by focusing on the interaction between the product and its industrial processes, such as freezing, oxidation, extraction, taking different matrices as references.

Scientific objective: To provide scientific results that effectively impact the competitiveness, sustainability and viability of several food processes. Her knowledge in different food technological processes, along with her experience obtained working for and in several national and international companies gives her a global perspective that could serve as a union between science and society needs.

On one hand, this line of research has served as know-how for understanding the chemical bases of the aromatic perception of foods (wine, meat and apples) and its evolution during maturation, aging, or storage processes, associated with changes of chemical nature. The candidate uses advanced statistical models that relate sensory properties and their evolution over time with flavoring chemical compounds. This knowledge has been acquired at LAEE (IA2, UZ) (2010-2015 and 2020-to date), ICSV (2016-2017), Mars (UK, 2014) and Universidade Católica Portuguesa (Portugal, 2017).

On the other hand, this line also focused on the extraction of new bioactive compounds from algae and different food by-products using compressed fluids technologies such as PLE, SFE and UHPE using Generally Recognized as Safe Solvents (GRAS). Furthermore, in order to improve the sustainability and economic feasibility of some biomass production processes, high value compounds have been obtained following a biorefinery-like approach. She acquired expertise in the chemical characterization of these bioactive compounds using different techniques: GC-QTOF-MS for volatiles and semi-volatiles, UPLC-q-TOF-MS/MS for identification of non-volatile substances and LC-QqQ for a very sensitive quantification of non-volatiles. She also accumulated experience on assessing bioactivity and collaborated in the development of new fluorescence-based methodologies for acetylcholinesterase and butylcholinesterase assays. She also carried out models that relate bioactivities to the chemical composition, providing relevant information for the future development of nutraceuticals or functional foods, such as those designed to prevent multifactorial neurological pathologies such as Alzheimer's disease. This knowledge has been acquired at Foodomics (CIAL-CSIC, 2018-2019) and University of Alberta (Canada, 2018).

Resumen del Currículum Vitae:

PhD funded by MICINN-FPI with International mention and extraordinary award in UZ (2016). During this period, I try to understand the chemical bases of the flavor perception of foods (wine and meat) and its evolution during aging or storage processes. As a result, I got great training in GC and GC-Olfactometry. This work was carried out at LAEE, as well as in a 3-month predoctoral stay with Prof. A. Taylor at Mars (UK, 2014).

Post-doc research assistant (2016-2017) at ICSV (UR-CSIC-GR) where I collaborated in the development of pioneering sensory directed strategies for isolating compounds driving dryness and persistence in red wines, in which I applied the knowledge in advanced statistical tools acquired with Antonio C.S. Ferreira (Universidade Católica Portuguesa, Portugal, 2017, Erasmus+ grant).

Post-doctoral research assistant (2018-2019) at Foodomics (CIAL-CSIC), funded by the MINECO JCF-2016. I carried out the extraction of new bioactive compounds from algae and different food by-products using compressed fluids technologies with green solvents, as well as their subsequent chemical characterization of high value-added dietary phytochemicals with beneficial effects in neurodegenerative diseases. I acquired expertise on assessing bioactivity, LC-MS/MS (QqQ, Q-TOF) and metabolomics. In this period, I co-supervised the work of 7 visiting PhD students resulted in 7 scientific articles.

Postdoctoral visiting researcher (3 months, 2018) at University of Alberta (Canada) with Dra. M. Saldaña, founded by the international I-LINK project, working in the extraction of bioactive compounds with one of the few ultra-high pressure extractors in the world.

My current post-doctoral research started with the MICIU JCI-2018 grant at the Department of Analytical Chemistry of UZ where I have worked on my own research line Metabolomics strategies for the identification of food flavor precursors, processes and interactions. On this regard, I have supervised 5 regional projects as PI as well as I am leading several WPs of different national projects and contracts. In the last two years, I developed two international collaborative projects: with Thierry Thomas-Danguin (INRAE, France) known for his long career in the study of perceptual aroma interactions and as co-PI with Heber Rodrigues (The Secret Vine, UK), an expert on market research. In addition, I am the coordinator and PI with Ignacio Ontañón of the CLIMAROMA international project (Poctefa 2021-2027).

According to WoS (January 2025), all these works have resulted in 36 scientific articles (50% in D1, 86% in Q1 journals) with 1520 citations (h-index = 23) on the Food Science and Technology or Analytical Chemistry categories. First author or sharing first position in 15 of them, corresponding in 3, with 66 co-authors (47% international collaborations), my citation percentile is 80. Coauthor in 2 patents, 8 book chapters (1 by myself), 1 encyclopedia article, 5 technical dissemination articles and 19 publications derived from conference proceedings; 82 contributions of scientific symposiums, 46% of



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them international (5 invited conferences, 3 keynotes presentations in technical meetings, 1 invited conference in a dissemination forum, 27 oral and 46 poster communications - 5 awarded).



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Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: PASCUAL VÁZQUEZ, JESÚS
Referencia: RYC2024-050768-I
Correo Electrónico: pascualjesus@uniovi.es
Título: Transcriptome plasticity and proteome diversification in stress response in green organisms

Resumen de la Memoria:

Mi investigación se enmarca en el campo de las ciencias vegetales. He estudiado los mecanismos de respuesta a estrés en varias especies, incluyendo especies forestales, cultivos como el kale o la planta modelo *Arabidopsis*. En mi tesis, realizada entre 2011 y 2016 en el grupo EPIOMIDES de la Universidad de Oviedo, estudié la respuesta a estrés UV en *Pinus radiata* a través de una aproximación de biología de sistemas consistente en la integración de datos ómicos con parámetros fisiológicos. Esta aproximación me permitió obtener una visión detallada de los procesos de respuesta a estrés, posibilitando la identificación de nuevos componentes implicados en procesos de señalización celular. Estos resultados fueron la base de mis estancias predoctorales en la Universidad de Turku. Además, han sido la base de la tesis de Lara García Campa, que he dirigido en la Universidad de Oviedo. Durante mi posdoc en la Universidad de Turku (2016-2021), estudié la regulación postraduccional de procesos relacionados con la señalización por luz y la inmunidad, con especial énfasis en la biosíntesis de glucosinolatos, metabolitos secundarios implicados en la defensa frente a herbívoros y hongos necrotrofos. Este trabajo se enmarcó en 2 proyectos de investigación financiados por la Academia Finlandesa de las Ciencias. Posteriormente, recibí financiación para desarrollar mi propia línea de investigación como investigador principal (IP). En este proyecto investigué la regulación postraduccional de la señalización retrógrada y su papel en el mantenimiento de la funcionalidad de la mitocondria y el cloroplasto en periodos de estrés agudo y la posterior recuperación. En la actualidad estoy desarrollando una línea de investigación independiente, iniciada durante mi contrato Juan de la Cierva Incorporación en la Universidad de Oviedo y continuada en mi nuevo puesto como Profesor Ayudante Doctor en Genética en la misma universidad, y en la que estoy estudiando la regulación de procesos de regulación postranscripcional en situaciones de estrés. Además, soy responsable de las líneas de investigación del grupo EPIOMIDES en variación natural, regulación epigenética de la respuesta a estrés y señalización de estrés UV-B. También soy el responsable del grupo de los análisis metabolómicos por espectrometría de masas y datos proteómicos de DIA/SWATH. Hasta el momento he publicado un total de 30 publicaciones, incluyendo 20 artículos en revistas indexadas del Q1 en sus respectivas categorías, 5 capítulos de libro y 1 artículo de divulgación. Mis trabajos han sido citados más de 800 veces. Tengo un índice h de 16 y un i10 de 21. Además he participado en 36 congresos, incluyendo 19 comunicaciones orales, he sido evaluador de proyectos para la Agencia Nacional de Investigación de Francia, y he editado dos números especiales para *Plants* y *Frontiers in Plant Science*, ambas Q1 en *Plant Sciences*. He participado en 2 contratos de transferencia de conocimiento, en 10 proyectos de investigación e innovación como investigador y docente en mis etapas en Oviedo y Turku, y he sido IP de un proyecto en Finlandia. Además he sido IP de un proyecto de innovación docente en la Universidad de Oviedo y he estado implicado en labores de supervisión de estudiantes, habiendo dirigido 3 trabajos fin de máster y 1 tesis doctoral.

Resumen del Currículum Vitae:

Me gradué en Biología en el año 2010 en la Universidad de Oviedo. En 2011 completé el Máster en Técnicas Analíticas Aplicadas al Manejo y la Conservación de Recursos Biológicos e inmediatamente después comencé mi tesis doctoral en el Área de Fisiología Vegetal de la Universidad de Oviedo bajo la supervisión de los Drs. María Jesús Cañal y Luis Valledor. Fui beneficiario de las becas predoctorales Severo Ochoa y FPU. Como doctorando, participé en un total de 3 proyectos de investigación y realicé dos estancias, de 3 meses cada una, en el laboratorio de Biología Molecular de Plantas de la Universidad de Turku, bajo la supervisión de la Dra. Saijalliisa Kangasjärvi. La financiación para dichas estancias la obtuve del Centro de Excelencia Internacional de la Universidad de Oviedo y derivada de mi contrato predoctoral FPU. Completé mi tesis doctoral en el año 2016 con mención internacional y la calificación de sobresaliente cum laude. Además, mi tesis doctoral fue galardonada con un Premio Extraordinario de Doctorado de la Universidad de Oviedo. Inmediatamente después de obtener mi doctorado, comencé mi etapa posdoctoral en el grupo de la Dra. Saijalliisa Kangasjärvi en la Universidad de Turku. Mi estancia posdoctoral en Finlandia duró 5 años (2016-2021). En ese periodo estuve contratado como investigador posdoctoral por el Centro de Excelencia en Biología Molecular de Productores Primarios y por el proyecto Regulación Metabólica de la Inmunidad en Plantas, ambos financiados por la Academia Finlandesa de las Ciencias. Posteriormente, en 2019, obtuve, en concurrencia competitiva, un contrato posdoctoral de la Academia Finlandesa de las Ciencias asociado a un proyecto liderado por mí como investigador principal. Durante mi periodo posdoctoral en Turku supervisé 2 trabajos fin de máster y fui mentor de 3 estudiantes de intercambio en el marco del programa ERASMUS+. También fui invitado como evaluador de trabajos fin de máster por la Åbo Akademi y como evaluador de proyectos por la Agencia Nacional de Investigación de Francia. Además, tuve la oportunidad de complementar mi formación con un curso en técnicas punteras de espectrometría de masas en la Escuela Politécnica de Zurich en el año 2017 y un curso FEBS en Microespectroscopía, organizado por la Universidad de Wageningen y la Universidad Radboud de Nimega, en 2018. Mi desempeño en mi etapa posdoctoral me permitió conseguir un contrato Juan de la Cierva Incorporación para retornar al Área de Fisiología Vegetal de la Universidad de Oviedo a finales de 2021 y posteriormente conseguir una plaza como Profesor Ayudante Doctor en Genética. En este tiempo he sido miembro del equipo de trabajo de un proyecto de investigación del programa nacional, investigador principal de un proyecto de innovación docente y he participado en el desarrollo de un módulo docente tecnológico en un proyecto internacional de innovación ERASMUS+. Además he dirigido 3 TFM's y 1 tesis doctoral. También he participado en una acción COST y presentado la propuesta de otra como proponente principal. En el ámbito docente, acumulo más de 450 horas de clase como doctor en diferentes programas de grado y posgrado principalmente de las Universidades de Oviedo y Turku, estando acreditado por la ANECA como Profesor Ayudante, Contratado Doctor y Profesor de Universidad Privada.



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Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: NAVARRO GUILLÉN, CARMEN DEL PILAR
Referencia: RYC2024-050256-I
Correo Electrónico: cnguillen@hotmail.es
Título: Aquaculture biological efficiency and sustainability
Resumen de la Memoria:

Desde el inicio de mi carrera científica he desarrollado una línea de investigación bien definida, centrada en la FISIOLÓGIA DIGESTIVA Y NUTRICIÓN DE PECES DE INTERÉS EN ACUICULTURA, con el objetivo global de aumentar la sostenibilidad del sector a través de la nutrición.

Defendí mi doctorado en diciembre de 2016, con el me inicié en la línea de investigación de FUNCIONALIDAD DIGESTIVA DE LARVAS. El objetivo de mi PhD fue evaluar los ritmos diarios de alimentación y la función digestiva en larvas de lenguado senegalés, concluyendo de forma novedosa que ambos parámetros están regulados con una base circadiana. Por lo tanto, desde un punto de vista aplicado, es importante estudiar los patrones de alimentación y digestión específicos de cada especie para el correcto diseño de los protocolos de alimentación.

Durante mi primera etapa como investigadora postdoctoral, contratada como investigadora el ICMAN-CSIC, continué estudiando los ciclos diarios de procesos digestivos en especies de interés en acuicultura incluyendo también la fase juvenil, ampliando así mi línea de investigación a FUNCIONALIDAD DIGESTIVA EN JUVENILES. Trabajé con especies de interés internacional como la cobia y especies emergentes para la acuicultura mediterránea como la seriola.

Entre 2018 y 2021, durante mi etapa como investigadora en el Centro de Ciências do Mar (Univ. do Algarve, Portugal) inicié un nuevo abordaje de la fisiología digestiva: PROGRAMACIÓN TEMPRANA DE LA FUNCIÓN DIGESTIVA EN PECES, con el objetivo de aumentar la producción y calidad de larvas de peces marinos mediante el suministro de ingredientes funcionales en los estadios tempranos de desarrollo (embrión y/o primera alimentación). Los resultados obtenidos fueron muy prometedores, revelaron que una intervención temprana con un estímulo nutricional modula la composición de la microbiota intestinal y eficiencia digestiva de las larvas. El conocimiento generado puede ayudar a diseñar intervenciones que promuevan la programación metabólica mejorando la eficiencia de cultivo y calidad de los juveniles. Durante este periodo también participé activamente en el desarrollo de un prototipo que permite incorporar compuestos hidrosolubles en huevos de peces a escala comercial, en 2020 se solicitó una patente europea.

Me reincorporé en 2021 al ICMAN-CSIC al ser beneficiaria de un contrato de investigador de 3 años de duración perteneciente al programa postdoctoral de la Junta de Andalucía PAIDI 2020. En este periodo he incorporado un nuevo aspecto de la fisiología digestiva a mi línea de investigación; la microbiota intestinal, con el objetivo de entender cómo contribuye la comunidad bacteriana a la funcionalidad digestiva del huésped, y así desarrollar estrategias de programación temprana dirigidas a obtener un perfil microbiano que correlacione con una alta eficiencia biológica en los peces. También he realizado trabajos para evaluar el efecto de factores abióticos en la funcionalidad digestiva en juveniles, y he testado NUEVOS INGREDIENTES PARA LA ACUICULTURA con una baja huella de carbono en colaboración con empresas internacionales del sector.

Todo lo anteriormente descrito ha sido posible gracias a mi continua formación en técnicas y procedimientos relativos a fisiología digestiva, microbiota, endocrinología y estrés oxidativo, entre otros.

Resumen del Currículum Vitae:

Al terminar mi PhD he continuado activamente desarrollando mi carrera científica gracias a ser beneficiaria de contratos posdoctorales en centros nacionales e internacionales.

He participado en 14 proyectos de investigación; 5 de convocatorias españolas, 3 de convocatorias portuguesas, 6 de convocatorias europeas. He sido IP de tres proyectos internacionales: 2 financiados por CEI-MAR y 1 financiado por CSIC y he coliderado un proyecto portugués (financiado por FCT). Como resultado de todo ello he publicado 33 artículos en revistas JCR y 1 capítulo de libro y he participado en 21 congresos internacionales con un total de 41 comunicaciones (23 posters y 18 orales, una de ellas como ponencia invitada), todos ellos en el campo de la nutrición y fisiología digestiva de peces.

A lo largo de mi carrera he considerado importante tener un alto nivel de internacionalización, por ello he realizado un total de 15 meses de estancias en centros en el extranjero durante mi etapa predoctoral, y he estado 2 años y 9 meses contratada como investigadora postdoctoral en un centro internacional de prestigio en el área (Portugal). En 2022 realicé una estancia de 2,5 meses en la Universidad Noruega de Ciencia y Tecnología (Trondheim, Noruega). Además, como parte de los proyectos anteriormente citados, he establecido colaboraciones con centros públicos I+D+i internacionales y con empresas privadas pertenecientes al sector de la acuicultura e ingredientes para alimentación de peces.

En el ámbito docente, he sido supervisora de 5 tesis fin de máster y 1 tesis fin de grado. He sido parte del tribunal evaluador en 4 TFM. He participado como ponente en un curso de doctorado organizado por la Univ. de Cádiz y en un curso especializado organizado por la Agencia Española de Cooperación Internacional para el Desarrollo y el CSIC.

En cuanto a divulgación, he participado en diversas actividades para hacer llegar la ciencia a la sociedad, p. ej. la Semana de la Ciencia en Andalucía, el Día Internacional de los Océanos, Summer School para niños entre 13 y 15 años en la Univ. do Algarve (Portugal). También he participado en actividades para promocionar la contribución de las mujeres a la ciencia. Además, he participado en la emisión de varias notas de prensa dando a conocer el estado y resultados obtenidos en los proyectos de investigación.

Como experiencia administrativa y gestión científica, he participado en 6 comités de evaluación para la contratación de becas de investigación (CCMAR), he sido evaluadora externa en la convocatoria de proyectos de investigación CONACYT Border Science (México) y del programa doctoral MSCA Cofund EDENE (EU Comisión). Soy socia fundadora y la actual tesorera de la Red Iberoamericana de Investigación y Formación de Postgrado en Ciencias Acuáticas (RIIF-AQUA) y he sido editora invitada en números especiales publicados en revistas de impacto internacional (Aquaculture Journal, Fishes y Frontiers in Marine Science).

Respecto a propiedad intelectual, soy inventora de una patente con ámbito europeo (referencia EP3756473A1); "Sonophoresis for the incorporation of natural compounds into fish eggs to promote early fish gut maturation". Entidad explotadora: Centro de Ciências do Mar do Algarve (No licenciada).



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Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: CERMEÑO AINSA, MARÍA
Referencia: RYC2024-050465-I
Correo Electrónico: maria.cermeno.ainsa@gmail.com
Título: Sustainable and healthy food ingredients

Resumen de la Memoria:

I am a researcher with over 12 years of experience in sustainable food bioactive ingredients. My research encompasses multiple disciplines, including food biochemistry, microbiology, technology, and formulation, with a primary focus on promoting wellness and health.

I began my PhD in 2013 at the University of Limerick (with Prof. Richard FitzGerald) and University College Cork (with Prof. Nora O'Brien) in Ireland. During this period, I developed my skills in protein characterisation (chromatography, electrophoresis, mass spectrometry), in vitro biofunctional analysis and cell culture assays. After graduating in August 2016, I pursued postdoctoral research at the University of Limerick (2017-2021) and the Bern University of Applied Sciences (2021-2022), engaging in multidisciplinary projects, such as the use of alternative protein sources and their application in industry. Over the past two years, I co-founded and led the scientific team at Poseidona, an R&D company dedicated to the sustainable extraction of proteins and bioactives from invasive seaweeds and seaweed by-products.

Throughout my career, I have focused on three main research areas:

- 1.) Sustainable valorisation of bioactive ingredients from food industry by-products, exploring alternative resources such as brewers' spent grain, seaweed and insects.
- 2.) Bioactive ingredients and health, investigating biofunctional properties such as blood pressure reduction, glucose control and anti-inflammatory effects.
- 3.) Ingredient formulation and application in the food industry, incorporating bioactives into food supplement prototypes to support product and patent development.

I have conducted independent research while actively collaborating with national and international research groups (Lund University, University College Cork, National University of Galway, CSIC-CIAL, University of Porto, University of Manitoba, among others) and food industry companies (Kerry Ingredients, Nestlé). My work has been supported by several national and international grants, and I have received multiple awards. To date, I have published 26 articles in high-impact journals, contributed to 2 book chapters, 1 pre-print, 1 conference paper and presented at numerous conferences, earning 2 presentation awards. Additionally, I have been invited to speak at various symposia.

My scientific journey has provided me with a comprehensive perspective on research, from its foundational aspects to practical applications. This experience has shaped me into a strong leader, capable of innovating and competing at a high level. I am well-positioned to advance my research focus, which is both scientifically impactful and socially relevant, and to establish my research group with the support of the Ramón y Cajal program. My current research interest focuses on the sustainable reuse of food ingredients to enhance health, with a particular focus on promoting a circular economy. I would like to explore phytonutrients that support healthy aging, reduce inflammation, and improve women's health, while enhancing their bioavailability through encapsulation for potent effects at lower, more sustainable doses.

Resumen del Currículum Vitae:

I am an experienced researcher specialising in sustainable food bioactives for wellness and health applications. I have an interdisciplinary expertise in food biochemistry, technology and formulation, both at academic and industrial level. After graduating in Human Nutrition and Dietetics in 2008, and then BSc in Food Science from the University of Zaragoza in 2011, I found my passion for research in a lab environment. This led me to pursue an Erasmus grant, where I spent six months at KU Leuven working on bacterial lysozyme inhibitors in Prof. Chris Michiels' lab. This formative experience solidified my commitment to scientific research. Following this, I completed an MSc at the University of Zaragoza, focusing on the probiotic and fermentative properties of lactic acid bacteria under the supervision of Dr. Pilar Mañas.

I then went on to complete a European PhD in Ireland at the University of Limerick under Prof. Richard FitzGerald in 2013. I also undertook a research internship at University College Cork under Prof. Nora O'Brien for 15 months. During my PhD, I strengthened my skills in protein characterisation, biofunctional analysis and cell culture, graduating in 2016.

In my first postdoctoral role, I managed multiple research projects, enhancing my project management skills. In 2017, I began a collaborative project investigating the sustainable reuse of brewer's spent grain (BSG) for its potential biofunctional benefits (e.g., blood pressure regulation, glucose control, and inflammation reduction) and application in baked goods. My recent work at Bern University of Applied Sciences in Switzerland, in collaboration with Nestlé Research, focused on plant protein blends for vegan product development, facilitating knowledge transfer that supported new products and patent development.

As CSO at the start-up Poseidona from 2023, I lead a team of three scientists (a PhD student, a Torres Quevedo researcher and an Erasmus student) in bringing food ingredients and bioactive products to pre-industrialisation, filing patents, and driving goals under tight timelines. This role has expanded my perspective on science within a commercial context, enriching my understanding of how marketing and science intersect. I would like to return to academia to develop the project BIONORA (Bioactive Innovations for Nutrition, Obesity, Reproduction and Ageing) - "Targeting Ageing and Metabolic Health Through Bioactive Innovations and Sustainable Delivery Systems" and to establish my research group with the support of the Ramón y Cajal program.



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Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: CUERVO BUSTAMANTE, PABLO
Referencia: RYC2024-048462-I
Correo Electrónico: pablo.f.cuervo@uv.es
Título: Spatial epidemiology and risk modeling of zoonotic snail-borne diseases, an overlooked threat of a changing world

Resumen de la Memoria:

I am an enthusiastic and talented emergent career researcher, with sound experience in eco-epidemiology. Working in the field of Spatial Epidemiology, my research aims to understand the processes that drive the spatial and temporal patterns of infectious diseases, with main focus on parasites and vector-borne diseases (VBD). This knowledge is fundamental to our ability to understand past and present epidemiological situations and foreseen future ones, especially as VBD are particularly susceptible to the effects of climate change and other human-caused disturbances.

After obtaining my degree in Veterinary Medicine in 2006, I got a postgraduate research associate position at the Universidad Juan A. Maza (2008-2013, Argentina). I carried out my PhD at the Universidad Nacional del Litoral (2014-2017, Argentina). After my PhD, I was awarded with a competitive Postdoctoral Fellowship at the CONICET (2017-2018), where then I achieved a permanent position as researcher in a highly competitive call (2018-2023, Argentina). During this period, I conducted two 3-month research stays in Spain (09-11/2017) and in the Dominican Republic (10-12/2020). During 2021, I conducted a second 12-month research stay in Spain, which was followed by a six-month hired position as Senior Doctor Researcher (04-09/2022). Being in Spain, I secured two postdoctoral fellowships: an APOSTD from the Generalitat Valenciana (CIAPOS/2021/134, 2022-2023), and a Marie Skłodowska-Curie European Individual Fellowship (grant ID 101062347, 2023-2025).

The international collaboration has played a crucial role in prompting my career. Indeed, 65% of my research publications have been co-authored with researchers in other countries/regions. I am an active member of the WHO Collaborating Centre on Fascioliasis and its Snail Vectors and the FAO-United Nations Reference Centre for Parasitology, both international reference centers adscripted to the Sanitary Parasitology Unit of the University of Valencia (Spain).

Vector-borne diseases pose a major threat to the health of human societies around the world, causing more than 700,000 deaths annually, and being associated with a lower economic development. Often concealed by mosquito-borne diseases, snail-borne diseases (SBD) represent a significant public health issue worldwide. Driven by climate and global change, SBD are evincing geographical shifts in their distribution, with local transmission being reported in non-traditional regions. Despite the threat they entail, and perhaps due to the inconspicuous nature of their intermediate hosts, SBD are often overlooked, and the public health concern is not reckoned until the first local human cases are reported.

The research line proposed aims to analyze the threat SBD entail to Europe and their response to the global environmental change, prioritizing two parasitic diseases transmitted by freshwater snails, schistosomiasis and fascioliasis. This will be tackled with an interdisciplinary ensemble of techniques seldom used in SBD, by combining field and laboratory activities to integrate the vector biological response in the modelling of the transmission risk from a disease biogeography perspective. Such integrated framework has not been tackled before when studying the impacts of global change on the transmission of SBD and constitutes a ground-breaking advance over current research effort.

Resumen del Currículum Vitae:

My trajectory towards scientific independence includes: i) a postgraduate research associate position in the Universidad Juan A. Maza (Argentina); ii) a PhD at the Universidad Nacional del Litoral (Argentina); iii) a competitive postdoctoral fellowship at the CONICET (Argentina); iv) a competitive permanent position as researcher at the CONICET (Argentina); v) a 3-month research stay at the Instituto Tecnológico de Santo Domingo (Dominican Republic); vi) a 3-month and a 12-month research stays at the University of Valencia (Spain); vii) a six-month hired position at the University of Valencia (Spain); viii) an APOSTD postdoctoral fellowship from the Generalitat Valenciana (Spain); ix) a 1-month research stay at the Universidad Mayor de San Andrés (Bolivia); x) and a prestigious MSCA-IF (Spain). In all, I have developed my research career during 14 years in Argentina, including 1.6 years of research stays in several countries, and followed by 3.5 years of highly competitive postdocs in Spain.

I have published 31 articles in peer-reviewed scientific journals (7 D1, 9 Q1, 6 Q2, 7 Q3, 2 Q4); 15 as first author (48%, 5 D1 and 5 Q1), six as second author (mostly from external collaborations) and 13 as corresponding author (42%). The proportion of articles I have first-authored in high-impact journals (5 Q1 + 5 D1) have substantially increased since the obtention of my PhD in 2017: prior to 2017, 33% (2/6); since 2017, 89% (8/9); in the last three years 2022-2024, 100% (5/5). Further, I have published four book chapters as leading author. My H-index is 12 and have 360 citations. The number of cites received by my publications have increased by 167% during the last five years and by 80% considering only the last three. During the last 10 years, 41% of my articles have been published in the top 25% journals, and 35% of them are listed in the top 25% most cited documents worldwide. I have contributed with +108 research communications to national and international scientific meetings, congresses and conferences (including +10 oral presentations).

I have participated in 24 research projects (4 as Principal Investigator, 3 as Co-Principal Investigator, 7 as hired and 10 as part of the research team; 1 international, 1 European, 8 nationals -2 Spanish-, and 14 regionals). I have been involved in the supervision and training of undergraduate, graduate and doctoral research students, as well as being responsible of teaching activities in universities from Argentina and Spain (both theoretical and practical classes, +1500 hours). As a result, I have supervised i) 7, and 2 ongoing, final graduation projects -TFG-; ii) 3, and 1 ongoing, master thesis, and iii) 1 doctoral thesis.



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Further, I am a regular reviewer of research papers in WoS-indexed journals, I have evaluated externally 1 PhD dissertation and been member of 2 PhD committees, and scientific advisor in national calls for state research projects funding in 8 occasions from 4 different countries. I have been member of the organization board of a scientific congress. I have received the Seal of Excellence of Marie Skłodowska-Curie Actions 2019 and 2021, and have obtained the certification of Contracted Lecturer by ANECA.



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Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: MORALES MEDINA, ROCÍO
Referencia: RYC2024-048865-I
Correo Electrónico: rociomomed@gmail.com
Título: Sustainable bioprocessing of green by-products

Resumen de la Memoria:

I started my career at the Department of Chem. Engineering of the University of Granada (UGR) with a PhD fellowship (FPI). My research focused on bioprocesses to up-grade fish discards into high economically valuable compounds as omega-3 concentrates and structured lipids. In 2014 I visited for 6 months the Department of Food Technology and Food Material Science at the Technical University of Berlin (TUB, Germany). I started a collaboration with Prof. Dr. S Drusch a world-leading expert in interfacial science and protein-based stabilisers for delivery systems. We developed a pioneering methodology to improve the interfacial and antioxidant properties of fish protein and applied them to omega-3 stabilization by microencapsulation. My thesis was awarded with the Extraordinary Prize of the UGR in Sciences and with the Best Young European Researcher in the 108th AOCS Annual Meeting and Industry Cases. In 09/2017, I became Research Associate in TUB. My research aimed at improving the water-binding properties of high cellulosic industrial by-products to develop new clean-label thickeners by microfluidization and enzymatic treatments. In 2020, I became the research leader in vegetable bio-processes in Prof Drusch's research. I expanded the application of the developed mechanical and enzymatic treatments to various vegetable and fruit by-products with applications in liquid matrix fortification, delivery systems and protein glycation to enhance functionality. These projects involved the participation of an international consortium build up of 13 companies, including Cargill R&D, Symrise GA, Austria Juice, Formo or Unilever among others. In these projects, I cooperated with Prof Bunzel head of the Department of Food Chemistry and Phytochemistry at the Karlsruhe Institute of Technology and Dr P. Ismail chair of the Department of Food Science and Nutrition at the University of Minnesota (USA). Additionally, I was co-PI of the European project "ENCAP4HEALTH, Innovative sustainable encapsulation systems for improving human health and well-being" (GA No. 872019).

I organised the webinar series "Encapsulation Training School" supported by Prof. Denis Poncelet. Also, I conducted the tech-transference to the industrial consortium associated to my projects I was also responsible for disseminating the results to the research consortiums. All these activities, including 36 ECTS that I have taught at UGR and TUB prove a high experience in communication at different levels. I have published 4 book chapters and 24 articles in peer-reviewed journals (JCR-indexed), 13 of them as first author and two as last author. Nine of them are published in journals in D10, such as Food Hydrocoll or Food Chem. My publications have received 545 citations. I have participated in 13 research grants (funding of ~3.4 million €, co-PI in three of them: 1.3 million €) and refereed manuscripts for high impact journals. I have experience in the supervision of students. I have participated in several public engagement activities: I participated in the UGR's Tutoring Action Plan (2011) and several public outreach activities, including the Summer Science Campus (2012-2016). I have a positive evaluation for Contratado Doctor and I am member of Bioencapsulation research Group network.

Resumen del Currículum Vitae:

As a PhD student, I focused on advancing the valorization of fish discards, developing cutting-edge methods to convert fish oil into high-value omega-3 concentrates and structured lipids (triacylglycerols with tailored fatty acid compositions and regiodistributions). I pioneered two sustainable approaches for omega-3 production: i) low-temperature winterization and ii) enzymatic hydrolysis in micro-aqueous systems. Additionally, I designed a bioprocess to convert fish proteins into hydrolysates that stabilize fish oil through microencapsulation.

In my early postdoctoral career, I joined the Technical University Berlin as a Research Associate, where I worked on enhancing the water-binding properties of high-cellulosic industrial by-products for clean-label thickener development. This research involved three innovative approaches: a) chemical extraction of soluble compounds (e.g., pectin), b) microfluidization for cell wall disruption, and c) a combination of enzymatic hydrolysis and microfluidization.

In 2020, I became the research leader in vegetable bioprocessing within Prof. Drusch's group at Technical University Berlin. I expanded the application of mechanical and enzymatic treatments to various vegetable and fruit by-products, focusing on fortification of liquid matrices (yoghurts, beverages, emulsions), delivery systems, and protein glycation for enhanced functionality. My work led to the production of low-viscosity, non-sedimenting pea hull suspensions and advanced my understanding of non-Newtonian fluid phase stability. I also applied these technologies to diverse by-products such as black currant, lupin, and carrot pomace, to develop tailored dietary fibers. As research leader, I played a key role in modeling and optimizing processing parameters to improve the functional and chemical properties of green by-products.

I also participated in the European project "ENCAP4HEALTH" (GA No. 872019) as co-PI. I led the research on the effects of incorporating dietary fiber into bead rheological properties, microstructure, and digestibility. This experience deepened my expertise in bead production via electrodripping, microstructural analysis, and in vitro digestion.

Looking ahead, my long-term vision is to drive the circular bioeconomy by advancing the upgrading of agri-food by-products. I am committed to contributing to a more efficient and sustainable food processing industry, capable of producing highly nutritious plant-based products while ensuring the sustainable use of both material and energy resources.



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Turno General

Área Temática: Ciencias agrarias y agroalimentarias

Nombre: PASTRANA LEÓN, ANA MARÍA

Referencia: RYC2024-050431-I

Correo Electrónico: anapasleo@gmail.com

Título: Protección de cultivos agrícolas

Resumen de la Memoria:

Dr. Ana Pastrana currently serves as a Plant Pathology Advisor with the University of California, Agriculture and Natural Resources (UC ANR), covering the counties of Imperial, Riverside, and San Diego. In this role, Dr. Pastrana develops and implements applied research and educational programs that address critical plant health challenges, collaborating closely with growers, industry stakeholders, and researchers. Her work focuses on sustainable and innovative solutions to manage plant diseases, improve agricultural productivity, and mitigate environmental impacts.

Dr. Pastrana has over 10 years of experience investigating the etiology, epidemiology, and management of plant diseases in agricultural ecosystems. Throughout her scientific career, she has mastered a diverse array of methodologies in plant pathology, including field sampling, pathogen isolation, greenhouse and field inoculation studies, molecular detection, phylogenomics, primer design, real-time PCR, molecular hybridization, and assay verification.

Her research emphasizes applied solutions that directly benefit agriculture by uncovering the origins and epidemiology of plant diseases and addressing regulatory and environmental concerns. Dr. Pastrana's work strives to advance sustainable agriculture through integrative disease management strategies. Her international career has resulted in strong collaborations and the (co)-authorship of 22 peer-reviewed, indexed papers.

Dr. Pastrana has an impressive track record in securing competitive funding. During her time with UC Davis, she obtained support from Driscoll's S.A. and the California Strawberry Commission for three consecutive years. She also contributed to multiple projects with PIs at UC Davis and the USDA, covering part of her salary through these initiatives. As a Research Scientist at Vineland Research and Innovation Centre, she managed plant pathology objectives funded by Genome Canada and OMAFRA-Canada grants. At the University of Seville, she secured funds from the Real Federación Española de Golf and R&A Championships Limited to further her research. In her current position, in just one year, she was able to secure four grants valued at US\$150,000.

In addition to her research accomplishments, Dr. Pastrana has mentored and supervised over 25 undergraduate students, six undergraduate theses (two ongoing), one Undergraduate Honors Thesis, one Ph.D. student summer stay, and two Ph.D. students (ongoing). Her contributions to scientific literature are reflected in her h-index of 10, i10-index of 10, and 629 total citations (425 since 2020) as recorded in Google Scholar. Additionally, in 2023, she obtained the R3 certification and the accreditation to 'Profesor Contratado Doctor' from ANECA.

Dr. Pastrana's combination of research expertise, international collaborations, and dedication to applied solutions ensures her ongoing contributions to the agricultural industry and sustainable plant disease management.

Resumen del Currículum Vitae:

In 2010, I received an EU fellowship to pursue a Ph.D. at IFAPA, focusing on soilborne fungal diseases causing strawberry decline in Spanish fruit fields. My thesis identified inoculum sources, quantified fungal incidence in nurseries and fields, and evaluated non-chemical control strategies like crop rotation and biocontrol agents in collaboration with a chemical company. This research resulted in four peer-reviewed journal articles and two farmers' journal publications to introduce innovative disease control strategies.

The fellowship funded a 10-month postdoctoral stay at UC Davis, later extended to five years through research contracts and grants. Collaborating with Driscoll's, I identified *Fusarium oxysporum* f. sp. *mori* (FOM) as the cause of Fusarium wilt in blackberry, implicating wild *Rubus* spp. as a reservoir host. I co-led objectives in a three-year grant on Fusarium wilt in strawberries, presenting findings at grower meetings and mentoring 20+ undergraduates (four presented at UC Davis' Undergraduate Research Conference). Collaborating with the USDA, I studied *F. o. f. fragariae* (FOF) saprophytic competence and microbial shifts during anaerobic soil disinfestation. With the company Biobest Group, I tested biocontrol products, and with Dr. Simmons (UC Davis), I explored biosolarization techniques to control Fusarium wilt in lettuce.

Following my postdoc, I joined the Vineland Research and Innovation Centre in Canada as a Research Scientist, managing the Plant Pathology lab. I led some objectives from Genome Canada (CAN\$1.4M) and OMAFRA (CAN\$2M) projects, testing mutant lines for disease resistance and evaluating natural products for powdery mildew control. I started working on rapid disease detection using hyperspectral imaging and volatiles, prepared grants and reports, evaluated federal grant applications, and presented findings to growers.

In 2022, I returned to the University of Seville as a Distinguished Researcher (María Zambrano Fellow) in the Department of Agronomy. I taught lab classes in Crop Protection and Plant Diseases, served on scientific committees, managed contracts, analyzed data, wrote grants and manuscripts, and mentored undergrad and Ph.D. students. I also achieved R3 certification and accreditation as a Profesor Contratado Doctor through ANECA.

In 2024, I became a Plant Pathology Advisor at the University of California, conducting a regional needs assessment and securing over \$150,000 in grants as a PI in just one year. In addition, I organized educational and professional meetings across Southern California and I am performing integrated applied research to address plant disease challenges effectively.



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Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: BARRACHINA PORCAR, LAURA
Referencia: RYC2024-050527-I
Correo Electrónico: lbarrach@unizar.es
Título: Advancing veterinary regenerative medicine under a One Medicine perspective
Resumen de la Memoria:

I have curated a markedly multidisciplinary profile that comprises cell and molecular biology, genetics, immunology and veterinary clinics. As a veterinary scientist and a stem cell biologist, I have found in research a unique way to contribute to both animal and human health. My work with equine mesenchymal stem cells (MSCs) critically contributed to the knowledge of their regulatory capacity and its exploitation for therapeutic purposes, and my studies on the interaction of MSCs with the patient's immune system can be translated into safer and more effective cell therapies. I decided to span my scope to induced pluripotent stem cells (iPSCs) to exploit their unique advantages for differentiation. This technology is substantially underdeveloped in animals and I saw this as a new frontier to expand the veterinary regenerative field. To do this, I obtained a Marie Curie fellowship to develop CAREQiPSC (Cartilage derived from equine iPSCs: an in vitro and ex vivo One Medicine approach for osteoarthritis). I have become one of the few researchers in the world who has established an equine iPSC cell bank. I have obtained equine iPSCs from a novel early developmental cell source and have probed that these cells can be chondrogenically induced. However, I also realised that there is an imperative need to improve and standardise the generation and differentiation of iPSCs in veterinary species to make this technology widely available. In summary, I have acquired strong leadership skills by conducting independent research and effectively engaging in teaching, supervision and outreach. Furthermore, I have curated an international profile by creating my own network of international collaborators, developing part of my career abroad, and participating in invited talks and editorial roles.

I plan to lead a research line on veterinary regenerative medicine that will go beyond the current state of the art. This will be achieved by covering both MSCs, as currently the most investigated stem cells in veterinary, and iPSCs, provided their innovation and great potential but still limited exploration. To do this, I will transfer my experience on the regulatory properties of equine MSCs to explore their application in infectious and immune-mediated diseases. For this purpose, I will expand my focus to MSC antimicrobial properties and to other pathologies such as equine asthma, which can also provide highly valuable pre-clinical knowledge (One Medicine). By having extended my scope to iPSCs, I am fully aware of the many challenges posed by their generation and differentiation in animal species. The lack of well-established methods to generate reliable animal iPSCs and to subsequently differentiate them seriously prevents the advancement of the field. Therefore, I propose studying in-depth the iPSC reprogramming and differentiation processes in animal cells to develop robust protocols that will make this technology accessible. Moreover, I will develop haplo-banks and cell-free alternatives to make regenerative therapy safer and more widely available. The creation of stem cell banks characterised by their MHC will result in safer therapies and will facilitate collaboration with research and industry partners. Finally, the development of cell-free derivatives can result in safer, more homogeneous and scalable products.

Resumen del Currículum Vitae:

I pursued my PhD in veterinary regenerative medicine with a 4-year fellowship (Gobierno de Aragón, Spain) at the Universidad de Zaragoza (UZ, Spain). During this time, I was a visiting scholar for 4 months at the North Carolina State University (Raleigh, NC, USA). I obtained my PhD in 2017 with maximum qualification (Cum Laude) and International Mention, and my research was awarded the Graduate School Award 2017 and the "Coris Gruart" Award 2018. I continued working on veterinary regenerative medicine at the UZ until the end of 2021, where I contributed securing funding and co-leading the ongoing projects. In 2022, I joined the University of Galway (Ireland) with a 2-year Marie Curie Individual Postdoctoral Fellowship, where I also secured complementary funding as PI. In 2024 I returned to the UZ with a senior scientist position earned in the "Manuel López" competitive program. In the last year, I have obtained two grants and I am applying for another three calls, two of them international. In total, I have secured funding as PI in 3 projects (2 international, 1 national), 1 strategic research line (national) (all of them in competitive calls) and 2 industry contracts.

I have authored 20 articles directly related to regenerative medicine, most of them in Q1 journals, of which I hold prominent positions in 19 (first author in 10 articles, second author in 5, and senior author [corresponding/last] in 4) (H-index 11). I have also contributed to >90 presentations to national and international congresses about regenerative medicine, animal genetics and veterinary surgery, 10 of which were awarded as "best communication". I have been invited as a speaker to several national and international events (Italy, Germany, Ireland, Uruguay, Argentina, United Arab Emirates) and I have served as guest editor in two article collections with colleagues from US, Germany and Austria. I am part of the Editorial Board of the Journal of Experimental Orthopaedics since 2020 and I regularly act as reviewer for scientific journals (>70 reviews) and for research proposals (AEI, Spain; Horserace Betting Levy Board, UK).

I have taught almost 500 hours in the Degrees of Veterinary and of Biotechnology (UZ), as well as in the MSc degrees of One Health (UZ), Regenerative Medicine (University of Galway) and Animal Health (Universidad de la República, Uruguay). I have been advisor of 17 thesis of undergraduate/MSc students (with 3 more ongoing) and have supervised three international PhD students (Uruguay, Austria). I am currently co-supervising three PhD students working on veterinary regenerative medicine at the UZ. I actively participate in outreach activities, including coordination of my lab in the European Researchers' Night, school talks (11F), lesson plan development with teachers ("Feeding Science", "Teachers in Residence", "Science in Wonderful!") and workshops to share my experience and to mentor undergraduates and young researchers. I am part of two outreach committees by invitation: the Aragonese Agrifood Institute (IA2) Outreach & Engagement Board, and the Community Engagement working group of the Early Stage Professionals Committee of the International Society for Cell and Gene Therapy, where we develop activities such as roundtables and podcasts.



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Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: CENDRERO MATEO, MARIA DEL PILAR
Referencia: RYC2024-050518-I
Correo Electrónico: mapilarc@gmail.com
Título: Quantifying Photosynthetic Dynamics: Integrating Sun-Induced Fluorescence, Modeling, and Multi-Scale Observations for Early Stress Detection

Resumen de la Memoria:

My research focuses on the use of sun-induced fluorescence for early plant stress detection and ecosystem monitoring. My background includes an M.Sc. in Remote Sensing from the University of Valencia (2010) and a Ph.D. from the University of Arizona (2014), where I studied fluorescence dynamics for nitrogen and water stress detection in wheat and camelina cultivars through extensive fieldwork and collaboration with plant phenotyping experts. My results revealed a complex, non-linear interplay between fluorescence, non-photochemical quenching, and photosynthesis. Fluorescence effectively tracked changes in photosynthetic capacity under water and nutrient stress, with growth light levels optimizing stress detection via non-photochemical quenching (water stress) or chlorophyll changes (nutrient deficiency), supporting remote fluorescence stress monitoring.

As a postdoc at Forschungszentrum Jülich (2014-2018), I focused on deriving biophysical traits from fluorescence and reflected radiance, contributing to the German Plant Phenotyping Program and publishing on disease detection, fluorescence retrieval, and linking fluorescence to photosynthesis. During my stay at FZJ, I also participated in the calibration/validation campaigns of the European Space Agency (ESA) Fluorescence Explorer (FLEX) mission. My work during the SoyFLEX2 campaign strengthened my skills in radiative transfer modeling.

Since 2018, I have led national and international projects on plant phenotyping and FLEX Cal/Val at the Laboratory of Earth Observation, University of Valencia, including the GreenCrop project (Principal Investigator), which focuses on early detection of drought and nitrogen deficit by studying the temporal and spatial dynamics of plant photosynthesis. I have actively contributed to the COST Actions OPTIMISE (co-chair) and SENSECO (working group leader), leading joint efforts on fluorescence and hyperspectral measurements, including instrument characterization, standardized protocols and retrieval methods.

My future research will focus on: (1) modeling the full temporal dynamics of fluorescence, non-photochemical quenching, and photosynthesis using spectral fitting, machine learning, and multiscale measurements, (2) developing FLEX-based photosynthesis and stress products for ecosystem monitoring in agriculture and forestry, (3) applying these products to study gene $\times$ environment $\times$ management interactions and develop a mechanistic stress detection model, and (4) leading the Spanish FLEX Cal/Val team. This research is in line with the United Nations 2030 Agenda and the Spanish AGROALNEXT program and contributes to climate change adaptation and sustainable ecosystem management by developing advanced tools to monitor photosynthetic processes and stress responses. This work extends my previous focus on agricultural systems to forest ecosystems, providing a more holistic understanding of climate change impacts.

Resumen del Currículum Vitae:

Environmental Scientist (2008) with a Masters in Remote Sensing (2010, University of Valencia) and a Ph.D. from the University of Arizona (2014), funded by a USDA-OECD Fellowship. My PhD focused on sun-induced fluorescence dynamics under water and nitrogen stress, demonstrating the effectiveness of fluorescence in tracking photosynthetic capacity. Key findings highlighted the role of growth light in optimizing stress detection via non-photochemical quenching (water stress) and chlorophyll changes (nutrient deficiency), supporting remote fluorescence stress monitoring.

Since 2014, I have been a postdoc at Forschungszentrum Jülich, where I scaled leaf fluorescence to canopies using top-of-canopy spectroscopy. At Forschungszentrum Jülich, I contributed to the German Plant Phenotyping Program, coordinating photosynthesis and water relations, and to the calibration/validation (Cal/Val) campaigns of the European Space Agency (ESA) Fluorescence Explorer (FLEX) mission. My FLEX Cal/Val research investigated light interaction with canopies and its effect on fluorescence measurements, showing that neglecting scattering and re-absorption misinterprets fluorescence and its relationship to GPP. Correcting for these effects revealed similarities in GPP and true fluorescence emissions.

Since 2018, I have been a postdoctoral researcher at the Laboratory of Earth Observation (University of Valencia), strengthening the group's expertise in plant phenotyping and FLEX Cal/Val. My research integrates remotely sensed high spectral resolution reflectance and fluorescence for early stress detection and FLEX Cal/Val protocols. This earned me a Marie Skłodowska-Curie Seal of Excellence and secured Principal Investigator funding for the Juan de la Cierva Incorporación, SEJIGENT GreenCrop, and Spanish FLEX Cal/Val projects. I led plant phenotyping working groups for TOMSMART (tomato) and MANAGE4FUTURE (holm oak). Within FLEX, I coordinated three Spanish projects (AVANFLEX, FLEXL3L4, CalValFLEX) and the HyperSense FEDER project, providing Laboratory of Earth Observation with a unique zipline UAV and growth chamber system for advanced phenotyping and Cal/Val. Through these activities, I have established a national network of experts, enabling collaborations with INTA, CSIC, ITAP, CITA and IVIA.

I contributed to H2020 COST Actions as Vice Chair (OPTIMISE) and working group leader (OPTIMISE and SENSECO), facilitating knowledge transfer through mentoring and workshops, leading to international collaborations and publications on fluorescence and hyperspectral measurements.

I have secured >400k€ as Principal Investigator for highly competitive projects. My contributions include 16 projects (7 international) and 26 publications (>1200 citations, 80% Q1, 70% independent). I have demonstrated leadership in H2020 COST Actions and currently lead the GreenCrops project and the Spanish FLEX Cal/Val team. My teaching includes 290 hours of lectures, serving on 3 PhD committees, and mentoring 3 PhD students. I am actively involved in science communication and am certified as Profesora Contratada Doctora (AVAP).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias agrarias y agroalimentarias

Nombre: DÍAZ COSTAS, SEILA MARÍA

Referencia: RYC2024-051302-I

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Título: Cánceres transmisibles en bivalvos

Resumen de la Memoria:

I began my research career at the Marine Research Center, CIMA (Xunta Galicia, Spain), focusing on the sustainable management of marine resources, supported by a competitive predoctoral grant from Xunta de Galicia. My early work involved diagnosing bivalve pathologies, including those mandated for declaration by the World Organization for Animal Health, using techniques like histopathology, cytology, and transmission electron microscopy. Upon detecting high mortalities linked to cancer in cockles, I focused on studying this transmissible cancer's impact at individual and population levels. My doctoral thesis (University of Santiago de Compostela, DEC 2015, with honors) demonstrated the cancer's transmissibility, ploidy anomalies, oncogenes, and its epidemiological impact, employing advanced techniques such as Western Blot, Flow Cytometry, Cytogenetics, and in-situ Hybridization.

In JAN 2017, I began a postdoctoral position funded by the EU-ERC Scuba Cancers project, spanning the University of Vigo and the University of Santiago de Compostela (Spain). This work investigated the genetic basis of transmissible cancers and the mutational processes driving their evolution. I developed expertise in genetics, genomics (Sanger sequencing, Illumina, Oxford Nanopore, and PacBio), and bioinformatics. Concurrently, I led three EU-funded transnational projects: Emerald-Neo (studying cockle transmissible cancers in Ireland), Ship-Neo (examining cross-species cancer transmission in cockles), and GALLINA (evaluating Chamelea gallina pathologies in Spain and Italy). These projects allowed me to hone my leadership skills and expand my collaborative network.

In SEP 2022, I joined the University of Aveiro (UA) as a Marie Curie Skłodowska Postdoctoral Fellow (MSCA-PF), achieving the highest score in my panel (99.4/100) with the Ship Clones project. I also secured funding for the MarCan project through Campus France. These initiatives led to the development of innovative molecular techniques for detecting and quantifying transmissible cancers, including e-DNA detection. I continue at UA as an auxiliary researcher, maintaining the research line established during my Marie Curie fellowship.

With a demonstrated ability to lead independent, high-quality research, mentor students, and foster international collaborations.

Resumen del Currículum Vitae:

Research Experience and International Engagement

I am currently an auxiliary researcher at the University of Aveiro (Portugal), where I am continuing the research line I developed during my MSCA-PF fellowship. My research has been shaped by affiliations with prestigious institutions, including the University of Santiago de Compostela, the University of Vigo, Fundación Biomédica Galicia Sur, and the Marine Research Center of Xunta de Galicia.

I have conducted research stays in institutions such as LEMAR and IFREMER (France), the University of A Coruña, NUIG (Ireland), the University of Gdańsk (Poland), and the European Union Reference Laboratory for Mollusc Diseases. I have also participated in three scientific expeditions aboard research vessels (NAFO Area, Hidroprestige0303, ARSA0302), accumulating over five months of fieldwork at sea.

Grants and Fellowships

My work has been supported by competitive funding, including the MSCA-PF fellowship, a PhD fellowship from Xunta de Galicia, and mobility grants from both the Spanish national and regional governments. Additionally, I received a Micro Travel Grant from the Marie Curie Alumni Association (MCAA).

Publications and Conferences

I have authored 24 scientific articles (three under review), one book, and one book chapter, alongside 10 book chapters derived from conference abstracts. My work has been presented in over 50 national and international conferences, showcasing my active contribution to advancing knowledge in my field.

Mentoring and Outreach

In the last five years, I have supervised two PhD students, three MSc students, seven BSc students, and seven internship students. I am deeply committed to mentoring, fostering the next generation of scientists.

Beyond academia, I actively engage in science communication through outreach activities, aiming to make my research accessible to broader audiences.

Professional Skills and Competencies

My expertise encompasses diagnostics, molecular biology, bioinformatics, and field-based research. With over a decade of research experience, I have demonstrated the ability to lead innovative projects, secure funding, mentor students, and build international collaborations. I am well-prepared to continue developing high-quality, impactful research in the field of marine sciences.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática:

Ciencias agrarias y agroalimentarias

Nombre:

JIMENEZ ASPEE, FELIPE

Referencia:

RYC2024-048717-I

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felipe.jimenez@nutres.de

Título:

The 3Bs of food phytochemicals: Bioaccessibility, Bioavailability and Biofunctionality

Resumen de la Memoria:

My scientific contributions center on the bioactive properties of natural compounds, particularly iridoids and polyphenols, with an emphasis on gastrointestinal metabolism and pharmacokinetics. I have published 53 scientific articles, two book chapters, and presented at 14 international conferences. My current h-index is 20. My work has led to the identification of novel bioactive compounds, development of innovative methodologies, and advancements in understanding food-drug interactions.

Internationalization has been a cornerstone of my career, with research stays in Germany, Spain and Belgium under prestigious grants like the Alexander von Humboldt Fellowship and collaborations with institutions such as the University of Antwerp and the Hebrew University of Jerusalem. These efforts have fostered interdisciplinary projects and expanded my global scientific network.

As an independent researcher, I have secured competitive funding, supervised students across academic levels, and contributed as an editorial board member for Plant Foods for Human Nutrition. My leadership has driven impactful research, mentoring, and collaboration, establishing me as a key contributor in my field.

Research line to be developed:

The human body continuously defends against xenobiotics—external compounds such as drugs, food additives, pesticides, and pollutants—through metabolic processes primarily in the liver and gut. These processes involve two phases: Phase I, catalyzed by cytochrome P450 enzymes, introduces functional groups through oxidation, reduction, or hydrolysis, while Phase II increases polarity by conjugating molecules like glucuronic acid. The pregnane X receptor (PXR), a nuclear receptor expressed in the liver, intestines, and kidneys, plays a critical role in regulating genes involved in xenobiotic metabolism. PXR activation by phytochemicals, often found in dietary components, can significantly impact drug metabolism, posing risks of food-drug interactions with clinical implications.

The Moraceae family, including mulberries and figs, contains prenylated extended flavonoids (PEFs) with unique structural features enhancing their bioactivity and lipophilicity. I have investigated PXR activation by PEFs using a reporter gene assays. Compounds like cycloheterophyllin and cyclomorusin exhibited strong PXR agonist effects, suggesting their potential to influence drug metabolism. However, questions remain about their stability during digestion, absorption, and effects on enzyme expression, highlighting a need for further exploration into their pharmacokinetics and clinical relevance.

This research proposes that PEFs act as PXR agonists, potentially triggering significant food-drug interactions. Objectives include characterizing PEF content in Moraceae species, evaluating their absorption and metabolism, and assessing their effects on PXR activity using advanced molecular techniques. Findings could improve understanding of food-drug interactions, impacting patient safety, pharmacology, and healthcare practices by emphasizing the need for informed dietary and therapeutic decisions.

This line of research marks a shift from bioactive compound characterization to examining clinical implications, integrating pharmacokinetics and food-drug interactions into the broader context of personalized medicine.

Resumen del Currículum Vitae:

My research focuses on bioactive natural compounds, covering identification, characterization, bioactivity, and pharmacokinetics. During my undergraduate and PhD studies at the University of Talca, I specialized in profiling polyphenols from Chilean fruits, pioneering counter-current chromatography (CCC) in my lab and training in Germany. As an associate professor, I led a FONDECYT-funded project on antidiabetic potential of Gaultheria fruits, discovering three new iridoids. My Alexander von Humboldt Fellowship enabled postdoctoral research in Germany, advancing pharmacokinetics of iridoids and fostering international collaborations. Currently, I lead a DFG-funded project integrating in vitro, ex-vivo, and clinical studies. My career includes 53 articles, two book chapters, and 14 international conferences, alongside innovation in methodologies such as CCC, reporter gene assays, and HPLC-ELSD.

I engage in outreach through seminars, podcasts, and articles, sharing findings on native Chilean resources like white strawberries and Chañar. I have collaborated with industry to study proteins in native legumes and aroma profiles of Chilean fruits. My interdisciplinary approach includes computational tools like Tinteresting for metabolomic data analysis, developed through a collaboration with the University of Antwerp.

I have mentored one PhD, five master's, and seven undergraduate students, supporting their integration into the scientific community. My FONDECYT project led to publications and launched students into academic careers, including positions at the University of Talca and the Max-Rubner Institute in Germany. My leadership has fostered interdisciplinary collaborations, equipping students with cutting-edge skills in techniques such as cell culture and HPLC-DAD.

Recognitions include Chile's National Award for Best Graduate in Chemistry and Pharmacy, the Alexander von Humboldt Fellowship, and the Chilean Society of Biology award for young researchers. I have innovated in methodologies, such as machine-learning approaches for HPLC-MS data, and have taught molecular nutrition and pharmacology at undergraduate and graduate levels. Currently, I lead modules on "Food Biofunctionality" at the University of Hohenheim and "Pharmacology" for a geriatric dentistry specialization at the University of Talca. My ongoing DFG project will culminate in a clinical study, solidifying my expertise in pharmacokinetics and bioactive compounds.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: PÉREZ DE LIS CASTRO, GONZALO
Referencia: RYC2024-049165-I
Correo Electrónico: gonzalo.perezdelis@usc.es
Título: Exploring tree responses to environmental stress: A multifaceted analysis across time scales

Resumen de la Memoria:

I obtained my PhD degree (supervised by I. García-González and V. Rozas.) at the Universidade de Santiago de Compostela (USC, Spain) in September 2016. After completing my PhD, I was hired as a research assistant for 12 months at the Universidade de Coimbra (UC, Portugal). In September 2017, I moved to INRAE (France), where I held a postdoctoral position for 24 months. In October 2019, I returned to USC, which is my current institution. I have successfully engaged in research activities within different research teams in several different countries, demonstrating a discernible evolution in terms of independence and leadership. I was a core research member in three national projects in Spain, France and Portugal, as well as in five regional projects in Spain and France (one as principal investigator) and one transfer contract (as principal investigator). As a postdoctoral researcher, I conducted a research stay at California State University Bakersfield (CSUB, United States) for 28 months under the supervision of Pr. Anna L. Jacobsen (2019-2022). As a PhD student, I performed a two-month stay at the Universidad de Valladolid (Spain) with Pr. José Miguel Olano (2014), and a five-month stay with Pr. Sergio Rossi at the Université du Québec à Chicoutimi (Canada). I have demonstrated the ability to obtain funding in competitive calls. I benefited from two competitive postdoctoral fellowships co-funded by the Regional Government of Galicia and Fulbright (2019-2023, 2023-2025). During my PhD, I was the recipient of the FPI-MICINN (3 months, 2011) and FPU (3 years and 9 months, 2011-2015) PhD grants, and one excellence V3 grant for a short-term research stay funded by the Regional Government of Québec. Additionally, I received the 2015/2016 PhD Excellence Award granted by the USC. The impact of climate change on forests has been a major motivation for pursuing my research career, which focuses on wood formation (xylogenesis) and its connections to wood anatomy and tree functioning. During my PhD, I focused on studying the intra-annual dynamics of xylogenesis and its relationships with leaf phenology and seasonal fluctuations in the tree carbon pool of ring-porous oak species. At this stage, I was able to conduct research autonomously and achieved a successful publication record. During my postdoc at INRAE, I had the chance to improve my skills in statistical modeling of xylogenesis and wood cell kinetic computation, as well as learn new techniques, such as carbon isotope analysis. In that period, I coordinated the work of several technicians, learning about team organization. During my stay at CSUB, I could incorporate key ecophysiological insights into my research. I learned techniques to determine tree water status and identify conductive pathways in wood, such as active staining and computerized tomography. As a result, I am currently conducting a follow-up project that involves analyzing the functional lifespan of earlywood vessels in evergreen and deciduous oak species growing under controlled conditions. Both as a PhD student at USC and a research assistant at UC, I gained extensive knowledge in dendrochronology for both ecological and historical applications. This allowed me to develop strong skills in image analysis for quantitative wood anatomy.

Resumen del Currículum Vitae:

According to Web of Science, I have 14 articles in Q1 journals (seven in D1 journals) and two articles in Q2 journals, reaching 431 citations and an h-index of 11. I have co-authored one additional article that is now in press in a Q1 journal. My citation performance ranks in the 75th percentile, which reflects a solid contribution to my field of research. Moreover, six of my works were published as open access. During my PhD (2016), I coauthored three papers on xylogenesis and functional wood anatomy and one on dendrochronology. As a postdoc (64 months), I have co-authored five more articles on xylogenesis, two of them in the form of methods papers, as well as one book chapter. My publishing record includes six more articles on dendrochronology and one on functional wood anatomy. I also co-authored 23 contributions to international conferences (14 as first author, and seven oral presentations). I have nearly 70 months of experience in international institutions, with two research stays in Canada and USA (supported by competitive funding), and two research contracts in Portugal and France. This demonstrates my ability to generate scientific results in diverse teams and working environments, my collaborative skills, and research independence (9 publications without my PhD advisors). I have been a core research member in three national projects in Spain, France, and Portugal, as well as in five regional projects in Spain and France (one as principal investigator) and one transfer contract (as principal investigator). My research activity also comprises 22 reviews for scientific journals and the organization of one international conference. I have participated in training and mentoring activities, lecturing 234 hours at USC (botany domain), 4 hours at CSUB (dendrochronology), and 3 hours at Université de Lorraine (dendrochronology). I am currently co-advising a PhD student recipient of an FPI doctoral fellowship (D. Irimia). I have mentored undergraduate students P. López-Seijas (USC, 2023), J. Espinoza, and D. Tran (CSUB, 2021) and Master students J. Spriester (CSUB, 2022) I.K. Adikurnia (INRAE, 2019). I also served on a Master's degree jury at AgroParisTech (France) in 2019 and was invited to give seminars to faculty and students at CSUB (USA) in 2021, INIA-CIFOR (Spain) in 2016, and UQAC (Canada) in 2015. As part of my contributions to knowledge transfer, I was the principal investigator of a contract with the company CoLAB ForestWISE (Portugal) to implement histological techniques in evaluating the effectiveness of resin extraction procedures in pine. I have also participated in outreach activities and seminars. I co-organized the event "Pint of Science" in Lugo in 2024, while I am currently coordinating the local team for the 2025 edition. I also co-organized a workshop on tree rings during the G-Night 2024 event, as part of the European Researchers' Night. I also gave two talks at the "Divúlgate" outreach event (Lugo) in 2022 and 2024. Finally, I have been interviewed by general and specialized media about my research activity as a PhD student and postdoctoral researcher.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: SÁNCHEZ PINILLOS, MARTINA
Referencia: RYC2024-050542-I
Correo Electrónico: martina.sanchez.pinillos@gmail.com
Título: Forest resilience to disturbances: linking theory to action

Resumen de la Memoria:

Throughout my career, my research has gradually positioned in the interface between quantitative ecology, forest ecology, and forestry, pursuing the general goals of (1) improving the tools to assess forest responses to natural and anthropogenic disturbances of any type (pulse or press events), and (2) providing empirical evidence of the most vulnerable communities that must be prioritized in management plans. With these goals in mind, I highlighted important inconsistencies between resilience theory and its empirical quantification and developed sophisticated methodological approaches to implement resilience concepts in empirical systems. Applying my developed methods to large datasets allowed me to identify the forest communities at the highest risk of collapse and the mechanisms underlying the response capacity and vulnerability of forest ecosystems.

My predoctoral and postdoctoral stages included more than 5 years of international stays in Canada, France, Argentina, and Germany. During these stays, I established an extensive network of collaborators working in different disciplines (theoretical and quantitative ecology, forest ecology, and forest management and policy). These stays allowed me to gain knowledge of the ecology of multiple forest biomes and their dominant disturbances, improve my quantitative skills and abilities to manage large datasets, and enrich my research with a holistic perspective of forest functioning. The interdisciplinarity of my research allowed me to provide new research lines to the labs in which I have worked, develop and contribute to funded project proposals, and lead an MSCA-IF project aiming to assess the ecological resilience of empirical systems using dynamic regimes. I also contributed to transferring knowledge to end-users of research from France, Spain, and Canada, hosted and trained international PhD candidates, and supervised BSc and MSc students.

My future research aims to improve the understanding of forest resilience to global change using the perspective of complex systems science (CSS), with the final goal of adapting future management strategies to uncertain stressors. To do so, I will strengthen and increase my international relationships and interdisciplinarity to consolidate and develop new ground-breaking methodological approaches based on CSS to assess forest responses to global change. Applying these methods to real data will provide empirical evidence not only of the most vulnerable forest communities but also of the processes and scales that must be considered in conservation and restoration plans. The obtained results will serve to define adequate management strategies to prevent forests from collapsing while maintaining their ecosystem services.

Resumen del Currículum Vitae:

I graduated with Honors as a Forest Engineer (UPM), carried out an MSc in Advanced Forest Research (UPM), and International PhD in Forestry and Environmental Management (Cum Laude distinction, UdL). Then, I worked as a postdoc at UQAM and UNB (Canada) and as an MSCA research fellow at CNRS (France). Currently, I am a postdoc at UQAM (Canada). Throughout my research, I have worked in five countries, being involved in multiple international projects and collaborating with researchers from different disciplines. In doing so, I acquired excellent skills in advanced statistics, computing analytics, and dynamical systems theory that allowed me to develop novel approaches and hypotheses and gain a holistic understanding of forest resilience to biotic and abiotic stressors.

My research has contributed to the theoretical progress of ecological resilience in forest ecosystems. I developed cutting-edge methodological frameworks that I implemented in open-access technological tools. My methods were used to provide empirical evidence of tipping points in disturbed forests and disentangle the mechanisms involved in forest resilience and vulnerability to disturbances. My contributions are reflected in high-impact, peer-reviewed journals (D1 or Q1). All my articles as the corresponding author are open access and 75% of them have a citation percentile >70th (25% have a percentile > 90th). I have widely disseminated my research in 19 national and international congresses and seminars (7 invited talks).

I demonstrated outstanding independence and leadership by obtaining a competitive MSCA individual fellowship the same year I defended my PhD thesis, leading objectives and tasks in nine national and international projects, and securing ~400,000 € throughout my career. I supervised two BSc theses (one ongoing) and an MSc thesis (ongoing), and I hosted and trained two international PhD candidates.

Among other scientific responsibilities, I am Associate Editor of the journal Ecological Indicators (D1), coordinator of the Forest Modelling group of the SECF, referee for 17 journals, evaluator of MSCA-COFUND PhD grants, and was called to evaluate an ANR proposal and a PhD thesis. I am also registered as an external expert on EU funding programs. To facilitate the transfer of knowledge to end-users of research, I developed technological tools and provided extensive documentation on their usage. I also collaborated with public organisms from France and Spain to write a protocol for defining mature forest stands in the Pyrenees and am a beneficiary of a grant to collaborate with multiple stakeholders across Canada.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: EL-AZAZ CIUDAD, JORGE
Referencia: RYC2024-050184-I
Correo Electrónico: jelazaz@gmail.com
Título: Understanding and harnessing essential amino acid metabolism of plants

Resumen de la Memoria:

The aromatic amino acids (Phe, Trp and Tyr) are synthesized by plants through the metabolically costly shikimate pathway and post-chorismate pathways (from here on, aromatic amino acid pathways) and used as precursors to produce several groups of specialized metabolites (e.g., phenolics and alkaloids) and hormones (e.g., auxins and salicylic acid) having critical roles. Moreover, as animals are devoid of the shikimate pathway, the aromatic amino acids are essential nutrients for humans and an attractive target for biofortification in crops.

My broad research interest has been focused on understanding how plants regulate the production of aromatic amino acids, and how this regulation impacts the production of a myriad of specialized metabolites that are derived from the aromatic amino acids. To this end, I have combined different perspectives and experimental approaches: phylogenetic studies, recombinant protein characterization, functional validation in planta, labeling experiments, and high-resolution mass spectrometry, among others.

At a more specific level, I have studied how key committed enzymes from the aromatic amino acid biosynthetic and phenylpropanoid pathways are regulated via feedback mechanisms. Interestingly, these feedback regulatory mechanisms have evolved differently in different plant lineages, depending on the demand of specialized phenolic compounds. This evolutive diversity can be used to identify key regulatory residues that can be modified to conduct a rational re-engineering of the regulation of these metabolic pathways, providing very useful tools to improve plant metabolism.

The long-term goal of my research approach to engineer plant metabolism to capture CO₂ and channel this carbon towards the sustainable production of useful high-value chemicals and more nutritious crops, while at the same time contributing to mitigate global warming.

Resumen del Currículum Vitae:

I graduated from my PhD at University of Malaga (UMA, Malaga, Spain) (2012-2017) in the Department of Molecular Biology and Biochemistry, studying the regulation of phenylalanine biosynthesis enzymes in maritime pine and other plant species. In 2019, I moved to a post-doctoral position at the Department of Botany, University of Wisconsin - Madison (UW-Madison, Madison, Wisconsin, USA), supported by a Fellowship from Fundacion Alfonso Martin Escudero, to investigate the regulation of aromatic amino acid metabolism in grass species and other plants. I am currently appointed as Scientist at the Department of Botany in UW-Madison in the group of Prof. Hiroshi A. Maeda.

During my post-doctoral tenure at UW-Madison, I have been developing my own independent project supported by Fundacion Alfonso Martin Escudero, as well as I have also actively participated in other projects led by professor Hiroshi A. Maeda. This has resulted in a highly productive academic output in terms of published papers, and also has allowed me to establish connections with an extensive network of scientists within the plant biology community.

I have made significant contributions to develop and optimize tools to study plant metabolism, and co-mentored three PhD students (Alberto Urbani-Gomez, Madelyn Schaut, and Carly Sanders) and two undergrad students for independent research (Junyan Chen and Jacob Kunkel, this last awarded the price for best undergrad student oral presentation at the ASPB Midwest Section Conference in 2023). I have also participated in the conceptualization and writing of two grants that were funded through the last year: NSF-MCB grant no 2404174 (Award amount: \$1,076,689) and USDA-AFRI Competitive Grant no 2024-67013-42518 (award amount: \$650,000).

The list of papers I have authored so far reflects a consistent and thematically coherent record in top journals within my area of expertise (Plant Biology), both during my PhD at UMA and my post-doctoral tenure at UW-Madison. My publications show that I can maintain high academic productivity through the years, and in different institutions with varying levels of funding.

Remarkably, I made important contributions in all my published papers (11 in total), reflected by my role as first or second author in all of them. Moreover, all my publications but one are original research papers. I have recently acted as co-corresponding author in my last publication, reflecting my ability to conceptualize and have a leading role in research projects. I have also recently authored a patent covering the use of novel shikimate pathway enzymes to improve the production of the amino acids Phenylalanine and Tyrosine in crops and other plants species.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: GARCÉS RIMÓN, MARTA
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Título: Innovación en alimentación funcional

Resumen de la Memoria:

Trayectoria. Resumen de 10 aportaciones entre las que se incluyen 2 patentes, 1 secreto industrial, la creación de una EBT y 6 artículos científicos. Movilidad e Internacionalización. He realizado 6 colaboraciones con centros nacionales e internacionales que mantengo hasta la actualidad (más de 25 meses en estancias), dando lugar a numerosos resultados de investigación que incluyen artículos de alto impacto, patentes y colaboración en proyectos de investigación. Debido a la transferencia de las patentes y el secreto industrial que tengo comercializados (Wovo®/EggenergyPro®, Affron® y Leggie®), mantengo una activa colaboración con el sector empresarial de restauración e industrial.

Independencia y liderazgo. Desde 2017 lidero como IP el Grupo de Investigación en Biotecnología Alimentaria de la UFV y soy co-fundadora de la empresa de base tecnológica iLike Food Innovation S.L (año 2020, CSIC-UFV). He liderado 5 proyectos como IP, he publicado más de 25 artículos de alto impacto (20 en Q1) y soy inventora de 4 patentes y un secreto industrial (PCT: 2; Licenciadas: 2; Explotación comercial: 3). Índice h = 15 (WOS-JCR), citas totales: 892. Tengo 2 sexenios concedidos (2011-2016 y 2017-2022). He dirigido 3 Tesis, 1 TFM y >25 TFG y participo activamente en divulgación científica.

Línea de investigación. El objetivo que he perseguido a lo largo de toda mi carrera investigadora ha sido obtener ingredientes funcionales para mejorar la salud, el bienestar y la calidad de vida de las personas, cuya base biológica y mecanismo de acción estén científicamente respaldados. En la actualidad, debido a la situación planetaria en la que vivimos, los consumidores reclaman productos saludables y sensorialmente óptimos, pero que además sean más éticos y sostenibles, lo que está impulsando su demanda en el mercado. Todo ello ha generado que se hable de un concepto global denominado one health definido por la OMS, que promueve que los avances científicos sean respetuosos con la salud de todos los ecosistemas y seres de nuestro planeta. Como respuesta, el sector alimentario cada vez está más centrado en desarrollar estrategias enfocadas a mejorar la huella hídrica y la huella de carbono de los diferentes procesos alimentarios. Por ello, es fundamental no sólo evaluar el valor biológico, nutricional y sensorial de los ingredientes, sino también su impacto en el medio ambiente. Por este motivo, el objetivo principal de investigación que persigo en la actualidad se centra en el desarrollo de nuevos alimentos funcionales saludables, con propiedades sensoriales mejoradas y respetuosos con el planeta. La LÍNEA I+D+i que propongo se centrará en diseñar nuevos ingredientes alimentarios con propiedades multifuncionales que consigan prevenir y/o tratar enfermedades multifactoriales como el síndrome metabólico y trastornos asociados a procesos oxidativos, así como proporcionar un envejecimiento saludable. Pero que además tengan propiedades sensoriales y tecnofuncionales y optimizadas para facilitar su escalado industrial y su adherencia a la dieta habitual de la población.

Objetivos específicos:

1. Desarrollo y caracterización de ingredientes multifuncionales, para prevenir y/o controlar el estrés oxidativo y las alteraciones asociadas al síndrome metabólico y al envejecimiento.
2. Optimización sensorial y tecnológica en la formulación de nuevos alimentos funcionales.

Resumen del Currículum Vitae:

Diplomada en de Nutrición Humana y Dietética y Licenciada en Ciencia y Tecnología de Alimentos por la Universidad Autónoma de Madrid. Me doctoré en el Instituto de Investigación en Ciencias de la Alimentación (CIAL; CSIC-UAM), (2014; Sobresaliente Cum laude, mención internacional), centrada en la obtención de hidrolizados de clara de huevo multifuncionales para abordar trastornos asociados al síndrome metabólico. Realicé 2 estancias predoctorales: URJC, Madrid y UMC Utrecht, Holanda. En esta etapa publiqué 6 artículos científicos y una patente PCT. En paralelo a mi Tesis, participé en un proyecto con el Chef Mario Sandoval (2 estrellas michelín y 1 sostenible) en la que obtuvimos nuevas texturas a partir de la clara de huevo, dando lugar a 1 artículo científico y 2 patentes (una ampliada a 145 países, licenciada a Granja Campomayor y comercializada bajo las marcas EggenergyPro® y Wovo®. Tras doctorarme, realicé una estancia postdoctoral en la empresa Bioactor BV-UMC Maastricht de 15 meses (2013-2014) para coordinar un ensayo clínico perteneciente a Eurostars FlaMeS y BACCHUS, de la que derivó 1 artículo científico. De vuelta a España tuve dos contratos de investigación con empresas (CIAL-Arturo Sánchez y Pharmactive Biotech Products) de los que derivaron 1 patente comercializada bajo la marca Affron®. Mi etapa postdoctoral amplió conocimiento científico y me proporcionó una relevante experiencia en la gestión de la colaboración público-privada. Desde el 2015 desempeño mi labor investigadora en la UFV, en la que lidero como IP del Grupo de Investigación en Biotecnología Alimentaria desde el año 2017. A nivel nacional, sigo realizando estancias con la Dra. M. Miguel (CIAL;CSIC-UAM) y con la URJC. Además, colaboro con la Dra. B. Sabater (I2SysBio-CSIC) con el fin de utilizar Saccharomyces cerevisiae como modelo in vivo de estrés oxidativo y con la Dra. A. Lázaro (CIG-IMIDRA), para estudiar la adecuación de los ingredientes desarrollados previo al escalado. A nivel internacional colaboro con el UMC-Maastricht y con la Dra. G. Wiggers (Universidad F. do Pampa, Brasil) con el fin de estudiar ingredientes funcionales frente a la exposición a metales pesados. Esta etapa de liderazgo y colaboración ha dado lugar a más de 20 artículos científicos, 15 proyectos de investigación (5 como IP). Dada la vertiente de transferencia que persigo en mis investigaciones, tengo un estrecho contacto con el sector industrial y empresarial. Recientemente, hemos desarrollado una novedosa alternativa 100 % vegetal basada en la algarroba, protegida bajo secreto industrial y comercializada bajo la marca Leggie®, otro ejemplo de éxito de transferencia a la industria alimentaria que he liderado, a través de iLike Food Innovation S.L, una empresa de base tecnológica de la que soy co-fundadora. En los últimos 10 años compagino mi labor científica y emprendedora con la docencia como Profesor Contratado Doctor en Grados de la UFV (>1000 horas de docencia), y en formación de personal investigador con la co-dirección de 3 Tesis Doctorales y 1 TFM (UAM) y >25 TFGs (UFV). Los Doctores que he formado continúan su labor en el ámbito científico, docente o empresarial. A lo largo de mi carrera he recibido numerosas distinciones por mi labor investigadora y emprendedora. Además, colaboro de forma activa en la divulgación científica, así como en prensa, radio y tv.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias agrarias y agroalimentarias

Nombre: MANETSBERGER, JULIA

Referencia: RYC2024-048202-I

Correo Electrónico: jmanetsberger@gmail.com

Título: Trayectoria J. Manetsberger

Resumen de la Memoria:

My research primarily focuses on the development of novel biological pest control agents (biopesticides) for improved crop production and quality while ensuring a sustainable agriculture. These biopesticides are based on bacterial spores and specifically target the phytopathogen *Xylella fastidiosa* (Xf). This research is mostly but not exclusively funded by the European Commission (Horizon 2020 MSCA Individual Fellowship, 259,399€, 2021-2024, SMART-AGRI-SPORE, ID: 101029930) as well as in a directly related follow up project by the European Union/Junta de Andalucía (Regional Development Fund - FEDER Andalucía, 30,000€, 2024-2026, Target-Xf, ID: M.1.B.B TA_000648) both led by me as Principal investigator (PI). I have won the MSCA fellowship under the highly competitive Horizon 2020 Marie Skłodowska-Curie Action (MSCA) programme supporting my re-entry into academia after briefly moving into the private sector.

Previously, I obtained my PhD in Biotechnology from the University of Cambridge (2015) investigating features conferring unparalleled resilience to *Bacillus* spores, in particular the spore's outermost layers. I notably discovered novel structural proteins allowing for the self-assembly of spore proteins, without the need for a structural scaffold. Importantly, this research furthermore laid the basis for the development of advanced biopesticides in sustainable agriculture. To complement my academic knowledge, I have moved outside academia for a brief period of time, working as Director for Food Safety Policy and Quality at a European industry association. I supervised up to 4 co-workers and led 3 industry working groups with > 40 industry specialists from top food companies. This area of public policy is complementary to my main line of research –microbiological agents in agriculture.

As a result of my work, I have raised over 500.000€ through several projects and highly prestigious grants, presented my work in >30 international conferences and through 33 publications. Throughout my career I have participated in 14 research projects (4 as Principal Investigator, 1 as member of the equipo de investigación) and my research has contributed significantly to the development of new technologies yielding in 3 patent applications developing, amongst others, novel antimicrobial agents for sustainable agriculture and food production.

In light of the above, my future line of research will concentrate on improving biopesticides by the development of an inert, intelligent and sustainable delivery system in the form of functional synthetic microparticles mimicking bacterial spores. In addition, in a second line of research I will pursue the development of novel water management systems creating smart water delivery vehicles for arid soils, based on bacterial spores.

Resumen del Currículum Vitae:

My current research focuses on harvesting the biotechnological potential of bacterial spore formers for sustainable agriculture. In particular, as Marie-Curie fellow at the University of Jaén I investigated the use of *Bacillus* spp. to fight the plant pest *Xylella fastidiosa* in olive agriculture. I am currently continuing this work as Principal investigator of the TARGET-Xf project.

I obtained my PhD in Biotechnology from the University of Cambridge investigating features conferring unparalleled resilience to *Bacillus* spores. I discovered structural proteins providing valuable insights into the development of novel microstructures in agricultural applications. During my PhD I also developed a high-resolution imaging technique, allowing the detailed localisation of proteins based only on standard fluorescence microscopy. My scientific career was fully supported by numerous prestigious fellowships and research projects which consolidated my research activity, skills and leadership. I have raised over 500.000€ in funding, where I would like to highlight the PhD fellowship awarded by the UK's Engineering and Physical Sciences Research Council (>£60.000) available to only 10% of non-UK residents at the University of Cambridge, the fellowship of the Nano Doctoral Training Centre (£3.500, 10 fellowships available to all Uni. Cambridge students) and my MSCA fellowship (259.399€). As postdoctoral researcher at the University of Leuven I headed the development of an innovative correlative light/electron microscopy technique, allowing for the first time the visualisation of synaptic changes in Parkinson's disease (PD). Complementing my academic career, I have acquired proficiency in the EU legislative process and food industry functioning as Director for Food Safety policy at a Brussels based food industry association.

My work has been published in 33 publications (19 peer-reviewed articles, [14 as first and/or corresponding author], 6 book chapters, 1 book edition, 2 articles in agricultural journals and 5 media publications), with more than 586 citations (h-index 9). I have participated in >30 international conferences (6 as invited speaker). I have also strongly fostered international collaborations with researchers from the UK, USA, Spain and Belgium as well as international food industries (e.g. Nestlé, Mondelez and Mars). My management skills can be exemplified by my participation in 14 research projects (4 as Principal Investigator). In addition, I have demonstrated proficient management and leadership skills as Director for Food Safety, leading four working groups with >40 industry specialists on food and agriculture related topics as well as heading the project management of 3 industry funded projects (>250.000 each). I have taught in 20 microbiology, food safety and agriculture related courses at degree, master's and professional level, and organized >20 workshops and conferences. I am currently supervising 3 PhD students, in addition to having supervised 14 final degree projects, 5 master projects and 2 external internships. I am routinely acting as reviewer for scientific journals and have evaluated 1 PhD thesis and 8 Master theses.

Finally, I endeavor to bring my research closer to the public, e.g. through news articles and science events for layman audiences.



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Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: PÉREZ RODRÍGUEZ, PAULA
Referencia: RYC2024-048624-I
Correo Electrónico: paulaperez10@gmail.com
Título: Environmentally friendly strategies to get sustainable agricultural systems: focus on soil health
Resumen de la Memoria:

During my PhD, I worked with the application of copper-based fungicides and organic pesticides on agricultural crops and their losses by wash-off, estimating the losses of organic pesticides and copper from plant to soil by rain, highlighting that wash-off is an important via of inputs into soil. At that time, I also collaborated in a parallel research line regarding the re-use of winery sub-products into soil to immobilize potential toxic elements (PTE), and pesticides in vineyards. I got predoctoral funding from MEC (FPU2010). During my postdoc in Strasbourg (France) funded by a 3.5-years postdoctoral contract (XG, modality A: 2y abroad university+1.5y university of origin), I learned different techniques to analyze stable isotopes in organic contaminants by CSIA and in nutrients, e.g., Ca and Sr. I could study the degradation of pesticides in the plant-rhizosphere-soil system as well as the plants behavior regarding nutrient caption into the rhizosphere. After my incorporation into UVIGO (July 2019), I've been working on the environmental effects of contaminants into soil-water interface and soil microbiology as well as agricultural management strategies to pursue a sustainable agriculture. I got a 2-years postdoctoral contract (XG modality B), which I resigned in December 2022 after achieving a postdoctoral contract Juan de la Cierva-Incorporación.

After successfully obtaining several research projects since 2021 as PI, my work has been focused on three interrelated research lines: 1) Re-use of subproducts from agroforestry industries in soil as biosorbents of PTE from mining activities and antibiotics from agricultural and human use. 2) Effects of different agricultural management practices on soil fertility, soil quality and soil biodiversity together with their implication in climate change mitigation. 3) Behavior of nano-agrochemicals in the environment. The importance of making agrochemicals of nano size could be very relevant in the future of agriculture since the aim is to reduce the amounts of applied fertilizers and improve their efficiency to reduce their effects on the environment, e.g., soil, waters, and microorganisms.

My future research line aims at applying these sustainable practices in agricultural crops and study the effects on soil organic matter quality, its stabilization and the increase of carbon stocks and soil biodiversity, promoting soil health. Concretely:

- 1) To implement the use of cover crops, biochar application and crop diversification in croplands.
- 2) To study the contribution of alternative agricultural managements to the soil C dynamics, carbon fractionation, and the functional pools of the SOM and its stability.
- 3) To use the nanotechnology to synthesized nano-agrochemicals on-demand and encapsulate them for their application into the soil as sustainable fertilizers to get a slow and smart release of active elements, resulting more efficient agrochemicals for plants, microorganisms and the environment.
- 4) To increase soil biodiversity and crop yield making the agriculture more profitable and allowing a circular economy.

As established researcher I would like to implement sustainable agricultural practices, more efficient products by using nanotechnology and, at the same time, studying the whole ecosystem with special emphasis in the carbon cycle and its contribution to the climate change.

Resumen del Currículum Vitae:

Graduated as an Agricultural Engineer in 2007. Master in Agricultural Food Science and Technology, 2009 and Master in Terrestrial Ecosystems, Sustainable Use and Environmental Implications, 2012. PhD in Soil Science Copper wash-off after foliar applications of agricultural use, 2016 (all at UVIGO). I participated as a researcher in projects from public regional calls, related to soil immobilization of pollutants from mining and agricultural activities. In 2012, I got a competitive predoctoral research contract FPU from MEC. In 2014, I did a short stay at University of Abertay Dundee (Scotland, UK) funded by MEC, to study the structure and macroporosity of soil by X-Ray CT after its amendment with biochar. In 2017, I worked as Expert evaluator of PPP, evaluating the approval of plant protection products at European level (Spain MS, EC). I obtained the national accreditation as PCD, PAD and PUP qualified by ANECA. After, I got a competitive postdoctoral research contract (XG, modality A), 2017-2020, for doing research abroad. Since Jun 2017 to 2019, I worked as postdoctoral researcher at University of Strasbourg (France) in Laboratory of Hydrology and Geochemistry of Strasbourg (LHyGeS), supervised by Dr. Imfeld and Dr. Schmitt, studying the dynamics of nutrients and pesticides in the rhizosphere explored by stable isotopes. At LHyGeS, I supervised 1 MSc and participated in 3 international research projects: PestIsotope, COST Action and BioDisphère. In 2019, I incorporated as postdoctoral researcher at UVIGO (modality A contract) and I did a short stay at Strasbourg university (2w). In 2021, I got a competitive postdoctoral research contract (modality B), XG, 2021-2023, including funding to establish and lead my own research (25k€). I participate in 3 international research projects: Coppereplace, SoildiverAgro (regional coordinator), and ReSuelBen (PI) in Cooperation for the Development. In 2022, I got Juan de la Cierva postdoctoral contract (AEI and Next Generation) and, together with maternity, I achieved 3 projects as IP: EnvinAgro as Co-IP (MICIN), GreenSoilVin (XG, Operative group: wine industries) and MRV4SOC (HE) as UVIGO-IP. I participate as deputy leader of WP at BIOservicES and InBestSoil, and as researcher at AGROSus projects (HE). Recently, I participated in an Erasmus+ KA220-SCH project (5G). Teaching in Agricultural Engineer, Environmental Science and Master Agricultural Food Science and Technology (UVIGO, since 2014 >500h). Since 2016, I am Reviewer in >20 JCR journals. Since 2018, I have been evaluator of Erasmus+ projects for SEPIE from MEC. I was Managing Guest Editor at Sci. Total Environ. (2020-21), Special Issue at Agriculture, (since 2020), Special Issue Guest Editor at Frontiers in Environmental Science and Guest Editor of Spanish J. Soil Sci. (2022-present), Guest Editor Special Issue Agriculture (2024-25). I have 15y of research and 9y of teaching experience, 66 published research documents (49 research articles, 1 book as editor and 16 book chapters). Participation in >80 national and international Congresses. Member of the Spanish Society of Soil Science. Supervision of 6 MSc and co-supervision of 3 PhD theses (in progress). Certificate R3 (2023), and national accreditation as full professor (ANECA, 2024). Participation in 2 transfer sessions in 2024. H-Index: 17, 663 citations from 602 documents, 62 co-authors.



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Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: FERNANDEZ MONTERO, ALVARO
Referencia: RYC2024-048716-I
Correo Electrónico: alvarofmontero@gmail.com
Título: Aqua-Immunology: advancing fish health through cutting-edge research in mucosal immunity and microbiota interactions

Resumen de la Memoria:

My research career has progressed through various phases, shaped by my academic journey. I began with a focus on Zoology and Ecology during my undergraduate studies, advancing to a master's degree in aquaculture where I defined optimal culture conditions for greater amberjack, a new species for aquaculture. My doctoral thesis addressed biosanitary challenges caused by ectoparasitic infections in greater amberjack, examining stress induction, histopathology, immune system characterization, proteomic effects, and supplementation strategies.

During my postdoctoral research in the United States, I transitioned to fundamental immunology, using fish as model organisms. I discovered structural aggregations in rainbow trout's spleen resembling germinal centers and elucidated an important role of IgM in intestinal mucosa and microbiome regulation. I also contributed to developing different monoclonal and polyclonal antibodies and developed a method for selecting specific probiotics called immunobiotics, offering interesting applications in the industry.

Looking forward, my research will focus on two key directions:

-Unveiling the role of T cells in teleost fish mucosal immunity:

This direction aims to explore the function of T cells, hypothesized to serve as a crucial first line of defense in mucosal tissues while maintaining microbiome homeostasis. Short-term objectives include localizing and characterizing T cells, investigating their cytotoxic capabilities, and examining their role in mucosal defense and microbiota regulation. Long-term goals include applying these findings to aquaculture by developing strategies to enhance T cell activity, improving mucosal health and resilience.

-Interactions between the immune system and microbiome; Applications to aquaculture and mucosal vaccine development:

This research investigates the immune system's regulation of microbiota and its application in aquaculture. Short-term objectives focus on enhancing understanding of microbiota colonization, coating, and immune exclusion, as well as developing attenuated mucosal vaccines using microbiota as vectors. Long-term goals include creating effective vaccines targeting pathogens that challenge aquaculture, leveraging natural microbiota-host interactions to improve disease resistance and sustainability.

My long-term vision integrates fundamental immunology with practical applications in aquaculture to address pressing challenges in fish health, contributing to more sustainable and resilient aquaculture practices.

Resumen del Currículum Vitae:

During my Master's thesis, I established optimal culture conditions and growth temperatures for greater amberjack (*Seriola dumerili*), producing a publication that provided key guidelines for culturing this species using recirculating systems (Fernandez-Montero et al., 2018).

My doctoral research addressed critical bottlenecks in the culture of greater amberjack, particularly biosanitary issues related to ectoparasites. Initially, I studied stress and immunity in skin and mucus to understand basal conditions leading to parasitization, resulting in a Q1 journal publication (Fernandez-Montero et al., 2020a). Subsequently, I identified the causative agent of parasitosis and characterized its effects on host skin, leading to another publication (Fernandez-Montero et al., 2020b). Our research explored the mucosa-associated immune system (SALT), employing advanced techniques like proteomics and recombinant protein production, which culminated in two additional Q1 journal articles (Milne et al., 2019; Fernandez-Montero et al., 2021a). My doctoral work concluded with the successful nutritional modulation of amberjack immunity, achieving the highest reductions in parasitism documented with nutritional supplements, documented in two Q1 journal publications (Fernandez-Montero et al., 2019; 2021b). During this period, I contributed to seven Spanish national and three European research grants, lectured undergraduates and Master students, and supervised both Master's and Ph.D. students.

As a postdoctoral researcher at the University of Pennsylvania (USA, 2019-2024), I advanced my expertise in comparative immunology, focusing on B cells, mucosal immunity, and the microbiome. In 2020, I applied for a USDA grant with Prof. Sunyer to investigate germinal-like centers in teleosts, which resulted in a groundbreaking publication in *Science Immunology* (Shibasaki et al., 2023; Q1, IF 33) as co-second author. This study challenged established concepts of acquired immunity in poikilothermic vertebrates and was featured on the December 2023 cover. In 2021, I co-applied for another USDA grant on specific immunobiotics capable of selectively inducing sIgT production, which has led to an in-preparation first-author publication. Additionally, I contributed to an NIH R01 project, resulting in a high-impact preprint (Ding et al., 2023), where I am co-first author, submitted to *Nature Microbiology*. Collaborations with American universities yielded significant publications in mucosal immunology (Salinas et al., 2021; 2022), while European collaborations explored innovative immunology applications (Montero et al., 2022), probiotics (Monzón-Atienza et al., 2022; Serradell et al., 2020), and contamination research (Q1).

During this time, I mentored rotation students at UPenn, supervised Ph.D. students at the University of Las Palmas de Gran Canaria, and delivered Master-level lectures. Recently, I was awarded a "Cesar Nombela" talent recruitment grant by the Madrid government (€420,000), where I serve as the principal investigator.



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Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: SANTAMARIA ECHART, ARANTZAZU
Referencia: RYC2024-048705-I
Correo Electrónico: tzazusanta@gmail.com
Título: Advanced processing technologies for functional healthy food applications - APTC&HEALS

Resumen de la Memoria:

The career of Arantazu Santamaria is founded in 3 centers, all favoring her scientific maturity and management: "Materials + Technologies" Group (GMT) at the University of the Basque Country (UPV/EHU), Applied Chemistry and Biotechnology Center (CQAB) in Madrid, and Mountain Research Centre - Polytechnic Institute of Bragança (CIMO-IPB) in Bragança, Portugal.

At the GMT she conducted the PhD Thesis (2013-2017, Cum Laude, International mention, Extraordinary Doctorate award by the UPV/EHU; 8 articles), followed by a Postdoctoral period (1 year). The thesis was focused on developing polyurethane dispersions, used to prepare films by casting and mats by electrospinning. The formulations were reinforced with cellulose nanocrystals or functionalized with plant extracts. During the postdoctoral period she broadened the PhD work preparing innovative formulations added with both nanoentities simultaneously, and a review about the thematic, leading to 2 publications (2Q1, 1D1). To note the importance of her PhD, not only for the scientific community (around 400 cites of the PhD articles), but also at the GMT, being the pioneer to open a new research line (polyurethane dispersions) in the Group, that subsequently led to additional 4 PhD in the area. In fact, this challenge made the candidate to address and manage the difficulties associated to new research lines since early stages of her scientific career, and most particularly, in the field of polyurethane dispersions recognized by its high complex chemistry and synthesis processes. During this period (2013-2018), Dr. Santamaria-Echart was involved in several collaborations with external (Inter/National) or researchers from GMT, leading to 14 articles (9Q1, 4D1; with SP, FR, SE, PL, AR).

Then, she enrolled the CQAB, as New Materials Area Supervisor (2018-2020). The center dedicated to provide products development projects and services to private companies strengthened the Technological Transfer experience and leadership skills of the candidate. She participated actively in experimental, reporting, progress meetings and supervision activities of several projects in direct contact with Inter/National companies (Química Italquim, Qualicaps Europe, Sertego), managing different thematics simultaneously, empowering her multidisciplinary overview in real scenarios (adhesives, pharmaceuticals, polyols synthesis or bitumen). Additionally, she was responsible to provide regular technical characterization services to companies (Tradecorp, 3M, Ravago Chemicals).

The CIMO-IPB stage (2020-now) covered a 3.5 years period as junior researcher and 1.5 years in a tenure track position as assistant researcher. Here, she has kept on the area of polyurethanes and extended to health related areas (food and cosmetics). She is consolidating a new research line based on advanced processing technologies (3D printing and electrospinning) for functional food applications, aided by bionanoparticles, emulsions and encapsulation strategies. In fact, at CIMO-IPB she has reinforced her leadership capacity including BSc, MSc and PhD thesis supervision or IP of projects (See CV section).

In this context, Dr. Santamaria-Echart intends to implement a new research line also based on advanced processing technologies for food applications, functionalized in this case with biological entities, such as digestive enzymes or probiotics.

Resumen del Currículum Vitae:

Arantazu Santamaria Echart showed a multidisciplinary profile handling academic and technological transfer roles at National-International stages. She completed a BSc in Industrial Technique Engineering, Industrial Chemistry (Extraordinary best academic record 2010/11 award) and a MSc on Renewable Materials Engineering (2012), at the University of the Basque Country (UPV/EHU). Then conducted her PhD (2013-17, "Materials + Technologies" Group (GMT), competitive UPV/EHU grant Ref:PIF/UPV/12/201), obtaining Cum Laude with International Mention qualification and awarded with the Extraordinary Doctorate award by the UPV/EHU (2016-17) leading to 8 articles (7Q1, 5D1), 11 participations in Conferences and 2 international internships at the Polytechnic Institute of Bragança (IPB). In the Postdoctoral stage, with a competitive "Call for Recent Doctors Grant" (1 year, GMT), broadened her PhD work and extended a collaboration network with 14 articles (9Q1, 4D1; with SP, FR, SE, PL, AR).

Her Technological Transfer experience was empowered moving at the Applied Chemistry and Biotechnology Center (CQAB) as New Materials Area Supervisor in Madrid (2 years, 2018-2020). The direct contact with Inter/National private companies (Química Italquim, Qualicaps Europe, Sertego) focused on applied products development challenges, overlapping diverse thematics, supervision and responsible to provide technical characterization services, enhanced her leadership skills and approximate to market products and services implementation.

Her international stage (5 years 2020-Ongoing) evolved from a junior researcher contract (1.5 years in "ValorNatural" (NORTE-01-0247-FEDER-024479) project and 2 years with a competitive call (Public Employment Position (PEP) ref: OE202010/0648)) to a tenure track position as assistant researcher (AR) from a competitive call (PEP ref: OE202210/0511), at the Mountain Research Centre - Polytechnic Institute of Bragança (CIMO-IPB), Portugal. Particularly at the AR stage is consolidating a new research line, based on materials advanced processing technologies (3D printing and electrospinning) to design innovative products for food and health applications.

This period, she combined teaching and research activities: participation in Inter/National research/technological projects (2 as IP; 1 as coordinator at CIMO-IPB; Projects total funding 86,418,382.73 €, Public and private funding), and co-supervision of > 10 research fellows, 1 BSc, 22 MSc and 5 PhD Thesis. Also responsible of technological transfer actions ("NatSauce" project winner at the "Concurso Promove2020" and at the AINanoTEC Startups Entrepreneurial Program 2021).

She published 46 articles in H-index journals (12 1st author, 7 corresponding), > 100 Inter/National conferences (5 best poster awards), 4 conferences as organizing committee (3 Local), 2 as scientific committee member, chairwomen in 2 national scientific events and exchange activities in 3 "ERASMUS+ staff mobility for training" programs.

Her scientific activities include Topical Advisory Panel member and Guest Editor of 2 Special issues, Reviewer of 50 articles, projects Evaluator (4 Individual, 2 consolidated, 1 Panel rapporteur), and jury in 5 PhD and 18 MSc Thesis defenses.

Her scientific production impact: 1297 cites; 144 Cites/year (2015/24); 45 Publications (2/3 Q1 (50% D1); 23 H-index (SCOPUS 20/01/2025).



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Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: BARREIRO BUJÁN, ANA ISABEL
Referencia: RYC2024-049932-I
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Título: Soil microbial community as indicator of soil quality in soils affected by different impacts

Resumen de la Memoria:

I am a soil scientist focused on soil microbial ecology and during my scientific career to date, I have published a total of 42 articles, plus an editorial paper (794/1152 citations according to Scopus/Google Scholar), both as lead-author and co-author, most of them published in leading environmental, soil and microbiological journals. Additionally, I am the co-author of 9 book chapters, and I have 90 conference contributions (60 international and 30 nationals). I realized my PhD at CSIC (Spain) (2011-2016), have a first post-doctoral stay (4 years) in SLU university in Sweden (2017-2021) and currently working in a second post-doctoral stage in USC (Spain) (2021 – now). I have obtained funding from competitive public calls to develop my own research avenues, both individually and as part of international consortia. I have participated in 16 different research projects, funded by funding agencies or industry, and being PI in 3 of them and leading WP in 7 of them. I have published articles with results from the projects I am involved in, 60% of them without my PhD supervisor.

The research I have performed until now, had a very clear focus on the soil microbial ecology of forest and agricultural soils and how soil microbes respond to different impacts or management. The analysis of how the soil microbial community is affected by the presence of emergent pollutants is not well known. In the case of antibiotics, compounds that are currently gaining attention regarding their spread in the environment, the studies are focused on the emergence of antibiotic resistance, a topic of great concern due to the potential impact on both animal and human health. The impact, however, of these compounds on the ecology of soil microorganisms and their functioning is currently critically understudied. The research programme I will develop is a new research line and will mainly focus on the impact of antibiotic pollution on soil microbial community structure and functioning. I will develop the study of emergent pollutants regarding their fate in the environment, removal techniques or impact on the soil microbial community. I will focus on non-ionophore antibiotics used as anticoccidial. The latter can be used as feed additives for treating animal coccidiosis, meanwhile other antibiotic are not allowed to be administrated in this way by recent EU regulation (2019/6), with the inherent risk of environmental pollution, and the number of studies worldwide about this topic being limited. My work will be focused on Galicia (NW Spain), where the high animal production, as well as the high incidence of coccidiosis together with the application of manure/slurry in cultivated soils, can facilitate the entry of these drugs into the soil. Harmful effects may appear on soil organisms, as well as promotion of bacterial resistance, contamination of surface and groundwater, and passage of these antibiotics to the food chain after being absorbed by crops, thus with associated risks of reaching humans by their consumption.

The main research line I am proposing, anticoccidial impact on the soil microbial community, is complementary to my previous research experience and skills, while also representing a critical next step in my research area.

Resumen del Currículum Vitae:

I am a soil scientist focused on soil microbial ecology working with the study of how different impacts or management influence the soil microbial community. I obtained a Bachelor's degree in Biology in 2009 and master's in Environment and Natural Resources in the University of Santiago de Compostela (USC) in 2010. I obtained a competitive grant for the realization of the PhD (FPU) at CSIC, achieving a PhD in Soil Science (Cum Laude with International mention) in 2016. During my PhD I realized a short stay of 3 months (2014), in Lund University (Sweden).

In my first Postdoctoral stage I worked in Sweden for 4 years (2017-2021) in the Swedish University of Agricultural Sciences (SLU). During this stage I published 8 articles and a book chapter and participate in 2 research projects. Towards the end of this stay I was appointed as Scientific Manager of SITES Lönnstorp Research Station (08/2020 - 01/2021) in SLU, being the responsible of the development and operation of the research activities.

In 2021 I obtained a "Juan de la Cierva incorporación" grant (2021-2024), being the final report graded as Excellent, and integrated in the USC research group UXAFORES. Within this group I incorporated to the soil section, in the emergent pollutants line, contributing with my knowledge on soil microbial ecology. I have developed a soil microbiology lab, which I am responsible for and that supposes an important contribution to the research line. I am the principal investigator of the work package "Antibiotic toxicity in soil microbes" within one project from Knowledge Generation of the National Plan (call 2021). Within a Next Generation EU project, titled "Barbanza Ecosocial Laboratory", I am currently the PI of the WP related with soil microbes and C sequestration, and I participated in other 5 European projects. Additionally, I am the PI of 2 projects with industries, ENCE and Faba Asturiana. Since the integration in this group, I have published 19 articles in journals JCR and 6 book chapters. I have been involved in the supervision of several bachelor, master and PhD students and I have one defended thesis (November 2024).

In summary, I have published 42 articles, 40 of them were JCR of which 28 of were in Q1 and 6 in Q2. I am the first author of 8 of those articles and the second one in 16 of them. I have published with authors from different universities and research centres in Spain, Sweden, China, France, Germany, Switzerland, Portugal, Italy, Tunisia and Mozambique. I have received 794 citations with an h-index of 16 (Scopus). Additionally, I am the co-author of 9 book chapters, and I have 90 contributions to conferences (60 international and 30 nationals). I have participated on 6 national and 8 international projects leading work packages in 7 of them. Regarding editorial tasks, I have been invited as Editor for a Special Issue in the journal Environmental Research in 2023 (Q1) and act as a reviewer for different journals. I organized a session at the SETAC conference in May 2023 and I will organize two in EGU 2025 conference. I have been as well involved in different activities for divulgation and transference. Finally, I am a member of the highly relevant group "factory farming" within the Expert Group for Technical Advice on Organic Production (EGTOP) of the European Commission, Directorate-General for Agriculture and Rural Development.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: VALLDECABRES INCHAUSTEGUI, AINHOA
Referencia: RYC2024-048973-I
Correo Electrónico: ainhoa.valldecabres@uchceu.es
Título: Applied research for bovine production and health

Resumen de la Memoria:

My research career as a veterinarian with focus on bovine health demonstrates a high level of achievement. Emphasizing on applicability and transferability of the research, I seek to use research to answer specific questions that meet the current needs of bovines and bovine production stakeholders (i.e. farmers, veterinarians). On my research, I directly involve the end-users by conducting most of the research in commercial farms (the "real" environment) and ensuring the adequacy of the research question and approach by conducting surveys and interviews with the stakeholders. I have addressed research questions in key areas of bovine health and production such as the transition period (highest incidence of disease in cows), the preweaning period (highest incidence of disease in calves) and colostrum composition, in a combination of controlled clinical trials, epidemiological, observational, systematic review and meta-analysis studies.

My research career spans about ten years and has been developed mainly in three research organizations based in two countries: the University of California-Davis (USA; postgraduate, predoctoral and postdoctoral stage; 6 years), DairyExperts Inc. (USA; scientific and biostatistics consultant service, independent researcher stage; 4 years) and Teagasc (Ireland; research officer, independent researcher stage; 3 years). Recently (September 2024) I have joined the Universidad Cardenal Herrera-CEU in Spain to continue developing as an independent researcher in my home country leading my own research group and opening a new research line focused on bovine health.

The overall objective of the line of research to be developed as a Ramón y Cajal Researcher in Spain is to provide science-based and data-driven solutions directly transferable to the bovine production context to optimize bovine health and ultimately, contribute to its environmental, social and economic sustainability. As a group leader, in order to maximize the impact of the developed research and utilized resources, I aim to adapt to the evolving research needs of bovine production. I will implement on my research designs my knowledge on bovine production and health, as well as the understanding of the societal concerns which play a key role on the sustainability of bovine production. The on-farm application and transferability to the end-users (i.e. farmers, veterinarians, animal health professionals) will be key components of the developed research as it is a mandatory step to achieve research impact in the presented context.

Given the current global societal concerns in relation to livestock and bovine production, I identify three objectives to address with my research line:

- 1- Reduction of antimicrobial use in bovine production
- 2- Mitigation of heat stress impact in bovine production
- 3- Welfare enhancement during transport of live bovines

At this point, I have specific projects in these topics which will be pursued with a combination of internal and external funding, in collaboration with national and international academic and research institutions.

Resumen del Currículum Vitae:

My research career spans about ten years. I earned my bachelor's degree on Veterinary Medicine in Universidad Cardenal Herrera-CEU (Spain, 2014) and my PhD in the University of California-Davis (USA, 2020). Subsequently, I worked four years part-time as a scientist and biostatistics consultant for a Contract Research Organization (DairyExperts Inc., USA), I established my research group and a research line as a Research Officer in Teagasc (The Agriculture and Food Development Authority of Ireland), and I have recently done the same in a new location, Universidad Cardenal Herrera-CEU (Spain; current position).

From the postdoctoral (University of California-Davis, USA) to the independent researcher stage (Teagasc and Universidad Cardenal Herrera-CEU, Ireland and Spain) I have been Principal Investigator of 2 externally and 3 internally funded research projects (1,083,146 €), Co-Principal Investigator of one externally funded and one internally funded research project (40,000 \$), and Researcher in 4 research projects and 2 contracts. As a result of these years of research experience and a Project Management Certificate (Beacon Training Services Inc.; Ireland 2023), I have developed skills on funding acquisition, project and study design and coordination, and data analysis, summarization and interpretation of large datasets. I am author of a total of 26 open access peer-reviewed publications, including 13 first author publications and 6 corresponding author publications, 73% published in Q1 journals (Agriculture, Dairy and Animal Science and Veterinary Sciences). In addition to communicating my research to the scientific community through scientific publications and conference presentations (total of 31 work presentations, 14 oral presentations, 14 conferences), I have authored 5 divulgation articles and been invited speaker for conferences (Total Dairy Conference, UK), group meetings (Corporación Alimentaria Guissona S.A. bovine producers annual meeting, Spain; Epidemiology Forum hosted by The Department of Agriculture Food and the Marine, Ireland) and webinars (DairyGlobal, Netherlands). I also collaborate in national dissemination activities "Calendario Científico Escolar y Guía Didáctica" funded by Fundación Española para la Ciencia y la Tecnología (FECYT) since 2021 (5 editions).

I am PhD thesis supervisor for L. Horan (PhD student at University College Dublin, Ireland) who has published two scientific papers of which I am corresponding author in Q1 open access peer-review journals, I have been Master thesis supervisor for J. Masson (master student at Institut Agro Rennes-Angers, Institut national d'enseignement supérieur pour l'agriculture, l'alimentation et l'environnement, France; 2023), and I am currently mentoring a TFG student (L. Nowak; Universidad Cardenal Herrera-CEU, Spain). Further, I have teaching experience built on the University of California-Davis College of Biological Sciences (USA, 1,980 hours) and the University College Cork School of Biological, Earth and Environmental Sciences (Ireland, 25.5 hours). Last, consequence of the internationalization of my career, I have an extensive multidisciplinary and international network, exemplified on my participation on the multidisciplinary "CONNECTING DAIRY BEEF" (CODABE) European collaborative network which includes 75 professionals from 23 different countries.



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Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: GARCIA HERNANDEZ-GIL, CARLOS
Referencia: RYC2024-050755-I
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Título: Untargeted metabolomics in plant-based foods and their associated biological matrices: applications in precision nutrition and human health.

Resumen de la Memoria:

Non-communicable diseases (NCDs), including metabolic disorders, represent a significant global challenge. Addressing these conditions is a priority under the European Union's Horizon Europe framework, particularly in the context of 2023 objectives aimed at eradicating NCDs and improving public health. This vision aligns with the European Green Deal, emphasizing sustainable health solutions. Research in nutrition and health is central to achieving these goals, focusing on innovative strategies to prevent and treat metabolic syndrome (MetS), which has reached pandemic levels. Plant-derived bioactive compounds, such as polyphenols, are particularly relevant due to their potential to modulate metabolic pathways sustainably. These metabolites, which I have studied extensively during my thesis and throughout my scientific career, offer promising avenues for improving health outcomes. MetS is characterized by disturbances in cholesterol, lipid, and glucose metabolism, closely linked to the bile acid (BA) pool. Primary BAs synthesized in the liver are transformed by gut microbes into secondary metabolites, influencing health. Bacterial bile salt hydrolase (BSH) activity hydrolyzes conjugated BAs, catalyzing the production of microbially conjugated BAs (MCBAs) and esterified BAs, which significantly affect intestinal receptors, metabolic homeostasis, and MetS progression. Modulating the BSH-derived metabolome offers a promising therapeutic target for restoring metabolic balance. Over the past years, my research has focused on dietary bioactive compounds, gut microbiota, and BA metabolism, targeting the modulation of BSH-derived metabolites. Since 2022, I have explored novel MCBAs and their relationships with metabolic disorders using untargeted metabolomics, identifying key molecules involved in MetS. This approach supports the development of my independent research line, building on my department's extensive polyphenol research under Prof. Tomás-Barberán. Using this foundation, I aim to modulate gut microbiota and optimize bile acids to improve MetS-related factors, emphasizing plant bioactives as sustainable therapeutic agents. This work secured a competitive project, where I serve as Principal Investigator, titled "Modulation of Microbial Bile Acid Metabolism Through Plant-Derived Bioactive Compounds: Precision Nutrition to Improve Cholesterol Levels." Building on this, I plan to pursue the following objectives:

1. Understanding the BSH-derived metabolome in health and MetS: Using untargeted metabolomics to characterize the BSH-derived metabolome in healthy and MetS populations, identifying biomarkers for diagnosis and therapeutic interventions.
2. Elucidating the role of novel MCBAs in metabolic health: Investigating how MetS and food component modulation of the gut microbiota influence the synthesis and function of novel MCBAs, contributing to personalized nutrition strategies.
3. Developing plant bioactive-based interventions: Identifying bioactives capable of shifting the BSH-derived metabolome towards a healthier profile through in vitro and human studies.

Securing a Ramón y Cajal contract will enable me to expand my research, focusing on MCBAs beyond cholesterol to include glucose metabolism and inflammation.

Resumen del Currículum Vitae:

I am a food researcher specializing in untargeted metabolomics and its applications in phytochemicals, nutrition, and health. My work focuses on modulating gut microbiota and bile acid metabolism by phytochemicals to address metabolic syndrome (MetS). This aligns with global health priorities by tackling non-communicable diseases through innovative nutrition strategies. I hold a Bachelor's in Food Science and Technology and a Master's in Molecular Biology and Biotechnology from the University of Murcia. My scientific career began with a FPI fellowship from the Spanish Government to pursue my PhD at CEBAS-CSIC (Spain). My doctoral research applied untargeted metabolomics to plant-based foods and phenolic metabolism. I defended my PhD with cum laude and received the Extraordinary Doctorate Award from the University of Murcia. After completing my PhD, I began my postdoctoral career with a four-month stay at the National Research Council (CNR) in Pisa, Italy, advising on adapting untargeted metabolomics tools in the agri-food sector. Subsequently, I joined the University of Chemistry and Technology (UCT, Prague) as a postdoctoral fellow, leading a project integrating metabolomics and lipidomics into clinical nutrition research. During this period, I finalized work on microbially conjugated bile acids (MCBAs), forming the basis of my independent research line. I have 27 months of international experience, including pre- and postdoctoral positions. My collaborations include IMIB, University of Alicante, UCAM, IATA-CSIC, Shanghai Jiao Tong University, and University of Aveiro. I also worked with companies such as Hero, AMC, and Ideagro, bridging academic and industrial research. Currently, I am a postdoctoral researcher at CEBAS-CSIC, participating in eight national and international projects, leading the metabolomics division, and supervising two PhD students. My independent research line, supported by competitive funding, focuses on gut microbiota and bile acid modulation through dietary bioactives to control cholesterol. As PI, I also lead one technological support and two technology transfer projects, totaling €126,120. My work translates fundamental metabolomics research into practical applications. My pioneering work on MCBAs exemplifies this potential. I have published my research in SCI journals, with over 70% in Q1-ranked journals, accumulating hundreds of citations. I have been first author in four articles with only three authors, reflecting my leadership. I have presented at national and international conferences and am supervising two PhD theses, one involving international collaboration. I contribute to the scientific community as a member of the expert panel for the PhytoHub database, leading data curation for phytochemicals. I review articles for high-impact journals and evaluate research proposals for funding agencies. Additionally, I coordinate events for the Young Researchers Group of the Spanish Society of Metabolomics. My engagement in science communication includes winning first prize in the IDIES program for a project on colonic fermentation of saffron apocarotenoids. In summary, my research utilizes advanced untargeted metabolomics to innovate in nutrition and health by addressing metabolic disorders and precision nutrition. My work highlights the discovery of MCBAs and their potential applications in tackling MetS.



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Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: VÁZQUEZ GONZÁLEZ, CARLA
Referencia: RYC2024-048810-I
Correo Electrónico: carvaz.g90@gmail.com
Título: Mechanisms and drivers of plant resistance to insect pests in agroforestry systems

Resumen de la Memoria:

I study the mechanisms and factors driving plant resistance to insect pests in agroforestry systems. My academic path began with a Biology degree (University of Santiago de Compostela, 2013) and a master's thesis in Ecology (University of Barcelona, 2015). I further developed my expertise during a six-month research internship at Siberian Federal University, Russia (2015–2016), where I investigated how climate affects tree growth and forest dynamics.

In 2017, I was awarded an FPI fellowship from the Spanish Ministry of Science to pursue a Ph.D. at the Misión Biológica de Galicia – CSIC (MBG-CSIC) under the supervision of Dr. Rafael Zas and Dr. Luis Sampedro. My dissertation focused on the genetic basis of tree resistance, specifically how genetic adaptation and environmental plasticity influence resistance traits in maritime pine (*Pinus pinaster*). Using quantitative genetics, dendrochronology, and forest ecology, I identified resin ducts as essential defensive traits against pests. My research demonstrated that resin ducts are genetically determined, providing practical insights for selecting pest-resistant populations and adaptive forest management. I completed my Ph.D. in 2 years and 9 months and continued this work thanks to a first postdoctoral grant linked to my FPI at MBG-CSIC (2020–2021). During this time, I further explored the genetic and phenotypic variation in resin production and its implications for forest management, including resin tapping activities.

During my Ph.D., I studied plant-insect pest interactions in isolation but realized that plant resistance is shaped by complex community interactions with other plants and animals. This led me to adopt an interdisciplinary approach, integrating ecological knowledge to better understand plant resistance in agroforestry systems. In 2021, I was awarded a three-year Xunta de Galicia/GAIN postdoctoral fellowship and joined Dr. Xoaquín Moreira's lab at MBG-CSIC. This fellowship included a Fulbright-funded two-year research stay at the University of California, Irvine (UCI). At UCI, I worked with Dr. Kailen A. Mooney, a leading expert in multitrophic interactions, to expand my research into the community context of resistance. During this second postdoc, my research focused on three main areas: (1) studying how chemical communication between plants through volatile organic compounds (VOCs) enhances pest resistance, identifying VOC-mediated priming as a sustainable alternative to pesticides in potato crops; (2) analyzing how tree species diversity promotes natural pest control; and (3) investigating the role of natural enemies, such as birds and arthropods, in regulating pest populations. These projects resulted in high-impact publications and collaborations with international networks like TreeDivNet.

Since July 2024, I have been leading my own research line at MBG-CSIC, supported by GAIN/Xunta de Galicia. In my current research line, I aim to expand the spatial scale of my work to investigate how biotic and abiotic factors shape the effectiveness of natural enemies in pest control across large geographical gradients. This research aims to enhance forest management strategies, improve pest control, and strengthen ecosystem resilience in the face of global change.

Resumen del Currículum Vitae:

During my career, I have published 35 articles (12 as first author, 11 as corresponding author) in high-impact journals in the areas of Forestry, Plant Sciences, and Ecology. My record includes 14 articles in Q1 journals and seven in D1 journals, reaching over 307 citations since 2020 (WoS; 429 in Google Scholars), meaning ca. 61 citations per year, with an h-index of 10 (WoS; 11 in Google Scholars). I have also authored two non-indexed outreach publications, contributed to two book chapters published by Springer (one as first author), and I am currently editing a book about plant diversity effects on herbivory for Springer.

I have built an extensive collaborative network nationally and internationally, including partnerships with Dr. Bastien Castagneyrol (INRA Bordeaux), Dr. Sergio Rasmann (University of Neuchâtel), Dr. Xoaquín Moreira (MBG-CSIC), Dr. Kailen Mooney (University of California, Irvine), and Dr. Luis Abdala-Roberts (Universidad Autónoma de Yucatán). These collaborations span projects funded by regional and national funding agencies such as the Xunta de Galicia/GAIN, and the Spanish agency of research (AEI), and international research networks like TreeDivNet, the world's largest tree diversity experiment network.

I have secured competitive grants, including a European Commission ERANET fellowship, an FPI predoctoral contract, a Fulbright/GAIN postdoctoral contract, and funding for independent research, including a project from Xunta de Galicia/GAIN (€30,000) and one from the Spanish Association of Terrestrial Ecology (€2,500). I also secured a technological contract between MBG-CSIC and UCI (€10,000), totaling €42,500 in funding.

In terms of mentorship, I have supervised one bachelor's and one master's research project and I am currently co-supervising a Ph.D. thesis. Additionally, I have served as a jury member for Ph.D. and master's defenses. I contribute to the academic community as a subject editor in Arthropod-Plant Interactions and as a reviewer for ca. 25 manuscripts, as well as project proposals for the Spanish Association of Terrestrial Ecology.

At MBG-CSIC, I co-founded and serve on the Gender Equality and Diversity Committee. I recently obtained the prestigious Dean's Early Career Research Excellence Award from the University of California, Irvine.



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Turno General

Área Temática: Ciencias agrarias y agroalimentarias

Nombre: PAREJO FEUZ, MELANIE

Referencia: RYC2024-048200-I

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Título: Applied Genomics in Apiculture

Resumen de la Memoria:

My research focuses on addressing pressing challenges in apiculture through applied genomics, with the overarching goal of promoting sustainable beekeeping and enhancing honeybee resilience. By integrating cutting-edge genomic and phenotypic approaches, my work aims to tackle the most critical issues facing honeybee populations, including Varroa destructor resistance, loss of genetic diversity, and the impacts of environmental stressors.

During my doctoral studies, I developed innovative molecular tools to support honeybee conservation and breeding. These included a subspecies diagnostic SNP chip and a hybridization assay, which have been applied across Europe to monitor and manage native honeybee populations. These tools now underpin breeding programs in countries like Spain and Switzerland and are also exploited commercially by Eurofins Genomics, Denmark. Building on this foundation, I founded "mp-genetics," a spin-off providing genetic testing services to breeders and conservation practitioners, directly impacting breeding practices by processing over 550 queen bees annually.

At UPV/EHU, I have expanded the honeybee research line to focus on two main pillars. The first pillar centers on the development of genomic and phenotypic tools for breeding resilient honeybees. This includes identifying genetic markers associated with Varroa resistance, investigating social immunity traits, and integrating these insights into breeding programs. My work in this area has been supported by key projects I helped secure, including ECOAPI (national) and BeeGuards (Horizon Europe). These projects foster practical solutions such as resilience breeding, sustainable hive management, and the reduction of chemical treatments, directly contributing to the ecological transition in apiculture.

The second pillar of my research focuses on developing a holistic understanding of colony resilience by integrating genomic, microbiome, and environmental data. Through a hologenomic framework, I aim to identify core genes, microbial communities, and environmental factors critical to honeybee health. This innovative approach builds on methods I acquired during the European HOLOFOOD project and is now central to the BeeGuards project, where I lead key genomic tasks and collaborate with international partners to refine multi-omic methodologies.

My research is deeply collaborative, bridging the gap between science and practice. I work closely with breeding associations (e.g., ERBEL, PANEGA, Dotze Reines), NGOs, and policymakers to ensure my findings translate into actionable solutions. Citizen science initiatives, such as the COLOSS colony loss survey, further highlight my commitment to stakeholder engagement and knowledge dissemination. My future research aims to expand these efforts, exploring genomic tools for quality control of hive products and addressing honey fraud, a significant challenge for Europe's largest apicultural sector.

In summary, my research combines innovation and application, advancing genomic tools to address the complex challenges of honeybee health and resilience while supporting sustainable and productive apiculture.

Resumen del Currículum Vitae:

I hold a Master's degree in Ecology and Evolution from ETH Zurich and a PhD in Biochemistry and Molecular Biology from the University of Bern, where I specialized in honeybee genomics. My academic journey has focused on applying genomics to solve practical challenges in apiculture, with the overarching goal of advancing sustainable agriculture.

Findings of my research have led to (i) new and adapted conservation and breeding management practices (e.g. implementation of routine genetic testing in the mating stations; guidance of crossing queen bees to avoid inbreeding between genetic lines; shifting of protection zones); (ii) the development of genetic monitoring tools such as a high-throughput hybridization test for bee breeding based on single-nucleotide polymorphisms (SNPs); a subspecies diagnostic SNP chip to classify European subspecies (applied in European and national research projects B-Good, BeeConSel, VitalBiene, Rescue.Bee, Erbelgen and by breeding associations in Spain and Switzerland, exploited by Eurofins Genomics, Denmark (10 projects with >8000 genotyped bees)); a SNP-based paternity assignment test to be employed in the evaluation of breeding mating stations' efficiency (applied in 1 mating station in Spain and 3 mating stations Switzerland). Building on my PhD research, I founded mp-genetics, a spin-off offering genetic testing services to breeders and conservation practitioners, processing approximately 550 queen bees annually.

Currently, I am a key member of the Applied Genomics and Bioinformatics group at UPV/EHU, where I expanded the honeybee research line to incorporate cutting-edge genomic and phenotypic approaches. I participated in European research projects (SMARTBEES, HOLOFOOD) where I performed bioinformatic analyses of large-scale genomic datasets. I have secured competitive funding for key projects, including ECOAPI (national) and BeeGuards (HORIZON Europe), where I serve as a work package co-leader. These initiatives focus on resilience breeding, sustainable beekeeping, and transitioning the group's research into hologenomics, an innovative framework integrating host and microbiota genomics. My work has been recognized through awards such as the RICOLA Award of Excellence (2022) and has generated impactful publications, with 23 peer-reviewed articles (11 as corresponding author).

Beyond research, I have demonstrated scientific leadership as Assistant Editor of the Journal of Apicultural Research, co-organizing the 1st Applied Hologenomics Conference and a COLOSS Training School on honeybee resilience, and contributing to international networks such as the COLOSS and RNSBB. I am deeply committed to outreach and capacity building, producing 11 popular articles and giving over 16 presentations to stakeholders, including policymakers, breeders, and conservationists. Citizen science initiatives, such as the COLOSS colony loss survey, exemplify my dedication to



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engaging the beekeeping community. As a scientific advisor, I guide regional breeding programs (e.g., PANEGA in Galicia and Dotze Reines in the Balearic Islands) to promote conservation and improve the resilience of Iberian honeybees. My leadership extends to supervising students and fostering interdisciplinary collaborations, with a strong emphasis on translating research outcomes into practical applications for the apicultural sector.



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Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: FERREIRA SANTOS, PEDRO MIGUEL
Referencia: RYC2024-049166-I
Correo Electrónico: pedromiguel.ferreira@uvigo.es
Título: Sustainable valorization of underexploited agri-food/forestry by-products and algae for a spectrum of products with high commercial value: focus on healthier foods and feed, and biofuels

Resumen de la Memoria:

Pedro Ferreira Santos is a researcher with expertise in the valorization of underexploited by-products (from agri-food industries and forestry) and algae, sustainable development, and bioeconomy. Holding a PhD in Food Science and Technology and Nutrition (2021), his career has been marked by international mobility, including collaborations in Portugal, Spain, Italy, Brazil, France, and Morocco. He has contributed significantly to advancing green technologies for the extraction of bioactive compounds and the development of functional foods, therapeutics, biomaterials, etc. Pedro has published 58 JCR-indexed articles, with 92% appearing in top-tier journals, and boasts an h-index of 22, reflecting over 1150 citations. His work has resulted in the participation in numerous collaborative projects, including two as Principal Investigator, with a combined budget exceeding €9 million. He has been actively involved in the NEWPOWER project, a multidisciplinary initiative targeting the integral valorization of agroforestry by-products, and has held leadership roles in projects like NET4FOOD, AgriFood XXI and REDVALUE, which focus on sustainable bioprocessing and development of valuable products.

Throughout his career, Pedro has demonstrated exceptional leadership and collaborative abilities. He has built a diverse network of 145 co-authors and contributed to interdisciplinary research spanning food science, pharmacology, and environmental technology. His editorial roles include Associate Editor of Frontiers in Sustainable Food Systems and guest editor positions in high-impact journals. He has also reviewed over 35 articles for 15 journals.

As an educator, Pedro has delivered more than 150 hours of teaching and supervised numerous undergraduate and graduate students, including eight final-year project (TFG/TFM) students and four PhD candidates. He has been involved in teaching innovation projects, resulting in the development of educational materials and workshops funded by ERASMUS+. His efforts in dissemination include organizing scientific events, such as workshops, international congresses, and community outreach programs like Pint of Science, Noite Europeia dos Investigadores, visiting high-schools, etc.

Key achievements in his career include groundbreaking research on the application of intensified green processes for bioactive molecule extraction, contributions to open science, and collaboration with industries in technology transfer initiatives. His research has enabled the development of eco-friendly and innovative food and pharmaceutical applications, promoting sustainability and circular bioeconomy.

Looking ahead, Pedro aims to lead research on the sustainable transformation of Mediterranean agri-food by-products and algae into value-added biomolecules, with applications in food, agriculture, and bioenergy sectors. His vision aligns with the EU Sustainable Development Goals and the Green Deal, emphasizing innovation, collaboration, and societal impact. His work promises significant contributions to science, industry, and the sustainability of the world.

Resumen del Currículum Vitae:

Pedro Ferreira Santos is graduated in Biotechnological Engineering (2011), MSc in Pharmacy and Chemistry of Natural Products (2013), and PhD in Food Science and Technology and Nutrition (2021) awarded by the Universities of Minho, Aveiro and Católica Portuguesa, Portugal. The main focus of my thesis was related to the green processing for bioresources valorization like plant by-products and microalgae/cyanobacteria at Centre of Biological Engineering (CEB)-U.Minho, with CCDR-N funding. During my PhD, he obtained a prestigious Marie Skłodowska-Curie fellowship for a research stay at the company EVRA SRL and Università Cattolica del Sacro Cuore (both from Italy). Through the pre-doctoral period, he published 15 articles, 2 book chapters, and 23 conference communications. During this time, I participated in 5 competitive research projects (3 of them granted by the EU).

Related to the postdoctoral experience (2021-2025), Pedro is a distinguished postdoctoral researcher at the Campus Auga U.Vigo, Spain, specializing in the valorization of agri-food/forestry by-products and algae, sustainable development, and circular bioeconomy. Previously, Pedro spent 21 months at Chemical Engineering Department at U.Vigo under Juan de la Cierva contract, 20 months in CEB-U.Minho (Portugal), 1 month in U. Pau et des Pays de L'Adour (France), 4 months in International Iberian Nanotechnology Laboratory (Portugal), and small stays at U.Federal Rural de Pernambuco (Brazil) and U.Piemonte Orientale (Italy). In this postdoctoral period, I participated in 8 competitive projects, 2 as PI (1 Interreg-Sudoe NEWPOWER with total budget >1.3 million € and 1 regional), published more than 45 articles and 3 book chapters, and participated in more than 25 conferences.

In total, Pedro published 58 papers (2 as last author, 14 corresponding author, and 16 as first author), 57% through international collaborations with 145 co-authors. He has delivered over 150 hours of teaching in chemistry, waste management, engineering, among other topics, and in specialized seminars and workshops. He supervised/supervise 8 TFG/TFM students, 4 PhD students, 5 PhD/Post-Doc internships, and 2 senior researchers from Spain, Portugal, Morocco, Brazil and Italy.

Throughout my scientific career, he developed work related to: i) Extraction and purification of bio-based molecules obtained from bioresources (plants/agri-food by-products/algae) using intensified green extraction techniques. ii) Chemical, functional and structural characterization of bio(functional) molecules. iii) In vitro, in silico and in vivo bioaccessibility, mechanisms of action and bioactive potential of biomolecules. iv) Assessment of nutritional, technological and environmental aspects related to the development of new functional foods and nutraceuticals.

Pedro's research excellence is complemented by editorial roles in journals like Frontiers in Sustainable Food Systems and guest editor positions in Molecules and International Journal of Molecular Sciences. He is a reviewer for over 15 journals and has organized and moderated sessions at international conferences, including WASTES2025 and Biothérapie 2D.

Pedro has the ability to interact with different national and international companies in order to enable technology transfer to industry and with general society in several dissemination activities.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: SOUZA ALONSO, PABLO
Referencia: RYC2024-048560-I
Correo Electrónico: pablo.souza@usc.es
Título: Innovative Strategies in Soil Quality, Ecosystem Restoration, and Education for Sustainable Environmental Solutions

Resumen de la Memoria:

Since 2010, my research career has been dedicated to analyzing and restoring degraded ecosystems, driven by a deep commitment to addressing globally relevant environmental challenges. During my PhD, I investigated the impacts of biotic factors, such as invasive species, on ecosystems, complemented by international research stays that enriched my expertise in assessing environmental impacts. Early in my postdoctoral career, I secured competitive funding to lead an international project (TECO call, 2017) on urban soil remediation in highly degraded areas of Lucknow, India. I later contributed to the LEGSEEDCOAT project (CEF, Portugal), which focused on enhancing the resilience of agronomically important species under environmental stress. Building on these experiences, I was awarded two regional postdoctoral competitive contracts (Xunta de Galicia, 2019, 2023) for international collaborations with leading researchers in Chilean institutions (UdC and UCSC). These stays allowed me to advance critical aspects of my research, including the impacts of invasive species and forest fires on soil and ecosystem health. This coherent trajectory has consolidated my expertise in studying environmental factors affecting ecosystems, mainly referred to the ecological impacts of wildfires, agricultural intensification, or biological invasions.

To date, I have published 34 JCR-indexed articles in high-impact journals, reflecting consistent leadership and an expanding network of international collaborations. My contributions have been recognized with I3 certification (2021) and positive ANECA evaluations for various academic roles. Employing advanced methodologies such as NMR spectrometry, calorimetry, and thermogravimetry, my work has generated innovative insights into soil quality, degradation, and recovery. Key achievements include: (i) pioneering studies on soil phosphorus dynamics in wildfire-affected areas, (ii) identifying novel impacts and invasive mechanisms of high-impact invasive species in the Mediterranean region, challenging established paradigms, (iii) uncovering critical factors defining fire regimes in ecoregions of critical importance like the Gran Chaco and Pantanal, and (iv) integrating innovative methodologies, such as service-learning (S-L), with significant international resonance.

Beyond academia, I actively contribute to knowledge transfer through collaborations with companies and society, with an increasing trend of applied projects, transference and capacity-building initiatives. Training activities also include PhD supervision and leading educational innovation projects. Besides my postdoctoral project (Xunta de Galicia), I currently lead an interdisciplinary project (USC, Campus Terra), expanding S-L to enhance education transfer and enabling the recruitment of early career researchers. My holistic approach, integrating research, teaching, and dissemination, reflects my commitment to tackling environmental challenges from multiple dimensions. At a crucial moment of maximum productivity and impact in my career, I aim to further advance ecosystem resilience research, focusing the intersection of soil science, plant communities, and environmental restoration. Through sustained international collaborations and knowledge transfer, I aspire to deliver actionable solutions to the pressing environmental challenges of our time.

Resumen del Currículum Vitae:

I am currently a postdoctoral researcher at the UXAFORES unit, an internationally leading group in agroforestry. I hold a Bachelor's degree in Biology from the Universidade de Vigo (UVigo), where my research career began with multiple competitive grants, including research collaboration awards, master's scholarships, and a doctoral scholarship. My PhD focused on the impact of invasive species on vulnerable ecosystems, funded through a 4-year UVigo contract. This training was enriched by research stays at the universities of Coimbra (Portugal) and Cádiz (Spain). During my postdoctoral stage, I secured European funding for the TECO project, participated in the international LEGSEEDCOAT project (CEF, Portugal), and was awarded a prestigious Xunta de Galicia postdoctoral contract to join the UXAFORES unit (USC). This included 30 months of international research stays at two prominent Chilean institutions (UCSC, UdC). I maintain active collaborations with UCSC as a research associate and was offered a permanent position there, which I declined to pursue my research career in Spain for both professional and personal reasons.

Over my career, I have contributed to 15 research projects, leading efforts to tackle critical challenges in environmental conservation and soil health in valuable ecosystems. My research has resulted in 39 peer-reviewed publications (34 in high-impact journals, five book chapters), along with numerous presentations at conferences, workshops, and symposia. I have consistently secured competitive external funding, from my PhD to postdoctoral projects. Since joining the UXAFORES unit in 2019, I have obtained over €100,000 in direct funding through research projects and knowledge-transfer contracts. Additionally, I have contributed to the acquisition of over €1.25 million in funding for my group through national projects (AGRORES & AGROMANURE) and the accreditation of UXAFORES as an excellent research unit (Xunta de Galicia). My independence and scientific leadership are evident, with >75% of my publications authored without my PhD supervisor and >75% as first, last, or corresponding author. My work has received more than 1,100 citations (Google Scholar), achieving an h-index of 17 and i10-index of 22. Half of my publications rank among the top 25% most cited worldwide (Scopus). My research excellence has been recognized with I3 certification and positive ANECA evaluations for various academic roles.

In the past five years, I have co-directed two PhD theses (one ongoing), supervised doctoral candidates within the DIAMD program and served as an external evaluator for FONDECYT (2018, 2022, 2025). I am an Editor for the European Journal of Forest Research and a reviewer for leading journals. Additionally, I have been actively involved in organizing international conferences (2014, 2023), online events (Yircis 2021-2024), and responsible for international summer courses (2023) and student/researcher mobility programs (2022-2023). Education and knowledge transfer are fundamental pillars of my career. With >200 hours of teaching experience at multiple universities (UVigo, USC, UCSC), I have also led impactful educational projects (FECYT, Erasmus+), introducing innovative methodologies such as service-learning (S-L) for environmental conservation, achieving widespread recognition and impact.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: MELLADO ORTEGA, ELENA
Referencia: RYC2024-050665-I
Correo Electrónico: melladoortegae@gmail.com
Título: Dynamic control of the metabolism in plants: from model to application
Resumen de la Memoria:

I am interested in studying the regulation of the plant metabolism in developing and abiotic stress, and translation into species of agri-food interest to increase crop resilience and yield.

During my thesis (IG-CSIC) I was focused on understanding the mechanisms of carotenoid esterification in cereals. The natural process by which xanthophylls, hydroxylated carotenoids, are esterified with fatty acids is an important part of post-carotenogenic metabolism that mediates their accumulation and stability in plants. I produced valuable results showing that cereal breeding programs, focused on carotenoid biofortification, should be directed to the selection of varieties with a higher esterification and retention capacity of the carotenoid content.

After my PhD, I moved to IRNASA-CSIC where I applied my knowledge on antioxidants and redox biology to the selection of the fungal probiotics for using on performance improvement of a new hybrid cereal, Tritordeum.

Later, thanks to my 1^o MSCA-IF, I was working on potato breeding in JHI (UK) implementing the POTENT project. POTENT was focused on the study of allelic variation of the gene, stCEN, which is a negative regulator of tuberization, for its use as marker in breeding programs to obtain potato more resilience to climate change. Thus, I was involved in the characterization of the promoters of the stCEN alleles, and the development of transgenic potato lines that express a pCEN:GFP reporter gene construct to conduct studies on expression of stCEN alleles and their response to abiotic stress. It enables to evaluate which alleles are more favourable and the generation of molecular markers specific that assistance in breeding programmes aimed at the selection of potato genotypes with improved tuber life-cycle characteristics.

In 2022, I was awarded with my 2^o MSCA-IF to lead SUMOCell project between two institutions CRAG and Duke University. SUMOCell aims to uncover the signals that trigger SAE2 cytosolic localization, and the cellular responses activated by cytosolic SUMOylation. In my stay in Strader lab, I was responsible for the development of a new methodology based on live cell imaging. This methodology has made it possible to carry out successfully high-throughput screenings, based on widefield fluorescence microscopy, aiming to identify bioactive compounds from large chemical libraries and/or perform physiological studies.

In the last years, I have conducted basic research focused on the regulation of the proteins at level cellular and subcellular, using biology cellular, microscopy techniques and NGS-transcriptomics approaches. This new context in my studies I would like to apply now to the improvement of crop yield under current climate change scenario, with the focus on the water use efficiency and resilience to drought stress. For that, I propose to a research line with the goal of obtaining new bioactive compounds with functionality relevant to agriculture such as antitranspirants. To this end, I consider the following specific objectives (I) Search for new compounds, capable of reducing plant transpiration, by using computational methods and machine learning. (II) Development of microscopic studies to as predictive models for the design of macroscopic studies. And (III) Study of the crop yield plants under real field conditions and assessment of the nutritional quality of their

Resumen del Currículum Vitae:

POSTDOCTORAL MOBILITY

- Duke University/ USA (19 months)
- CRAG/ Spain (3 months)
- JHI/ UK (30 months)
- IRNASA-CSIC/Spain (21 months)
- EEZ-CSIC/Spain (3 months)

AWARDS

- Microfunding Duke University \$15 000.

From EC:

- MSCA-2021-PF-01 Budget: € 330 428,87. Score: 95.80%. (15.13% success rate)
- MSCA-IF-EF-CAR-2018 -Budget: € 337 400,64. Score: 94.60%. (16.55% success rate)
- JAE-PREDOC CSIC Predoctoral Fellowship funded by ESF
- Short-term Predoctoral Fellowship for stays in foreign Institutions, JAE-predoc Program CSIC funded by ESF. Budget: € 5000

SCIENCE DISSEMINATION

- My work has produced 15 JCR papers so far (10 in Q1, 4 in Q2), 10 of which as first author and responsible for writing the manuscript (67%) and 2 as second author. Additionally, I have 3 book chapters, 2 as first author and I am also co-author of two interactive electronic publication. As a result, I have accumulated 358 citations and have a h-index of 11 (WoS, Clarivate, 2025).
- I have contributed to obtaining research outputs through my participation in 13 projects, of which two are European projects as PI. The latter allowed me to achieve a total funding close to € 700 000. I was awarded 2 prestigious Marie Curie individual fellowships, in 2019, MSCA-IF in UK-European, and more recently in 2022, MSCA-IF Global, establishing collaboration between Duke University and CRAG
- I have experience in industrial collaboration and consultancies for companies in the seed sector, as well as in presenting data at National and International meetings



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Turno General

- From 2023, I am collaborating in the organization committee of symposiums organized by Climate-Plant Innovation Center at Duke University
- Other metrics: Source Scopus: 15 documents, 393 citations, h-index 12; Google scholars: 24 documents, 484 citations.

TEACHING ACTIVITIES

- Guest lecture in genetics, Biology degree, Duke University

CITIZENS-SCIENCE COMMUNICATION

- Talk "What is Crop Science" to students at D&A College. Dundee, Scotland, UK.
- I took part in the organization and communication, to the general public, of the impact that POTENT and TRICE projects have for society in different fair events such as "POTATO IN PRACTICE" in the UK, and "SALAMAQ'15 in Spain.

EVALUATION AND REVIEW ACTIVITY

- 2024-2025: Work as scientific expert evaluating proposals MSCA-PF and evaluation teams coordinator for European Research Executive Agency (REA).
- Invited to participate at thesis committee, as international external evaluator, in University of Murcia, Spain. (Student: Alvaro Lopez Zaplana)
- Review Editor on Plant Abiotic Stress (Frontiers in Plant Science). -Reviewer: in African Journal of Biotechnology; Frontiers in Plant Sci; Journal of Innovative Food Science and Emerging Technologies; Journal of Plant Sciences and Crop Protection; Agronomy.

SCIENTIFIC NETWORKS

- Present. Member of: Climate-Plant Innovation Network from CPIC, Duke University; (AMIT); (MCAA); (RDA); (AISBL) - 2012-2015. Member of IBERCAROT (ref. 112RT0445), CYTED

OTHERS

- I hold 2 bachelor degrees, 1º in Biological Sciences and 2º in Biochemistry and 2 masters besides my PhD Sobresaliente Cum Laude
- I have mentored 2 PhD, 2 undergraduate students and 1 technician and I am mentor in MCAA
- Scottish qualifications certificate, level National 4 for English
- Certificate of MSCA award from EC
- Mentee in REBECA mentoring programme by Euraxess, EC



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: VÁZQUEZ VILAR, MARTA
Referencia: RYC2024-049775-I
Correo Electrónico: marvazvi@ibmcp.upv.es
Título: Innovative Breeding Tools for a new generation of Sustainable Crop Biofactories

Resumen de la Memoria:

My research career began in 2011 at the Instituto de Biología Molecular y Celular de Plantas (IBMCP, CSIC-UPV), where I pursued my Ph.D. with a JAE-Intro (CSIC) fellowship. During this time, I received an EMBO-Short-Term Fellowship to conduct a research stay in Prof. Cathie Martin's lab at the John Innes Centre (UK). After completing my Ph.D., I joined Dr. Christian Fleck's laboratory at Wageningen University and Research in the Department of Systems and Synthetic Biology. In 2018, I returned to IBMCP as a postdoctoral researcher in the H2020 Newcotiana project, later securing a competitive APOSTD/2020 Fellowship (GVA) to continue my work, including an international research stay at Prof. Paul Fraser's lab at Royal Holloway University of London. I firmly believe that New Genomic Techniques (NGTs) have the potential to drive transformative changes in agriculture by providing tools that enhance the speed, precision, and predictability of crop improvement. My research has focused on developing foundational tools for reliably engineering plants to produce high-value compounds and achieve targeted traits. Through my career, I developed standardize solutions for DNA assembly (GoldenBraid), CRISPR/Cas9 and CRISPR/Cas12a multiplexing construct assembly, vectors for virus-induced gene editing (VIGE), dCas-based programmable transcriptional activators and switches and anti-Cas proteins for regulating CRISPR activity. Using CRISPR multiplexing, I engineered novel tobacco varieties optimized for outdoor biofactory applications. These plants demonstrated enhanced traits suitable for molecular farming, such as increased biomass or high anatabine production. Focusing on another NGT, cisgenesis, I developed a cisgenic marker for tomato transformation and I used it to generate dually biofortified tomatoes with high flavonol, high BCAAs accumulation. In 2021, I co-founded a technology-based company to translate my research into high-value products manufactured in plants, contributing to a technology-driven bioeconomy in agriculture. Building on my expertise, now I plan to develop advanced genome engineering tools for biofactory crop improvement to directly address the growing need for sustainable protein sources and scalable molecular farming. My plan includes: 1) expanding the toolbox of NGTs for crops by incorporating prime editors, base editors, and new Cas variants tailored for agricultural applications, adapting PASTE (Programmable Addition via Site-specific Targeting Elements) for precise transgene integration in crops, 2) Breeding Advanced Biofactory Crops with traits such as increased leaf biomass and seed harvest index to enhance productivity and 3) Developing robust myoglobin biofactories with precise genome integration and copper-controlled expression for high-yield recombinant protein production. This research will provide transformative tools for accelerating crop improvement and establishing consistent plant biofactories. By enhancing predictability and performance in biofactory crops, it will contribute to sustainable food production, drive agricultural innovation, and support the global transition toward a bio-based economy.

Resumen del Currículum Vitae:

I am a postdoctoral researcher at IBMCP (CSIC-UPV) since 2018. My research focuses on Genome Engineering and Molecular Farming, with a particular emphasis on optimizing tobacco as a crop for the plant-based production of recombinant proteins and metabolites. I started my scientific career as a PhD student with a JAE-Predoc Fellowship (2011) in Dr Diego Orzaez's lab (IBMCP). One of the main outcomes of my thesis was a cloning webtool that is used daily in hundreds of plant labs worldwide. In 2013, I was awarded an EMBO Short Term Fellowship for conducting a 3-months research stay at Prof. Cathie Martin's lab (John Innes Centre, UK). I got my PhD from the UPV in 2016 with the special mention "Premio Extraordinario de Tesis Doctoral". Next, I moved to Wageningen University and Research (WUR, The Netherlands) as a postdoc in the Department of Systems and Synthetic Biology. In 2018, I joined back my former lab at IBMCP for working as a postdoc in the H2020 Newcotiana project. In this period, I applied CRISPR multiplexing to engineer tobacco as a chassis for molecular farming in the open field. I conducted the first two field trials of CRISPR plants in Spain designed to evaluate these plants. In 2020, I was awarded a competitive postdoctoral fellowship from the Generalitat Valenciana (APOSTD) to continue this work. I recently carried out a 1-year research stay at Prof. Paul Fraser's lab (Royal Holloway University of London, UK). During these years, I have participated in several national and international R&D projects in collaboration with renowned academic groups, companies and stakeholders. Some of these collaborations resulted in fruitful and long-term alliances. My extensive research activity resulted so far in the publication of 32 articles in peer-reviewed journals (22 of them in Q1), accumulating a total of 945 citations (source WOS). I have been the first author in 11 of them (three as first co-author), second or third author in nine and corresponding author in one. Since 2019 I am a member of the visual Synthetic Biology Open Language community. Moreover, I have participated in more than 30 national and international top scientific conferences, being once chair of a session and I have reviewed several papers for some top scientific journals. During my career, I have supervised 2 PhD, 5 BSc and 15 MSc theses and I am currently supervising three PhD students. I have also mentored four interdisciplinary teams of students participating in the synthetic biology iGEM competition with successful results (Wageningen_UR iGEM 2016 was First Runner-Up and Valencia_UPV iGEM 2018 was the Grand Prize Winner). Additionally, I have trained several national and international visitors in the lab. In addition to my research and supervision activities, I was a lecturer in a master course at WUR and I have given some sessions in a master at UPV. I have also participated in several communication activities, including interviews in local media, the organization of scientific lab activities, and presentations to the general public. To promote the transfer of my scientific results into commercial products while stimulating the biotech sector in Spain, in 2021 I co-promoted and co-founded Madeinplant S.L., a technology-based company (spin-off CSIC-UPV).



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: DIAZ GARCIA, MARIA
Referencia: RYC2024-051189-I
Correo Electrónico: maria_dga@hotmail.com
Título: Understanding microbial communities in food processing environments and their impact in food safety and quality

Resumen de la Memoria:

During my scientific career, I have made significant contributions to food microbiology and safety.

During my PhD, I developed a culture-independent method that identified *Limosilactobacillus parabuchneri* as the primary cause of histamine accumulation in cheese. My findings demonstrated its ability to thrive at refrigeration temperatures and form biofilms on industrial materials, initiating research into targeted strategies to reduce contamination. This work resulted in 9 publications (7 as first author) and 5 conferences (4 oral communications, 1 international).

As a postdoctoral researcher, I investigated the microbiota of infants with non-IgE mediated cow's milk protein allergy, revealing the microbiota's role in allergy progression. This led to 2 publications (2 co-first author) and 5 conferences (2 international).

Since 2017, I have led multiple projects at the Quadram Institute, focusing on food microbiology safety and quality. I collaborated with African research groups to study microbial dynamics in traditional fermented foods, using sequencing, genomics, and metabolomics to develop starter cultures that improve safety and consistency. I was awarded a 2-year Clarin-Cofund Postdoctoral Fellowship and played a key role in securing funding to facilitate knowledge exchange through workshops I delivered. These efforts empowered early-career researchers in Africa and resulted in 6 publications (4 as first and corresponding author), 1 in preparation, and 1 international conference presentation.

Currently, I study microbial populations in food processing environments to address safety and quality issues. Using genomics and metagenomics, I investigate microbial dynamics to understand pathogen persistence and transmission, particularly *Listeria monocytogenes*, and to investigate novel approaches to eliminate them. Notably, I led a project in collaboration with UK Health Safety Agency (UKHSA) and a food producing company that revealed the adaptation of the microbial communities coexisting with *L. monocytogenes* to specific sites within a food factory, even after cleaning procedures. This work established the groundwork for developing laboratory models to combat persistent pathogens, for which I have received funding as Principal Investigator from the National Biofilms Innovation Centre (NBIC) PoC5. This work resulted in 1 publication (first author), 3 oral presentations in International Conferences, 1 oral presentation as Invited Speaker for the Gordon Research Conference for Microbes in the Built Environment in 2025 and a Press Release by the Microbiology Society.

I also adapt and apply genomics and metagenomics to investigate food spoilage processes. For that, I have secured funding as Principal Investigator from the UK Food Safety Research Network to collaborate with a food producer to investigate a spoilage problem. The resulting data will be published in two manuscripts (under preparation) and have led to a strong collaboration with a major UK producer and plans are to apply for further funding.

In the future, I would like to advance my previous work by integrating predictive modelling and system-based approaches to tackle food spoilage. The outcomes will enhance scientific understanding and offer practical industry solutions, reducing waste, improving safety, and supporting sustainable.

Resumen del Currículum Vitae:

H-index: 11 - 499 citations.

20 peer-reviewed publications: 13 Q1, 2 D1; 14 as first author, 4 as corresponding author and 1 publication under review.

24 contributions to conferences: 11 oral presentations & 5 International Conferences - 4 presented by me and 2 posters in International conferences as first author.

Participated in 12 Research projects: 2 as Principal Investigator, 4 international (resulting in 6 publications).

I was awarded a Clarin-Cofund fellowship.

I organised two international workshops and participated in the organisation of an International conference.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: LEDESMA ESCOBAR, CARLOS AUGUSTO
Referencia: RYC2024-051313-I
Correo Electrónico: carledesma@gmail.com
Título: Aprovechamiento de componentes bioactivos de residuos agroalimentarios con técnicas de bajo impacto ambiental

Resumen de la Memoria:

Ledesma-Escobar realizó su formación doctoral en México, la cual reforzó con estancias de investigación en España (1 año) y Estados Unidos (4 meses), posteriormente, realizó estudios posdoctorales en la Universidad de Córdoba, España (2 años) periodo en el cual obtuvo también el Doctorado en Química Fina por esta universidad. Desde 2018, el aspirante forma parte del Departamento de Química Analítica de la UCO, donde ha dirigido TFGs, TFM's y Tesis y forma parte del PDD desde 2022.

Desde junio de 2024, Ledesma-Escobar es investigador principal del proyecto: "Obtención y estabilización de extractos en polvo ricos en compuestos bioactivos de alto valor añadido, obtenidos de residuos agroalimentarios mediante técnicas de bajo impacto ambiental" (referencia PP2F_L1_L19), para el cual obtuvo una financiación de 118.269,05 € de la Convocatoria de subvenciones en concurrencia competitiva a proyectos I+D+i orientados a retos de la sociedad andaluza (Línea 1) financiado por la Universidad de Córdoba, la Junta de Andalucía y la Unión Europea (Fondos Feder). Previamente, consiguió un contrato postdoctoral en la convocatoria competitiva del Plan Andaluz de Investigación, Desarrollo e Innovación (PAIDI 2020) para la incorporación de investigadores a universidades y entidades públicas. Lo cual le ha permitido formar parte del PDD del Departamento de Química Analítica de la Universidad de Córdoba y consolidar su carrera investigadora. mediante contratos de investigación de la Oficina de Transferencia de la Universidad de Córdoba (OTRI), donde el aspirante es investigador principal.

Su línea de investigación se centra en el aprovechamiento de residuos de la industria agroalimentaria, en concreto la caracterización, extracción y estabilización de componentes bioactivos mediante técnicas de bajo impacto ambiental. En el marco de esta convocatoria, se pretende ampliar su línea de investigación incluyendo extractantes eutécticos de origen natural (NADES), los cuales tiene baja o nula toxicidad y son parte de los conocidos como "disolventes verdes" por su bajo impacto medioambiental, la combinación de diferentes componentes permite la formación de NADES hidrofílicos o hidrófobos, lo cual determina su selectividad para los metabolitos de interés. Para esto se plantean 4 estrategias: (i) La optimización, mediante métodos de diseño multivariante, para diseñar NADES específicos para maximizar la extracción de moléculas de interés, (ii) Investigar el efecto combinado de los NADES con el uso de enzimas para mejorar el rendimiento de las extracciones, (iii) Desarrollar metodologías de extracción asistida con energías auxiliares compatibles con los NADES y (iv) Explorar la obtención de polímeros y/o carbohidratos de origen natural compatibles con los NADES para la estabilización de los extractos obtenidos mediante la formación de polvos, micro encapsulados o emulsiones.

La idoneidad del aspirante para desarrollar esta línea de investigación queda de manifiesto en sus publicaciones y producción científica, pero además en el perfil de sus estudios que incluyen la formación en ingeniería, ciencias en alimentos y química analítica, estas últimas dos a nivel de doctorado.

Resumen del Currículum Vitae:

Ledesma-Escobar es especialista en ciencia y tecnología de alimentos y química analítica, con énfasis en caracterización y aprovechamiento de residuos de la industria agroalimentaria y en análisis metabólico mediante la utilización de técnicas cromatográficas acopladas a espectrometría de masas. Esta experiencia se ve reflejada en las publicaciones científicas derivadas de su actividad investigadora y de transferencia, que comprende 34 artículos en revistas especializadas, en los cuales es primer autor en el 32 %, segundo en el 38 % y autor para la correspondencia en el 20 %. También ha publicado 4 capítulos de libro, siendo autor de correspondencia en uno de ellos.

Desde junio de 2024, Ledesma-Escobar es investigador principal del proyecto: "Obtención y estabilización de extractos en polvo ricos en compuestos bioactivos de alto valor añadido, obtenidos de residuos agroalimentarios mediante técnicas de bajo impacto ambiental" (referencia PP2F_L1_L19), para el cual obtuvo una financiación de 118.269,05 € de la Convocatoria de subvenciones en concurrencia competitiva a proyectos I+D+i orientados a retos de la sociedad andaluza (Línea 1) financiado por la Universidad de Córdoba, la Junta de Andalucía y la Unión Europea (Fondos Feder). Previamente, Ledesma-Escobar consiguió un contrato postdoctoral en la convocatoria competitiva del Plan Andaluz de Investigación, Desarrollo e Innovación (PAIDI 2020) para la incorporación de investigadores a universidades y entidades públicas. Esto le ha permitido formar parte del PDD del Departamento de Química Analítica de la Universidad de Córdoba desde 2022, impartiendo hasta la fecha 15.6 créditos.

Su experiencia y liderazgo también se da en actividades de transferencia, ha sido investigador principal en dos contratos de investigación registrados ante la Oficina de Transferencia de la UCO: (i) Análisis de tirosol e hidrotirosol en muestras de orina para evaluar la fijación de dieta (OTRI 12023090) y (ii) Proyecto de generación de datos ómicos (OTRI 12023156) con la empresa Phytoplant Research SL, que suman una inversión de 58.000,00 €. Además, ha participado como investigador de dos proyectos europeos: (i) Proyecto Aristoil (Interreg MED-1033, 2016-2020) y (ii) Proyecto GEN4OLIVE (Programa H2020 Innovation Actions) y en actividades de transferencia como Nutradaft (CDTI, ITC-20161265), ADIBIO SL (CDTI-Interconecta, IDI-20191105), y Global Feed SL (CDTI, IDI-20200061).

Ledesma-Escobar es doctor en Ciencias en Alimentos por el Instituto Tecnológico de Veracruz, México (2016) y Doctor en Química Fina por la Universidad de Córdoba, España (2018). Sus publicaciones científicas ponen de manifiesto su experiencia en el desarrollo de métodos analíticos basados en espectrometría de masas, análisis multivariante y metabólica, así como la aplicación de estas para dar soluciones al sector agroalimentario, principalmente en el aprovechamiento de residuos.

Indicadores de Calidad (Scopus, 01/2025): Tesis dirigidas en los últimos 10 años: 2 tesis doctorales; Promedio citas por artículo: 14,7; Número total de citas: 501; Índice H: 12; Promedio citas/año durante los últimos 5 años: 80; Publicaciones en primer decil/cuartil: 15/16; Documentos con colaboración internacional: 43 %; Documentos en el top 25% de documentos más citados en el mundo: 64 %; Documentos en el top 25% de revistas en CiteScore: 88 %; FWCI 1,28.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias agrarias y agroalimentarias
Nombre: FERNÁNDEZ OCHOA, ÁLVARO
Referencia: RYC2024-050119-I
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Título: Metabolomics approaches to understand the health effects of bioactive compounds in humans
Resumen de la Memoria:

The focus of my research career has been the development of metabolomics methodologies for diverse applications, with notable contributions in the study of bioactive compounds and clinical applications. All my research has been focused on the contribution through omics approaches to generate knowledge that support personalized nutrition and medicine strategies.

During my predoctoral training, I focused on optimizing and validating untargeted metabolomic strategies which were applied in nutritional intervention trials to study the bioavailability and metabolism of bioactive compounds, as well as in the European PRECISESADS project, aimed at identifying metabolic reclassification biomarkers for 7 systemic autoimmune diseases. In 2018, I completed a predoctoral research internship at Chalmers University in Sweden, specializing metabolomic data processing and statistical analysis using R packages.

From 2020 to 2022, I worked as a postdoctoral researcher at the Metabolomics Platform of the Max Delbrück Center in Berlin (Germany). My main objective within the MSTARs project was to develop metabolomics methods, both targeted and untargeted, based on mass spectrometry to support the projects and collaborations of the Metabolomics Core. In this role, I developed untargeted methods and a targeted analytical method for the analysis of short-chain fatty acids and metabolites derived from the tryptophan pathway.

Since 2022, I have been working at the University of Granada, collaborating with Dr. M. Hernández, a proteomics specialist, in establishing a Metabolomics and Proteomics Platform at the university. During this time, I have contributed to the national POLYMEALTH project, in which an innovative top-down approach based was developed to study the mechanisms of action of various families of bioactive compounds derived from different plant sources. This novel methodology involved the direct implementation of an acute intervention study in humans to detect common circulating compounds in biological samples using untargeted metabolomics, followed by an evaluation of their bioactivity. Notably, the untargeted study of bioavailable metabolites in human plasma samples from Olive and Lippia extracts has led to the annotation of nine common circulating metabolites to both extracts, yielding significant and novel findings.

Building on these results, I am currently leading a nutritional intervention trial with human volunteers as part of the ECOBIOLIVO and ObeoMIC projects. These projects aim to explore the benefits of prolonged olive leaf extract consumption on aging and obesity, respectively. In addition to metabolomics methodologies, these projects include microbiomics analysis and data integration. In this line, I have recently contributed to the development of Biomix software that allows multi-omics data integration.

In summary, my expertise is multidisciplinary, encompassing Food Science and Technology, Biology, Analytical Chemistry, Medicine and Bioinformatics. My research focuses on the development, application, and integration of omics technologies and bioinformatics tools to investigate complex biological systems, including foods, by-products and biological samples. My current line of research involves developing innovative metabolomic methods using UHPLC-IMS-QTOF-MS to advance understanding of bioactive compounds and their health benefits.

Resumen del Currículum Vitae:

I graduated in Chemistry from the University of La Rioja in 2014 and received the Extraordinary End-of-Studies Award. From 2015 to 2019, I conducted my PhD research at the University of Granada (UGR), funded by a competitive FPU grant. My PhD Thesis obtained the highest grade (best qualification cum laude, International PhD distinction, Extraordinary Award). During that period, I undertook a 4-month international stay at Chalmers University, Sweden, in 2018. During my predoctoral period, I was the researcher responsible for the WP6 tasks of the European PRECISESADS project.

From 2020 to 2022, I was employed as a postdoctoral researcher at the metabolomics platform of the Max Delbrück Center for Molecular Medicine, Germany. In that position, I focused on the metabolomics activities of the MSTARs international project. In 2022, I received a competitive postdoctoral grant for young researchers from the Junta de Andalucía. With that grant, I worked at the UGR in different projects developing metabolomic strategies for nutritional applications based on mass spectrometry. Since 2023, I have been employed as a substitute professor at the UGR. I am currently leading the development of a Metabolomics Platform at UGR and the nutritional intervention trial of the ECOBIOLIVO project.

To date, I have participated in 10 research projects funded through competitive calls: 2 internationals funded by the EU, 3 national projects, 3 regional projects and 2 at the UGR, the latter two as Principal Investigator. I have also participated in 3 knowledge transfer contracts with different companies (more than 130,000 €). I have co-authored 47 JCR publications (72% Q1) that have been cited 1003 times, and my H-Index is 19. I am the first, second or last/corresponding author on 70% of my publications and have been the corresponding author in 14 of them. 62% of my articles have international collaboration, having collaborated with more than 200 different co-authors. I have also published 9 book chapters. The results of my research career have led to 71 contributions to national and international conferences, including 5 invited lectures, 2 workshops, 10 oral communications and 22 poster communications presented by myself. I have received 4 awards at conferences for the best communication. In 2023, I received the Senior Research Award from the Groupe Polyphenols.

I have taught official courses (620 hours) at UGR during my career. I have taught courses at various international institutions such as University of Rio de Janeiro, University of Costa Rica and National University of Tucuman with the aim of transferring my knowledge to low- and middle-income



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countries. I have supervised 20 Final Master's Theses and 10 Final Bachelor's Theses. I am currently supervising 3 Doctoral Theses (2 at the UGR and 1 at the University of Rio de Janeiro). I have also supervised the PhD and postdoc internships of 6 international researchers.

I serve as a research project evaluator for the Polish National Science Centre. I am an active member of different international scientific societies (Metabolomics Society, Groupe Polyphenols, mQACC). I am currently leading the establishment of a working section for young researchers within SESMet. I have been actively involved in the organization of 3 national and 4 international scientific conferences and in dissemination science activities.



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Área Temática: Ciencias de la educación
Nombre: PÉREZ MANJARREZ, EVERARDO
Referencia: RYC2024-050257-I
Correo Electrónico: manjarrez.ep@gmail.com
Título: History education of colonial pasts in the Americas and Spain. Formal and informal contexts
Resumen de la Memoria:

Since the beginning of my research career, I have been committed to maintaining the highest academic standards while exploring innovative methodologies to address critical and contemporary challenges in education research. This dedication has been recognized through the award of two highly competitive doctoral scholarships and two prestigious postdoctoral contracts, one at Harvard University, alongside funding for research stays at leading institutions. My doctoral research focused on the intersection of history and civics in education, a topic still underexplored in the field. To bridge this gap, I conducted comparative research on Mexican and Spanish students' representations of colonialism and its contemporary social implications. This pioneering research secured funding from the National Council of Science and Technology (Mexico) and a completion scholarship from Spain's Ministry of Economy, Industry, and Competitiveness—both exceptionally competitive programs. The outcomes of this work include six peer-reviewed articles in esteemed international journals. During the initial phase of my postdoctoral career, I advanced my research by analyzing how historical narratives shape civic engagement inside and outside the classroom. This innovative proposal earned me a postdoctoral contract at the Autonomous University of Madrid (2018), where I co-edited the first academic book on historical reenactments in education and drafted three articles on the subject. From 2019 to 2022, I expanded my research at Harvard, where I developed independent research analyzing students' learning of history on digital platforms. This emerging field allowed me to present innovative approaches, including the design and co-creation of cutting-edge online history curricula in collaboration with FLACSO-Argentina and Harvard. My focus on historical reenactments and digital platforms, two of the most impactful and contemporary forms of disseminating history, was groundbreaking within the context of history education in Spain and remains a nascent area of international study. This work integrated research on core learning concepts and historical skills, culminating in 11 peer-reviewed publications that further enriched the field. Later, as a María Zambrano fellow at UNED (Talent Attraction and Consolidation grant, 2022-2024), I pursued a more structural analysis of how social agents navigate the challenges of colonial heritage in modern societies. This phase of my career is marked by the expansion of my research scope to include memory studies. I co-edited a book on historical dialogue and contributed new insights into the dynamics of collective memory and its implications for social cohesion. My latest research represents a significant leap forward in my research trajectory. Unlike conventional studies that focus on the influence of historical narratives, my research pioneers an analysis of the interactions between social agents and memory institutions in disputing the past to create inclusive and transformative historical interpretations. I further enhance my social impact by organizing international conferences and creating historical content for wider audiences. All this work, which bridges history education, memory studies, and civic engagement, breaks new ground by addressing the dynamic interplay between history, memory, and democracy in contemporary society.

Resumen del Currículum Vitae:

I am a visiting scholar at the Harvard Graduate School of Education, USA (PhD in Education) specializing in history, civics, and ethics in education. My research examines the enduring socio-educational impacts of the colonization of the Americas, particularly in Spain and Latin America. I analyze the students' understanding of colonialism and how colonial narratives are conveyed through historical reenactments and digital platforms, by applying methods from historiography, memory studies, and cultural psychology. I also designed free, innovative e-learning history modules, funded by private grants, to support educators and students globally. My early career experience includes a one-year postdoctoral fellowship at UAM, Spain, and 3 years at Harvard, funded by competitive Spanish and Mexican grants. One of my key contributions has been developing theoretical models that analyze how colonial narratives shape contemporary civic debates rooted in colonial heritage. These models have influenced publications, research projects, and the creation of new e-learning history modules and curricula. As a María Zambrano fellow (Talent Attraction Grant, MIU/EU Next Generation) at UNED, Spain, I deepened my research into processes of decolonization in museums, civic commemorations, and digital contexts. My current research examines how memory institutions address colonial heritage and its challenges in modern society. This work has garnered institutional support, enabling me to organize international workshops, conferences, and courses on these subjects. I have over 22 academic publications—including 2 co-edited books, 13 book chapters, and 7 peer-reviewed articles (h-index 5). My work has been published in leading venues such as Routledge, Cambridge University Press, Springer, APA Qualitative Psychology, and Teachers College Record. Many publications stem from collaborations with distinguished scholars across institutions in the USA (Harvard, Clark University, UCSC—Santa Cruz), Argentina (FLACSO), and South Korea (Seoul National University). I have presented at over 30 international conferences and served on academic decision-making bodies like the Association for Moral Education (AME) executive board. From 2020 to 2023, I led AME's Emerging Scholar Program, mentoring nearly 200 doctoral and postdoctoral researchers globally. My teaching spans undergraduate and graduate courses in history, memory, and historiography at UNED, as well as international teaching engagements in Mexico and Argentina. I have supervised Bachelor's, Master's, and Doctoral theses, all successfully evaluated. As a researcher, I have contributed to 14 excellence and innovation projects, supported by the European Union and Spanish Ministry of Science and Innovation. I lead a European research group of 15 scholars analyzing troubled pasts within the "Making Histories" project (GA101086106). I also co-lead the "Remembering the Past?" sub-project within the Out of Eden Learn Project (Project Zero/Harvard), working with over 2,500 students across 18 countries. This initiative has been widely adopted in Latin American schools. Beyond academia, I engage in public debates, create media content, and participate in radio programs in Spain to make history accessible to wider audiences.



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Área Temática: Ciencias de la educación
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Título: Understanding and transforming schooling, informal learning and digital technology in contemporary childhood and youth

Resumen de la Memoria:

In my research career, I have, broadly, generated knowledge of how and what children and young people learn in contemporary society through both formal and informal learning. Such understanding is neglected in educational studies, and yet is the key to finding ways to transform the educational system. I have so far researched widely, taking deeply interdisciplinary approaches. I started by developing an understanding of education for disadvantaged children and young people, focusing on one of the most disadvantaged, i.e. in conflict-affected settings. While I continue to work on the line broadly, in recent years I have also contributed a contextualised knowledge of children's and young people's digital practices and literacy, working with scholars from communication studies, linguistics, psychology and sociology, which I plan to continue. I have also made methodological contributions regarding methods that involve children and young people in the research process.

I have a strong INTERNATIONAL PROFILE. Originally from Japan, I received my doctorate and one of my master's degrees in the UK (Oxford University) and USA (Columbia University (2005-2006)). During my time at Oxford, I also collaborated with the Educational Research Network for West and Central Africa (ERNWACA) based in Mali. I also stayed in Sierra Leone for over 7 months at the invitation of the University of Sierra Leone. With the birth of my two children (2016 and 2019), it has become complicated to conduct long international stays. However, I performed "Short-Term Scientific Mission (STSM)" in Lisbon hosted by Universidade Católica Portuguesa and funded by the DigiLitEY COST Action (IS1410), an EC Horizon 2020-funded project.

I have also contributed to the INTERNATIONALISATION ACTIVITIES AND ATTRACTION OF RESOURCES. In the DigiLitEY COST Action (2015-19), as a researcher as well as a substitute member of the Management Committee, I played a crucial role in the development and dissemination of early childhood digital literacy research. I also took the lead in two projects coordinated by the European Commission Joint Research Centre (EC-JRC), Ispra: "Young Children (0-8) and Digital Technology" (2015-18) and "Kids' Digital Lives in COVID-19 Times" (KiDiCoTi, 2020-21). Other internationalisation activities include: International teaching activities, Participation in prominent international conferences, etc.

My career reflects consolidated INDEPENDENCE as a researcher and rising LEADERSHIP. Besides my contributions to the three European projects mentioned above, I have co-coordinated a consultancy work for Save the Children: "Study of perceptions and barriers in access to early childhood education of first cycle (0-3 years) in disadvantaged families", winning a 12.400 € grant. I am currently leading, as a co-PI, "Artificial Intelligence project from TikTok: Fostering Critical Engagement among Young People (IA-TIKTOK)" winning 37,610€. I also performed tasks in "Challenging Stigmatization: Discourses and creative and Inclusive Educational Practices with digital media in Schools of 'Special Complexity'" financed by the Ministry of Science and Innovation since funding acquisition, and the project will also continue as "Inclusion of student and community voices for creative and sustainable education in a digital context" funded by Ministry of Science and Innovation (2024-27).

Resumen del Currículum Vitae:

I am accredited as Profesor Contratado Doctor (Associate Prof) and Professor of Private University by ANECA and work at the Universidad Internacional de La Rioja (UNIR). Trained in international and comparative education (DPhil and M.Sc., University of Oxford, UK; M.A., Columbia University, USA), I belong to a research group PROCOMM: Perspectivas de la Comunicación Multimedia at UNIR and collaborate with the Contemporary Childhood Research Group of the Autonomous University of Madrid (UAM) and the Institute Ikeda at the Alcalá University.

As SCIENTIFIC CONTRIBUTIONS, I have participated in national and international projects, such as "Challenging stigmatization" (2021-2024, PID2020-112880RB-I00, 49.731 €), an EC Horizon 2020 funded COST Action "The Digital Literacy and Multimodal Practices of Young Children" (2015-2019, IS1410, 7,000,000€); and "Kids' Digital Lives in COVID-19 Times" (2020-2021) and "Young Children (0-8) and Digital Technology" (2015 - 2018) coordinated by the Joint Research Center of the European Commission (EC-JRC) in Ispra, Italy and in which I took leadership as the national coordinator of Spain. Over 40 academic and educational publications include:

- 12 articles in journals ranked in SJR and/or JCR (9 articles in Q1 and Q2; I am the sole author of 4 articles)
- 8 book chapters in established publishers, e.g. Springer, Routledge, Sage.
- 1 edited book published by Bloomsbury
- Total citations: 230, Average number of citations per year since 2020: 41.5, h-index: 10 (Source Google Scholar)

I have presented at more than 30 international/national conferences, including AERA (American Educational Research Association), the International Council for Educational Media (ICEM), Comparative and International Education Society (CIES).

As CONTRIBUTIONS TO SOCIETY, I collaborated with different entities, including: Save the Children (SP), Educational Research Network for West and Central Africa (ERNWACA) and UNESCO. Among them, the consultancy work for Save the Children, in which I was the co-coordinator, laid the basis for the organization's report and policy campaign to promote access to early childhood education "Donde Todo Empieza". I also promote young people's critical engagement with TikTok through projects FANSTIKTOK (30,921€) and IA-TikTok (37.610€). We produced educational materials "TikTok in the Classroom" and complementary audiovisual materials. An online training session targeted at (future) teachers achieved more than 1,6k views and received great attention from the media, including Europa Press and Siglo XXI.



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I TRAIN FUTURE RESEARCHERS regarding qualitative research methodology. I have designed materials for doctoral students and deliver seminar series annually (1ECTs) as well as a Master course (6ECTs). I also trained 25 early career researchers across Europe in the Summer School of the COST Action mentioned above. I have directed 31 Final Master's and Degree Projects.

I EVALUATE PROJECTS, such as AFRICAN and EUROPEAN proposals submitted to the EC's Marie Skłodowska-Curie Individual Postdoctoral Fellowships and for the Small Grant Awards by ERNWACA. I am also an EDITORIAL BOARD MEMBER for the Journal of Early Childhood Literacy (Q1) since 2017 and a REVIEWER FOR 5 HIGH-IMPACT JOURNALS, including Cambridge Journal of Education (Q1), Linguistics and Education (Q1), and Revista Complutense de Educación (Q2).



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Área Temática: Ciencias de la educación
Nombre: HIDALGO MIGUELES, JAIRO
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Título: Advancing physical activity measurement using wearable sensors to enhance physical and brain health

Resumen de la Memoria:

My research journey began at the University of Granada (UGR), where I completed a PhD in Biomedicine: Physical Activity and Health (2014-2020). Supported by the prestigious FPU fellowship, I focused on advancing methodologies for assessing physical activity (PA) and its implications for health in children. My doctoral work culminated in 11 first-author publications, including a highly cited article with over 1,800 citations. During this phase, I expanded my expertise through multiple international internships, collaborating with leading researchers at institutions such as the University of Massachusetts, Northeastern University, the National Institutes of Health, and Karolinska Institutet. These experiences shaped my research vision, strengthened my methodological skills, and fostered a global collaboration network.

In 2021, I transitioned to the postdoctoral stage of my career at Linköping University, Sweden, where I led the development of innovative methods for wearable sensor data analysis. I secured competitive funding as Principal Investigator (PI) for the PROACTIVE project, further establishing my independence as a researcher. The following year, I joined Karolinska Institutet, where I broadened my focus to include large-scale epidemiological studies and refined my leadership skills, mentoring students and collaborating on international projects. It was during this period that I launched my freelance consultancy, developing open-source software tools such as GGIRmatcher and stepmetrics. These tools have become widely used in the research community, furthering my contributions to open science and solidifying my reputation as a software developer in wearable sensor analytics.

In late 2023, I returned to UGR as a distinguished researcher under the prestigious Beatriz Galindo Fellowship. In this role, I am leveraging my international experience and technical expertise to establish a leading research group focused on tailoring PA assessments to individual and population characteristics. My goal is to develop innovative methodologies and tools that improve public health outcomes while fostering collaboration across disciplines and sectors. My career embodies a commitment to methodological excellence, open science, and societal impact, and I look forward to continuing to contribute to these global priorities.

Resumen del Currículum Vitae:

Dr. Jairo Hidalgo Migueles is a distinguished researcher specializing in physical activity (PA) measurement, wearable sensors, and health outcomes. His innovative methodologies and open-source tools have significantly advanced the field. He completed his PhD at the University of Granada (UGR) in December 2020, with a thesis comprising 11 first-author publications, earning the Cum Laude distinction and the Extraordinary Award for PhD Thesis at UGR in 2024. He currently holds a Beatriz Galindo Fellowship at UGR.

Dr. Jairo Hidalgo Migueles has authored over 100 scientific articles in high-impact journals, with 95% published in top-quartile journals and 24% in the top decile, accumulating more than 7,200 citations (H-index: 37) in Google Scholar, or more than 3,800 citations (H-index: 28) in the Web of Science. His research combines methodological innovation and practical application. For example, I have introduced age- and sex-specific PA thresholds to address the limitations of generic cut-points, enabling more precise monitoring of PA and health outcomes. He has also explored the interplay between PA, sleep, and sedentary behavior using advanced statistical approaches such as compositional data analysis and machine learning. His work has contributed to key advancements, including the development of GGIR, an open-source R package widely adopted for accelerometer data analysis.

Throughout his career, Dr. Jairo Hidalgo Migueles has demonstrated strong leadership, securing over €250,000 as Principal Investigator for projects in Sweden. Additionally, He actively contributed to numerous national and international research projects as a key team member in high-impact initiatives like ActiveBrains, STEP-IN, and HealthyMoms, which have advanced understanding of physical activity and health across diverse populations. His international collaborations span the USA, Sweden, and Australia, reflected in impactful joint publications and initiatives such as the PROACTIVE project, investigating longitudinal associations between PA and health in children.

Beyond research, Dr. Jairo Hidalgo Migueles is committed to mentoring and teaching, supervising MSc and PhD theses across Spain and Sweden. He has delivered keynote presentations at six international conferences, organized workshops on accelerometer data processing, and engaged in public outreach, including media features and initiatives promoting PA during the COVID-19 pandemic.

Dr. Jairo Hidalgo Migueles has collaborated with industry, including ActiGraph and Accelting, while maintaining a strong focus on open science. His consultancy activities and software tools, such as GGIRmatcher and stepmetrics, are globally used by researchers to analyze wearable sensor data. His vision includes leading a research group dedicated to refining methodologies for wearable sensors, tailoring PA assessments to population-specific characteristics, and advancing public health. This vision aligns with global health promotion goals, emphasizing the societal impact of his work.



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Turno General

Área Temática: Ciencias de la educación
Nombre: VALENZUELA TALLÓN, PEDRO LUIS
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Título: Exercise promotion in older adults

Resumen de la Memoria:

The primary focus of my research has been the promotion of a healthy lifestyle in populations of all ages, especially older adults. Throughout my career I have conducted numerous studies in which we have proven the benefits of physical activity in older adults. Thanks to my Sara Borrell contract we have also observed that exercise interventions can be applied even in the clinical setting, such as in hospitals. In the last year, during my stay at the Institute of Ageing in Toulouse, I have also worked on the importance of physical activity for healthy aging. However, despite this evidence, we are still facing a pandemic of physical inactivity. Thus, I believe that the problem is not the lack of scientific evidence, but the paucity of resources we have to effectively promote an active lifestyle, especially at advanced ages.

For this reason, during the next years I expect to progress on my own line of research, trying to provide new resources to effectively promote an active lifestyle among older adults. Specifically, given that primary care physicians are often the first point of contact for people to discuss their health, promoting physical activity in this setting might be of particular relevance. In fact, the Global Action Plan for Physical Activity endorsed by the World Health Organization highlights the need to provide resources to health professionals so that competent assessments and provision of physical activity advice can be given in routine practice.

Under this context, in the next years I aim to develop my own project in different phases (including educational interventions for both primary care physicians and older patients) to promote an active lifestyle among older adults from primary care centers. First, through a randomized controlled trial, I aim to test the effects of educating primary care physicians about the importance of an active lifestyle on their perceived barriers to promote physical activity among their patients. Secondly, through a mixed-method approach I aim to co-design a mobile app for the promotion of exercise among older adults by primary care staff, trying to enhance its acceptability and feasibility in the real-life setting through collaboration with the involved stakeholders (i.e., patients and health professionals). Then, after the development of the app, I aim to conduct a multi-center randomized controlled trial in different primary care centers to test the effectiveness of a multicomponent educational intervention provided by the physicians to effectively promote physical activity among older adults.

This project will enable me to open a new line of research that builds upon my previous experiences, but that uses a different approach to promote an active lifestyle in the real-life setting through educational strategies. After working in different institutions, including hospitals, I aim to start this research line at University of Alcalá, where there is a lack of specific research in Sport Sciences. Thus, not only I believe that this institution will enable me to conduct my research, but also that I can be valuable to build a new research area that will be interesting for the university and the primary care centers of the area.

Resumen del Currículum Vitae:

I did my BSc in Sport Science, a MRes in Integrative Physiology (University of Barcelona), and a PhD in Health Sciences (University of Alcalá). I have then moved across different institutions through my post-doc period, including Universidad Europea de Madrid and Instituto de Investigación del Hospital 12 de Octubre. Moreover, during my career I have completed +9 months of research stays in international centers, particularly in Schulthess Klinik (Switzerland), University of Beira Interior (Portugal) and the Institute of Ageing (France).

The primary focus of my research has been the promotion of physical exercise in populations of all ages, especially older adults. I have been a prolific author during my career, being the author of ~230 publications in high impact JCR Journals (most of them [>75%] ranked Q1, including highly prestigious journals such as The Lancet, Nature Reviews Cardiology, or European Heart Journal). I have received +3800 citations according to Web of Science [WoS], resulting in a H-index=33. I am the sole first author in +90 studies and corresponding author in +70 studies. I have worked independently of my supervisors in +40 studies. Moreover, during the last years I have worked as last (senior) author, including 12 publications in very prestigious journals (all of them Q1 or even D1) such as The Lancet Healthy Longevity or Sports Medicine. I am also a collaborator in numerous (+10) national and international research projects related with the application of physical exercise interventions in clinical settings, funded in total with more than 1M €. International collaborations have also played a major role on my scientific career. Indeed, +80 of my publications have been co-authored by international researchers of different countries.

I am accredited as Profesor Contratado Doctor, with +400 hours of teaching experience. I have directed 5 PhD theses. I also participate in editorial activities in numerous international journals. I serve on the Editorial Board of the Journal of Nutrition, Health and Aging, a leading journals in Geriatrics (Q1). I also participate as Associate Editor in Frontiers in Physiology (Q2), and I have participated as Guest Editor in Nutrients (Q1). In addition, I routinely contribute as a reviewer for high-impact journals, having reviewed more than 100 times in +55 different JCR journals (almost all of them Q1).

I also have a strong background in scientific dissemination. I routinely participate in the media and in several news outlets discussing health sciences, including radio (e.g., Radio Nacional de España, COPE, Onda Cero) and national (e.g., El Mundo, El País, Marca, El Diario, Redacción Médica) and international journals (News Medical, Forbes, The Washington Post). Moreover, I founded (and currently serve as a co-editor in chief) Fissac (www.fissac.com), a website for scientific dissemination on the topics of Health and Exercise. This website is currently among the most important in Spanish language of its kind, with ~200,000 followers in social networks.



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Finally, I have received some important awards, including the Premios Nacionales de Medicina del Deporte. Moreover, I have been ranked in the top 2% of researchers Worldwide by University of Stanford, being in the top-20 of Spanish researchers in the field of Sports Sciences.



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Área Temática: Ciencias de la educación
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Título: Ana M. Greco

Resumen de la Memoria:

Despite the prevalence of violence against children, few empirically tested school-based interventions exist, especially for younger age groups. Even fewer utilize robust pre-post designs with control groups. Addressing this gap, my work focuses on developing and testing interventions for elementary and kindergarten schools, particularly in areas such as violence prevention and other factors affecting children's well-being, like screen device exposure. Building on my prior experience, I propose two innovative research lines:

1. Including children through participatory designs:

Children are often excluded from decisions that directly impact their lives, despite being the main stakeholders. My goal is to integrate children's voices into interventions and research through participatory action research (PAR) methods and the Lundy model. PAR promotes children's sense of agency, improves intergenerational communication, and addresses power imbalances between children and adults. This approach will allow for meaningful contributions to the design, implementation, and evaluation phases, ensuring interventions align with children's perspectives. This aligns with Article 12 of the Convention on the Rights of the Child, emphasizing children's right to participate in matters affecting them.

2. Incorporating new technologies in interventions:

Having designed and evaluated various training programs for school staff and children (e.g., SAVE, #EscolaSenseViolències), I plan to integrate technological tools such as virtual reality (VR) into these efforts. VR can simulate realistic scenarios, allowing participants to practice interpersonal skills, such as responding to child victimization disclosures, in a safe environment. This approach enables the measurement of both self-reported and biometric stress responses (e.g., heart rate, skin temperature), providing deeper insights into intervention effectiveness.

These innovations would not only enhance current training but also expand their reach and impact. VR simulations could be compared to traditional role-playing techniques in terms of cost-effectiveness and scalability, while advancing research into the physiological and psychological effects of training interventions.

These research lines aim to innovate child protection strategies within schools by incorporating children's perspectives and leveraging technology. The methodologies developed will be transferable to other contexts, such as hospitals or public services, potentially influencing policy and practice on a broader scale.

Moreover, this work positions me as a leader in child participation methodologies and technology-enhanced interventions, fostering collaborations with new research groups, such as NUS Child Development Lab (Singapore) or Murdoch Children's Research Institute (Australia). By bridging gaps between academia and societal needs, I aim to inspire new projects, support student researchers, and create a Spanish research group dedicated to child participation.

Finally, the integration of participatory and technological approaches will contribute to the long-term goal of addressing violence against children while promoting their well-being and rights, fulfilling a critical scientific and societal need.

Resumen del Currículum Vitae:

I hold a comprehensive academic and professional background spanning education, research, and advocacy for child protection. My career began in Argentina, where I completed my degree at the Universidad de Buenos Aires while teaching elementary school and volunteering to support children at social risk. Later, a scholarship to teach Spanish in France solidified my passion for working with diverse cultural and linguistic contexts.

Pursuing further training, I enrolled in the postgraduate program in Inclusive Education at the Universitat de Barcelona (UB), where I collaborated with Prof. Noemí Pereda, a renowned researcher in child victimization. Under her supervision, I completed a Master's thesis and predoctoral dissertation (DEA) on school staff's knowledge and practices in detecting child victimization, funded by public scholarships. During this time, I gained extensive experience in advanced quantitative methodologies as part of the Quantitative Psychology section at UB and taught Psychometrics alongside Prof. Georgina Guilera.

My predoctoral research on addressing child and adolescent victimization in schools sparked widespread interest. It contributed to academic publications, national dissemination, and international collaborations, including funded stays at Université Paris-Diderot and the University of Porto. I also led the European SAVE project (Erasmus+ 2018), which created a free, multi-language training course for school staff, reaching over 20,000 users globally.

Following my DEA, I joined the Universitat Oberta de Catalunya (UOC) as a postdoctoral researcher, leading a two-year project funded by private organizations to train school staff, students, and families in preventing and addressing child victimization. This project included a quasi-experimental study to evaluate program outcomes and the adaptation of the Juvenile Victimization Questionnaire (JVQ) for younger children, integrating innovative psychometric methods and ethical research practices.



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Turno General

Currently, I am a professor at the Universitat de Vic (UVic-UCC) and UB, teaching courses on cognitive and motor development, conflict resolution, and restorative practices across undergraduate and postgraduate levels. I have supervised several master's theses, and collaborated on research projects exploring school-based interventions to prevent violence and foster resilience. I am also currently supervising a PhD dissertation

My academic output includes over 20 scientific publications, with an average of 3.14 publications per year, and over 200 citations (Google Scholar; h-index 9). I recently obtained the recognition of six years of research by the national and regional agencies. I also serve as a peer reviewer for high-impact journals like Child Abuse & Neglect and Journal of Interpersonal Violence.

My dedication extends beyond research to practical applications. I have developed training materials, such as the SAVE course, and contributed to initiatives like the #EscolaSenseViolències program, which supports vulnerable students. My professional journey, enriched by teaching across all educational levels and working with diverse student populations, reflects a commitment to inclusive education and addressing child protection through evidence-based strategies.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias de la educación
Nombre: NEUT AGUAYO, PABLO
Referencia: RYC2024-051186-I
Correo Electrónico: paneut@uc.cl
Título: Desigualdades educativas, relaciones de autoridad pedagógica y perspectivas críticas de transformación socioescolar

Resumen de la Memoria:

Desde el 2024 soy investigador posdoctoral de la Universidad Autónoma de Barcelona, becario del programa Juan de la Cierva, ayuda que obtuve tras graduarme de Doctor en Educación y Sociedad por la Universidad de Barcelona el año 2022. En mi tesis doctoral obtuve la calificación de Sobresaliente Cum Laude y el Premio Extraordinario de Doctorado.

A nivel investigativo, la primera fase de mi trayectoria (2011-2016) se centró en el estudio de las relaciones de autoridad pedagógica. Durante este periodo, participé en el I+D+i "Autoridad y procesos de democratización social en Chile" financiado por la Comisión Nacional de Investigación Científica y Tecnológica (Conicyt) de Chile. A este proyecto me integré como tesista de Máster, posición para la cual obtuve la prestigiosa beca de Formación de Capital Humano Avanzado de Conicyt. Como resultado, obtuve la distinción máxima en el Máster y la mejor calificación final de mi generación. Asimismo, esta fue galardonada como la 2ª mejor tesis de Máster a nivel nacional (Instituto Nacional de la Juventud, 2014) y, posteriormente, fue publicada como libro en una de las principales casas editoriales de Chile (LOM Ediciones).

La segunda parte de mi carrera comienza el 2018 con mi ingreso al doctorado y tras adjudicarme la principal beca chilena para estudios doctorales en el exterior: BECAS-Chile (Agencia Nacional de Investigación y Desarrollo). En esta etapa, me integro al grupo Esbrina y participo en proyectos I+D+i (ref. PID2019-108041RB-I00) y como técnico de investigación del proyecto europeo Educational roadmap for transformative agency (Erasmus+. KA220-HED). En esta etapa mis intereses principales se relacionan con las nuevas desigualdades educativas asociadas a la plataformización educativa, el estudio de la experiencia escolar y el desarrollo de perspectivas críticas para la transformación escolar.

En la etapa actual, me integro como investigador posdoctoral al grupo Globalisation, Education and Social Policies (GEPS), participando en 2 proyectos I+D+i (GENTRED dirigido por el Dr. Xavier Bonal y LEARNER dirigido por la Dra. Aina Tarabini) y un proyecto Erasmus+ (Anchoring Ethical Technology - AI and Data- Usage in the Educational Practice). En esta etapa mantengo mi interés por las desigualdades digitales (proyecto Erasmus+), pero amplío la mirada a fenómenos macro, como los efectos de la gentrificación en la desigualdad educativa (proyecto GENTRED), y micro, como la producción de desigualdades en las trayectorias escolares (proyecto LEARNER).

En relación con mi producción científica, he publicado 15 de artículos en revistas indexadas en WoS y/o SCOPUS (7 de ellas en revistas Q1 y en 6 de ellas como primer autor; además, los 15 artículos han sido publicados en acceso abierto); 8 capítulos de libro en prestigiosas editoriales (como OCTAEDRO y Dykinson) y soy autor de 3 libros. Adicionalmente, he colaborado y publicado con algunos de los más prestigiosos académicos de la pedagogía crítica a nivel mundial, como Henry Giroux. El carácter promisorio de mi carrera científica se ve reflejado en el número de citas recibidas, las que suman un total de 484 citas de acuerdo a Google Scholar.

El conjunto de esta trayectoria -tanto en Chile como en España- me ha permitido obtener las acreditaciones de Profesor/a Contratado Doctor/a concedido por la ANECA y de Profesor Lector por la AQU.

Resumen del Currículum Vitae:

En mi calidad de investigador posdoctoral soy miembro del grupo de investigación Globalisation, Education and Social Policies (GEPS) de la Universidad Autónoma de Barcelona. También, desde el 2018 soy colaborador del grupo de investigación consolidado Esbrina-Subjetividades y Entornos Educativos Contemporáneos (2017SGR1248) de la Universidad de Barcelona. Asimismo, desde el 2022 soy investigador encargado del área de Educación del Núcleo Interuniversitario Individuo, Lazo Social y Asimetrías de Poder, de la Universidad de Santiago de Chile y la Universidad Diego Portales (Chile). También soy fundador y co-director de una editorial especializada en investigación educativa (Editorial Sole).

En cuanto a mi trayectoria internacional, he realizado estancias de investigación en universidades de España (Universidad de Málaga) y Chile (Universidad de Santiago de Chile y Universidad Diego Portales). En el campo de la consultoría he colaborado con el Consejo de Universidades del Estado de Chile en proyectos en programas referidos a al fortalecimiento de la colaboración en materia de Formación Docente y he realizado consultorías para el Ministerio de Educación de Chile en materia de Modelos de Desarrollo Profesional Docente y Directivo.

En mi carrera docente he ejercido como profesor en la Pontificia Universidad Católica de Chile, dictando cursos en la Facultad de Educación y guiando las prácticas profesionales de una decena de futuros pedagogos. De manera paralela, me desempeñé como profesor en un instituto de educación pública secundaria. En España, he ejercido la docencia en cursos de Sociología de la Educación a nivel de grado y Máster, y actualmente dirijo la tesis de un estudiante de doctorado en la Universidad de Barcelona. En su conjunto, en ambos países he dictado más de 75 créditos.

En materia de participación en proyecto, he formado parte del equipo de trabajo de cuatro (4) proyectos competitivos I+D, dos (2) proyecto europeos Erasmus+ y 3 consultorías a organismos públicos chilenos.

El conjunto de mi trayectoria me ha permitido ser beneficiario de múltiples becas, así como recibir una serie de premios y reconocimientos. Entre ellos destacan: el Premio Extraordinario de Doctorado (curso académico 2022-2023); el II lugar en la categoría de mejor tesis de Máster a nivel nacional, premio otorgado por el Instituto Nacional de la Juventud (INJUV, 2014); el reconocimiento al mejor promedio de notas y la Distinción Máxima en la tesis de Máster realizada en la Universidad de Chile y el reconocimiento al mejor promedio de notas de la generación 2010 del Diplomado en Liderazgo Educativo de la Pontificia Universidad Católica de Chile.

Asimismo, he sido beneficiario de las becas de Magíster para la Formación de Capital Humano Avanzado concedida por la Comisión Nacional de Investigación Científica y Tecnológica (CONICYT) de Chile; y de la Beca-Chile para estudios de Doctorado en el Extranjero concedida por la Agencia Nacional para la Investigación y el Desarrollo (ANID). El año 2024 obtuve la beca posdoctoral Juan de la Cierva. Esta forma parte del Plan Estatal de Investigación Científica, Técnica y de Innovación 2021-2023 y es financiada con fondos de la Unión Europea "NextGenerationEU"/PRTR. En la convocatoria fui seleccionado en el lugar n° 4 de 46 postulantes. Actualmente, he cursado 1 año de la beca y me queda 1 año de la misma.



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Turno General

Área Temática: Ciencias de la educación
Nombre: MORENO MEDINA, IRENE
Referencia: RYC2024-050976-I
Correo Electrónico: irenemmedina@gmail.com
Título: Análisis de la situación de la escuela rural. Un estudio en la Península Ibérica
Resumen de la Memoria:

La trayectoria de la investigadora demuestra una línea consolidada de trabajo, en la que además destaca una alta capacidad de transferencia de las investigaciones en diferentes ámbitos. Ha realizado contribuciones significativas en tres áreas fundamentales: escuelas en contextos vulnerables, educación equitativa para la justicia social e innovación en educación superior. En el ámbito de las escuelas en contextos vulnerables, destaca su tesis doctoral con Premio Extraordinario. Su investigación ha dado lugar a varios artículos, todos enmarcados en el Proyecto I+D+i de Excelencia sobre escuelas en contextos socioeconómicos desafiantes. Ha trabajado en el Plan Estatal I+D+i "La democracia en las escuelas como fundamento de una educación para la justicia social", evidenciando su liderazgo en el desarrollo de la línea de estudio de escuelas en contextos vulnerables. En el ámbito de la equidad en educación, la investigadora ha logrado resultados significativos a través de su colaboración en la Cátedra UNESCO, reflejados en varios artículos. También ha participado en el proyecto Ref: EDU2017-82688-P, que ha dado lugar a otros productos. Las aportaciones significativas de la investigadora se enmarcan en los diferentes proyectos de investigación competitivos (un total de 5) y en los proyectos de transferencia. Asimismo, es miembro de la Red de Investigación sobre Liderazgo y Mejora de la Educación, de la Cátedra Unesco de Educación para la Justicia Social, del Observatorio de la Segregación Escolar y colabora con el departamento de Ingeniería Química de la Universidad Autónoma de Madrid en calidad de experta en cambio educativo en educación superior. La investigadora ha realizado tres estancias postdoctorales en el marco de convocatorias competitivas. La primera, en la Universidad de Oporto, se centró en la investigación sobre democracia. La segunda, en la Universidad de Sevilla, se enfocó en proyectos que abordan la mejora de la alfabetización en contextos de transformación social. La tercera, en la Universidad Rovira i Virgili, se enmarca en el International Successful School Principalship Project. La investigadora destaca su papel como editora de la Revista Internacional de Educación para la Justicia Social y de la Revista Iberoamericana de Evaluación Educativa, así como su labor como evaluadora para diversas revistas científicas. También ha sido evaluadora en la Dirección de Evaluación y Acreditación de la Agencia Andaluza del Conocimiento y en la Agencia Nacional de Evaluación de la Calidad y Acreditación. Continuando con la línea de investigación de la candidata, la línea presentada se relaciona con las escuelas en contextos vulnerables, con la principal novedad de centrar el objeto de estudio en las escuelas rurales. El objetivo general de esta línea de investigación a desarrollar es conocer la situación de la escuela rural a nivel peninsular, centrándose en sus fortalezas y debilidades. Para abordar esta situación, se establecen los siguientes objetivos (con respectivos subestudios): a) comprender cómo el contexto rural afecta a la dinámica de las escuelas; b) conocer los liderazgos exitosos en las escuelas rurales y el uso de la IA; c) Indicar cómo son los entornos de alfabetización multimodal familiar del alumnado de escuelas rurales; d) conocer el imaginario social de las escuelas rurales en las redes sociales.

Resumen del Currículum Vitae:

La trayectoria de la investigadora demuestra una línea consolidada de trabajo, en el que además destaca una alta capacidad de transferencia de las investigaciones en diferentes ámbitos. Ha realizado contribuciones significativas en tres áreas fundamentales: escuelas en contextos vulnerables, educación equitativa para la justicia social e innovación en educación superior. En el ámbito de las escuelas en contextos vulnerables, destaca su tesis doctoral, que recibió el Premio Extraordinario. Su investigación ha dado lugar a varios artículos, todos enmarcados en el Proyecto I+D+i de Excelencia sobre escuelas en contextos socioeconómicos desafiantes, financiado por el Ministerio de Economía y Competitividad de España. Además, ha trabajado en el Plan Estatal I+D+i "La democracia en las escuelas como fundamento de una educación para la justicia social", donde ha evidenciado su liderazgo en el desarrollo de la línea de investigación sobre escuelas en contextos vulnerables. Es miembro de la Red de Investigación sobre Liderazgo y Mejora de la Educación, investigadora de la Cátedra Unesco de Educación para la Justicia Social, colaboradora del Observatorio de la Segregación Escolar y del departamento de Ingeniería Química de la Universidad Autónoma de Madrid en calidad de experta en cambio educativo en educación superior. ha realizado tres estancias postdoctorales, en el marco de convocatorias competitivas. La primera, de cuatro meses en Oporto, se centró en la investigación sobre democracia y resultó en la coordinación de un número monográfico en RIEJS. La segunda estancia, de doce meses en la Universidad de Sevilla, se enfocó en la alfabetización multimodal y la diversidad, colaborando con un grupo de investigación en proyectos que abordan la mejora de la alfabetización en contextos de transformación social. Actualmente, sigue colaborando activamente con este grupo en un proyecto sobre entornos de alfabetización multimodal familiar. La tercera estancia postdoctoral, de nueve meses, se lleva a cabo en la Universidad Rovira i Virgili, en el marco del proyecto ISSPP (International Successful School Principalship Project). Asimismo, la candidata ha participado activamente en la organización de congresos internacionales, formando parte del comité organizador de nueve congresos y comité científico en dos. Además, La investigadora ha estado activamente involucrada en diversas actividades de divulgación científica y educativa, destacando su participación en el Hackathon UAM: Mujer y Ciencia, en la campaña "Reivindicando una educación feminista para la justicia social" de la Cátedra UNESCO (2021) y en la iniciativa nacional 11 de Febrero - Día Internacional de la Mujer y la Niña en la Ciencia en tres ocasiones. También fue dinamizadora del II Encuentro de Doctorados/as e Investigadores/as Noveles AIDIPE en 2019. También ha participado en proyectos de innovación docente en la Universidad Autónoma de Madrid y la Universidad de Sevilla. En el ámbito editorial, destaca su papel como editora de la Revista Internacional de Educación para la Justicia Social y de la Revista Iberoamericana de Evaluación Educativa, así como su labor como evaluadora para diversas revistas científicas. Además, ha sido evaluadora en DEVA y ANECA).



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Turno General

Área Temática: Ciencias de la educación
Nombre: MIRALLES CARDONA, CRISTINA
Referencia: RYC2024-051401-I
Correo Electrónico: cristina.miralles@ua.es
Título: Educación para el desarrollo sostenible de la igualdad de género

Resumen de la Memoria:

La igualdad de género (IG) es uno de los problemas globales de nuestro siglo, a pesar de la existencia de políticas igualitarias para promover la equidad. Mi trayectoria previa (JdC 2023-2024) como investigadora en formación ha estado centrada en la línea "Educación para la igualdad de género y la formación del profesorado" con dos objetivos: (1) explorar el estado de desarrollo de la transversalidad del género en la docencia universitaria y (2) diseñar, desarrollar y validar instrumentos de medición para valorar el impacto de dicha política en la educación universitaria y los planes de igualdad de los centros, aportando conocimiento para mejorar la formación de los futuros docentes y del propio profesorado tratando de romper, de ese modo, la precariedad de la investigación con perspectiva de género. Esta línea de trabajo ha dado sus frutos, pero se ha mostrado incompleta para dar una respuesta satisfactoria al problema. Un análisis atento de los resultados de la investigación sugiere que la educación para la IG sigue estando ausente de las prioridades de las instituciones educativas y que, en el mejor de los casos, la formación proporcionada fracasa por desconsiderar el rol que las prácticas sociales desempeñan en la innovación y transferencia de las competencias adquiridas a los procesos de enseñanza-aprendizaje (Ley et al., 2022). Para cambiar la situación, resulta fundamental crear un entorno en el que las y los docentes no sólo se sientan alentados, sino también apoyados, lo que implica garantizar que mejoren sus habilidades y conocimientos para responder a las necesidades actuales. Por lo tanto, en un contexto innovador y transformador de la educación para la igualdad, la creación de comunidades multi-institucionales e inter-disciplinares de práctica (CoP), junto con la co-creación de conocimiento a través de procesos de investigación-acción colaborativa parece ser esencial para el desarrollo profesional inicial y continuo de las/os docentes y su transformación como agentes de cambio en el contexto de la Agenda 2030.

Partiendo de este planteamiento, la línea de investigación a desarrollar "Educación para el desarrollo sostenible de la igualdad de género", no sólo es más comprensiva que la anterior, sino también más transgresor. Lo que se persigue es incorporar a la educación para el desarrollo de la IG, una perspectiva sostenible que basada en la formación en prácticas colaborativas en comunidades de aprendizaje y en la co-creación de conocimiento desarrolle las competencias socio-emocionales, la conciencia de género, la identificación de estereotipos y proteja la salud mental para prevenir los efectos asociados a las distintas formas de violencia. El objetivo general es contribuir a transformar los sistemas de formación de docentes en ecosistemas de aprendizaje integrados por CoP. Y para ello se busca generar evidencia, herramientas y experiencia sobre el perfil de competencias necesarias y estrategias de aprendizaje para impartir una docencia con perspectiva igualitaria y de género.

Resumen del Currículum Vitae:

Mi contribución científica, cuatro años después de doctorarme, se resume en 19 publicaciones en acceso abierto (nueve aportaciones en revistas con factor de impacto [JCR o SJR] y 10 CL [SPI Q1 o Book Citation Index, WoS], 42 presentaciones en congresos de prestigio internacional como la AERA y ECER, así como tres patentes (Batería METCI, Índice EDS 5, Herramienta TI-GÉNERO. Mis trabajos han recibido 230 citas y 9 recomendaciones, siendo el trabajo más citado Miralles et al. (2020), Educación XX1 (JCR, Q1) con 163 citas. Defendí mi tesis doctoral (TD) con mención internacional y obtuve el Premio Extraordinario de Doctorado en el programa interuniversitario en Estudios Interdisciplinares de Género (Consejo de Gobierno UA 22/05/2024). Además, fue galardonada con el Premio a la mejor TD Cecilia Castaño 2023 por la Universitat Oberta de Catalunya (<https://gender-ict.net/2024/02/cecilia-castano-award-2023-ceremony-know-the-authors-of-the-winning-research-works/>) y con la mención honorífica accésit de los Premios Solveig Nordström de la Cátedra Paz y Justicia de la Universidad de Alicante (UA), al mejor artículo sobre la paz, la justicia e instituciones sólidas (2022-2023).

Mi capacidad de iniciativa y liderazgo pueden apreciarse en la captación de cuatro proyectos I+D+i (1 Erasmus+ Teacher Academies, 2 PID del Plan Nacional de I+D+i y 1 Programa Propio de la UA) y varios contratos que suman una financiación de 422.942,12 euros. En ellos, he desempeñado el rol de IP, co-IP o coordinadora, lo que me ha brindado la oportunidad de desarrollar mi actividad investigadora con cierta independencia. De los proyectos, destacaría el europeo (G-STEAM) y los PID del Plan Nacional y, de los contratos, el suscrito con (a) el Dept. de Educación del Estado de Minnesota (proyecto AWARE, jul 2021 a oct 2022) y con (b) Arizona State University (Mary Lou Fulton Teachers College) como asesora experta en género (2023-2024) "Higher Education Partnership-Morocco" (HEP-M, <https://education.asu.edu/projects-and-impact/higher-education-partnership-morocco>). Dicha capacidad de liderazgo se ha visto apoyada y potenciada por mi participación activa en cuatro grupos/redes de investigación: DEG (Diversidad, Educación y Género) de la UA; ICI del Institute on Community Integration, UMN-Twin Cities; AGORA del Center for the Study of Social Justice and Equality in Education, University of Helsinki, Finland y, recientemente, G-STEAM, red europea (Academia de Profesores) orientada a reforzar la dimensión internacional de la formación del profesorado en el ámbito STEM.

Asimismo, he impartido docencia no tutelada en Métodos de Investigación y Diagnóstico en Educación en el máster en Formación del Profesorado de Educación Secundaria, especialidades Orientación, FOL y Procesos Sanitarios, por un total de casi 200 horas lectivas, y me he mostrado comprometida con la organización de congresos (CIIDES 2024 y 2025); evaluación de proyectos (e.g. para AGAUR); co-edición de special issues; y revisión de manuscritos de revistas indexadas (International Journal of Inclusive Education JCR-Q2, Social Psychology of Education JCR-Q1, Journal of Social Psychology JCR-Q3, Education Sciences SJR-Q1, Sustainability JCR-Q2); además de formar parte del panel de evaluadores/as expertos/as de la AERA desde hace varios años.



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Turno General

Área Temática:

Ciencias de la educación

Nombre:

OROZCO ALMARIO, INMACULADA CONCEPCIÓN

Referencia:

RYC2024-048361-I

Correo Electrónico:

inmaoroal@gmail.com

Título:

Narrativas docentes y voces polifónicas para la construcción de una sociedad democrática e inclusiva

Resumen de la Memoria:

Doctorado en Educación con Mención Internacional en la Universidad de Sevilla (Sobresaliente Cum Laude, 2022) con la Tesis Doctoral titulada "Luces para una educación sin exclusiones: narrativas docentes que enseñan cómo hacer pedagogía inclusiva en Educación Infantil, Primaria, Secundaria y Universidad" dirigida por Anabel Moriña y vinculada al proyecto "Pedagogía Inclusiva en la Universidad: Narrativas del Profesorado (EDU2016-76587-R)" de MINECO. La adscripción de la Tesis al proyecto gracias a una ayuda FPU derivó en una contribución alta y rol activo. También supuso una ampliación de la línea de investigación del grupo de investigación, estudiando la pedagogía inclusiva desde una mirada amplia de la diversidad, en otras etapas educativas y profundizando en metodologías más participativas (historia de vida polifónica co-construida). Seguidamente, el proyecto "Prácticas docentes inclusivas con tecnologías emergentes (m-learning): diseño, desarrollo y evaluación de un programa de formación para profesorado universitario [US-1381423]" fue clave para colaborar con otras universidades, así como aprender a investigar con docentes y saber qué y cómo diseñar formaciones prácticas de éxito con tecnologías para la promoción de la educación superior inclusiva. Más adelante, con el actual proyecto "Historias de Éxito Universitario de Graduados con Discapacidad: Un Análisis Ecológico de Factores Personales y Contextuales (PID2020-112761RB-I00)" se está avanzando en la promoción de universidades inclusivas, escuchando testimonios de egresados con discapacidad y tejiendo historias de vida de éxito narradas a partir de una polifonía de voces. Por último, con los proyectos "Comunidades de práctica profesional y mejora de los aprendizajes. Liderazgos intermedios, redes e interrelaciones (P20_00311)" y "Co-construcción de narrativas pedagógicas inclusivas en procesos de transformación socioeducativa (PID2023-151491NB-I00)", así como otros liderados por centros educativos de la Comunidad Valenciana se está comprendiendo que los procesos de investigación tienen que ser participativos, vinculados al territorio y democráticos, así como coherentes con los principios de la investigación inclusiva. Se aprecia un hito significativo en la trayectoria y línea de investigación que impulsa a la solicitante a soñar y erigir sus propios proyectos centrados en las narrativas para la inclusión desde voces polifónicas donde, esta vez, los participantes sean co-investigadores y se fortalezcan redes de apoyo entre universidades y escuelas.

Líneas de investigación: educación inclusiva, pedagogía inclusiva, investigación narrativa, investigación-acción-participativa, formación docente, tecnologías emergentes, Educación Infantil, Primaria, Secundaria y Universidad, co-construcción del conocimiento, escuela incluida.

Miembro de dos grupos de investigación: I.D.E.A de la US y MEICRI de la UJI. Miembro del Grupo de Innovación Educativa de la Universitat Jaume. Participación en 5 proyectos de investigación financiados y competitivos (3 nacionales y 2 autonómicos) en 3 universidades: US, UGR y UJI. Publicación de 26 artículos en revistas científicas de impacto siendo estos en su gran mayoría JCR(17) y SJR(4) y autora de 12 capítulos de libros. 76 comunicaciones en congresos y jornadas nacionales e internacionales y ponente invitada en 22 congresos nacionales e internacionales.

Resumen del Currículum Vitae:

La carrera investigadora se inicia con una Beca de colaboración en el Departamento de Psicología Evolutiva y de la Educación de la UMA (2016) y siendo Alumna Interna y Asistente Honoraria en el Departamento de DOE de la Universidad de Sevilla (2018-2019). Beneficiaria de una becaria de inicio a la Investigación del Plan Propio y una Ayuda FPU (FPU2017-01209) en el citado departamento y dirigida por Anabel Moriña. Actualmente Contratada Posdoctoral Juan de la Cierva-Formación en la UJI (Grupo MEICRI, supervisión: Odet Moliner) y visitante académica durante seis meses en la University of Southampton (Ayudas para estancias de movilidad en el extranjero José Castillejo para jóvenes doctores 2023) con la profesora Kiki Messiou. Acreditada como Profesora Contratada Doctora y Profesora de Universidad Privada (ANECA, 2023). Participación en 5 proyectos de innovación docente y cooperación al desarrollo financiados por el Plan Propio de la US la UJI. Participación en 2 proyectos de innovación y transferencia ACORD de la Generalitat Valencia centrados en la investigación-acción-participativa y las narrativas pedagógicas inclusivas. Estancias predoctorales de investigación internacionales financiadas con una duración total de 8 meses y 5 días (Plymouth, 2021; Universidade de Lisboa, 2022; FAU Erlangen-Nürnberg, 2022) y autofinanciadas (UCA, 2022). 7 meses y 15 días de estancias posdoctorales nacionales (UCA, 2023) e internacionales (Universidad de Algarve, 2024). En estas instituciones se ha establecido una alta colaboración en términos de artículos, proyectos, redes de investigación, congresos, formaciones y divulgación conjunta que todavía continúan en auge. 6 años de experiencia docente universitaria dirigiendo un total de 30 TFG y 8 TFM y siendo miembro de 8 tribunales evaluadores de TFG y TFM en 4 universidades españolas (US, EUO, UNIR y UJI). Miembro de Redes de Investigación Educativa como WERA-IRN "Student Voice for Promoting Equity and Inclusion in Schools", Red Internacional de Escuelas por la Inclusión y la Equidad ("Querierla es Crearla"), Instituto Interuniversitario Andaluz de Investigación Educativa y RUEI entre otras. Evaluadora externa internacional invitada en Tesis Doctorales en la University of Sydney (2024) y UNED como vocal (2024). Gestión y liderazgo siendo coordinadora académica en el Programa UNIDIVERSIDAD de la US (2020-2023) y Unidiversummer (2023), miembro de comisiones de Curso de la FCCE, US (2023-2024) y la Comisión de Ciencias Sociales, Educación y Salud para la Renovación de la Acreditación del título de Máster Universitario en NEEADE (2017-2018), y transfiriendo el conocimiento a la sociedad a través de la divulgación científica (Noche Europea de los Investigadores, Café con Ciencia, Jornadas Internacionales de Innovación Docente) y formando a profesorado universitario en educación inclusiva en la US y UCA (2022-2023) y la Universidad de Aveiro (2024). Revisora externa de revistas de impacto como International Journal of Inclusive Education, Gender, Work & Organization, REICE, Aula Abierta, Teoría de la Educación y Profesorado entre otras. Coordinadora de monográficos, miembro de comités editoriales de dos revistas de impacto y miembro de comités organizadores y científicos en 26 congresos internacionales reconocidos como ECER (2021; 2024), CILME (2023), CUICID (2023, 2024) o CILCS (2024) entre otros.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias de la educación
Nombre: ZANDONAI, THOMAS
Referencia: RYC2024-051106-I
Correo Electrónico: thomaszandonai@gmail.com
Título: Drug Use in Sport and Doping: The Importance of Science and Education in protecting health
Resumen de la Memoria:

Dr Zandonai pursued an academic career in Physical Activity and Sport Science at the University of Verona, earning a degree in 2006, a Master's with honors in 2010, and a PhD in Translational Biomedicine specializing in Pharmacology.

His research interests include the prevalence and effects of substances on physical exercise and cognitive performance in both sports and clinical settings, focusing on psychoactive drugs, analgesics, and anxiolytics. He also investigates physical activity as an adjunct in treating substance use disorders, exercise addiction, and experimental, social, and educational research in the anti-doping field. His expertise spans sports science, biomedical science, pharmacology, experimental psychology, and education. Dr Zandonai has conducted studies with healthy volunteers, athletes (clinical trials involving drug administration), and patients. Additionally, he has demonstrated strong leadership abilities, reflected in his extensive collaborations and impactful contributions to sports science, pharmacology, and psychology.

To date, Dr Zandonai has published 49 Journal Citation Report (JCR) articles, which have been cited 318 times in Scopus and 514 times in Google Scholar, giving him H-Indexes of 12 and 14, respectively. Eighty-eight percent of his publications (43 articles) are in the 1st and 2nd JCR quartiles, with 12% in the 3rd and 4th quartiles. He has authored seven book chapters covering topics such as: i) Doping and drugs of abuse in "In Sostanza" book, ii) Doping in Tennis, iii) psychological intervention on Doping use during COVID-19 pandemic, iv) exercise as a coadjutant to treat addiction v) Doping in soccer, vi) Exercise Addiction and vii) Drugs use in Sport.

Dr Zandonai has won 13 funded calls (four as Principal Investigator) and delivered 54 contributions at congresses, conferences, and seminars, including one symposium, one workshop, and 21 invited lectures. He has supervised 25 student academic projects, including a PhD student (with two ongoing), and has served as a lecturer and researcher at six universities across Italy, Spain, and Chile.

In the 2023 Ramón y Cajal call, Dr Zandonai was placed on the reserve list with a score of 80.10.

He is currently an Associate Editor of Emerging Trends in Drugs, Addictions, and Health (Elsevier) and a member of the Editorial Board of Performance Enhancement and Health (Elsevier). He was elected an Honorary Member of The International Society for the Study of Emerging Drugs (ISSED). Over the past year, he has served as Reviewer Editor for Frontiers in Sports and Active Living and as a reviewer for 14 JCR journals.

Dr Zandonai is a member of several prestigious organizations, including the Human Enhancement Drugs Network (HEDN), Academic Football Lab (AFLab), the Italian Society of Tobaccology (SITAB), the European Behavioural Pharmacology Society (EBPS), the European College of Sport Science (ECSS), and the Spanish Association of Sports Sciences (AECD).

Starting in 2024, Dr Zandonai will hold a Postdoc position at the Department of Psychology and Cognitive Science (Department of Excellence) at the University of Trento, Italy, where he serves as Scientific Coordinator of the Addiction Science Lab. He is also a Research Collaborator with the Department of Pharmacology, Pediatrics, and Organic Chemistry at UMH.

Resumen del Currículum Vitae:

Dr Zandonai pursued an academic career in Physical Activity and Sport Science at the University of Verona, earning a degree in 2006, a Master's with honors in 2010, and a PhD in Translational Biomedicine specializing in Pharmacology. Alongside his supervisor, Prof Chiamulera, he co-applied for and won a World Anti-Doping Agency (WADA) grant to study the effects of nicotine on sports performance, securing a 12-month Postdoctoral Research Fellowship in 2015. As scientific coordinator, he oversaw the WADA project and Human Lab, producing 13 JCR-indexed articles, six conference proceedings, and supervising eight dissertations.

In 2016, he joined the University of Granada's Department of Experimental Psychology under supervision of Prof Daniel Sanabria. There, he earned three Postdoctoral Fellowships (totaling 42 months), funded by two WADA grants and one from the Spanish Ministry of Economy, co-authoring five articles and three conference proceedings.

Since 2021, Dr Zandonai has been an Associate Lecturer at Miguel Hernández University of Elche (UMH), collaborating with the Department of Pharmacology, Pediatrics, and Organic Chemistry. Working with Prof Ana María Peiró, he contributed to the development of the Pharmacogenetics Unit at ISABIAL, resulting in 11 publications, 10 conference presentations, and supervising two PhD students. In 2022, he joined the La Sapienza University of Rome collaborating with Prof Fabio Lucidi on projects that yielded three articles, a book chapter, and a media literacy campaign on doping during a 19-month contract.

Starting in 2024, he holds a Postdoc position at the University of Trento's Department of Psychology and Cognitive Science, serving as Scientific Coordinator of the Addiction Science Lab, focusing on addiction science and doping. He also continues as a Research Collaborator at UMH.

To date, Dr Zandonai has published 49 JCR articles, cited 318 times in Scopus and 514 times in Google Scholar, with H-Indexes of 12 and 14, respectively. Eighty-eight percent of his publications (43 articles) are in the 1st and 2nd JCR quartiles, with 12% in the 3rd and 4th quartiles. He served as corresponding author (first or last name) for 28 out of 49 articles (57%). Zandonai supports Open Access through IRIS (University of Trento), OSF, and REDIUMH. He has authored seven book chapters on doping, drug abuse, and exercise addiction among athletes.

Dr Zandonai has won 13 funded grants (four as PI), presented 54 contributions at conferences, seminars, and congresses (including one symposium, one workshop, and 21 invited lectures), and supervised 25 student academic works, including a PhD student who graduated with outstanding honors (two others are ongoing). He has served as a lecturer and researcher at six universities across Italy, Spain, and Chile.

In the 2023 Ramón y Cajal call, he was placed on the reserve list with a score of 80.10.

Currently, he is Associate Editor of Emerging Trends in Drugs, Addictions, and Health (Elsevier) and a member of the Editorial Board of Performance Enhancement and Health (Elsevier). He was elected Honorary Member of The International Society for the Study of Emerging Drugs (ISSED). Additionally, he is Reviewer Editor for Frontiers in Sports and Active Living and a reviewer for 15 JCR journals.



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Turno General

Área Temática:

Ciencias de la educación

Nombre:

LÓPEZ GIL, JOSÉ FRANCISCO

Referencia:

RYC2024-049320-I

Correo Electrónico:

josefranciscolopezgil@gmail.com

Título:

Contribuciones al estudio de estilos de vida saludables y su impacto en la salud infantil y adolescente

Resumen de la Memoria:

El candidato ha desarrollado una carrera destacada en el ámbito de la investigación aplicada a la promoción de la salud pública, con énfasis en la infancia y la adolescencia. Su trayectoria se centra en el estudio de la dieta mediterránea, los trastornos alimentarios, la actividad física, el comportamiento sedentario y su impacto en el sobrepeso, la obesidad y la salud mental. Con más de 200 publicaciones científicas en revistas indexadas, ha contribuido significativamente al avance del conocimiento en estos campos.

Entre sus logros destacados, figura el desarrollo de estudios pioneros sobre la relación entre el desayuno y la salud psicosocial, así como el impacto de la dieta mediterránea en indicadores cardiometabólicos en niños y adolescentes. Además, sus investigaciones durante la pandemia de COVID-19 permitieron documentar los cambios en los comportamientos de movimiento en poblaciones infantiles de Brasil y España. Estas aportaciones han sido reconocidas por su inclusión en el prestigioso ranking de la Universidad de Stanford de los científicos más influyentes del mundo.

Ha mantenido un fuerte vínculo con su municipio natal, Archena, donde realizó su tesis doctoral. Desde entonces, ha liderado varios proyectos orientados a mejorar la salud de su comunidad, como "Archena Infancia Saludable" y "The EHDLA Study". Estos proyectos han buscado transformar la realidad local mediante intervenciones que promuevan hábitos de vida saludables, impactando directamente en niños, adolescentes y sus familias. A pesar de su alcance global como investigador, el candidato ha seguido trabajando para mejorar la situación de su municipio desde cualquier lugar del mundo, demostrando un compromiso genuino y sostenido con sus raíces.

La línea de investigación propuesta busca integrar los principios de la Medicina del Estilo de Vida (MEV) en el ámbito educativo como herramienta para la promoción de la salud mental en adolescentes. Mediante la aplicación de intervenciones basadas en la asignatura de Educación Física, se pretende fomentar la nutrición saludable, la actividad física regular, la calidad del sueño y otros pilares esenciales de la MEV, como las relaciones sociales positivas, la evitación del consumo de sustancias tóxicas y la gestión del estrés. Este enfoque multidimensional busca empoderar a los estudiantes y sus familias, promoviendo un estilo de vida saludable que trascienda el ámbito escolar y se refleje en una mejora duradera de la salud mental y física de la población joven.

La innovación de esta propuesta radica en que no existe ninguna intervención previa que verifique la aplicación de una web app basada en la adherencia a los pilares de la MEV y su impacto en la salud mental de los adolescentes. Además, se incorpora la formación del profesorado como un eje central para garantizar la sostenibilidad y escalabilidad del programa, así como herramientas tecnológicas gamificadas para fomentar la participación activa y el compromiso de los estudiantes.

El candidato aspira a consolidar esta línea de investigación como un referente en la promoción de la salud mental desde un enfoque educativo y multidisciplinar. La propuesta también tiene como objetivo generar una metodología replicable que pueda adaptarse a diversos contextos culturales y educativos, maximizando su impacto y contribuyendo al bienestar de las futuras generaciones.

Resumen del Currículum Vitae:

El candidato cuenta con una trayectoria profesional destacada en el ámbito de la salud pública y la investigación en estilos de vida saludables en la infancia y adolescencia. Con más de 200 publicaciones científicas en revistas indexadas, su producción académica refleja un impacto significativo, con más de 1.623 citas y un índice H de 18. El 82,5% de sus trabajos le identifican como autor preferente, y el 88,3% son fruto de colaboraciones internacionales, evidenciando su liderazgo y alcance global. El 76,6% de sus trabajos están en acceso abierto y el 41% se encuentran en el primer decil, demostrando su compromiso con la ciencia abierta y la calidad investigadora. Además, el 88,3% de sus publicaciones son colaboraciones internacionales, consolidando su perfil como investigador global. Entre sus logros más destacados está su inclusión en el ranking de la Universidad de Stanford, que reconoce al 2% de los científicos más influyentes del mundo.

Ha liderado proyectos innovadores como "Archena Infancia Saludable" y "The Eating Healthy and Daily Life Activities (EHDLA) Study", financiados por entidades locales, que han generado más de 30 publicaciones de alto impacto. También ha desarrollado proyectos financiados en Ecuador, como "PASOS-Region of Murcia study" y "SUNRISE Project", que han recibido un respaldo significativo y han producido resultados relevantes en el ámbito de la salud infantil. Además, ha liderado el proyecto "Efecto de una intervención basada en la promoción de las recomendaciones de movimiento 24 horas y la Dieta Mediterránea en adultos de la población de Albacete", financiado por las Ayudas a la Investigación Juan Carlos Izipisúa Belmonte. Su participación en redes internacionales como Global Burden of Diseases, HEPA Europe y Active Healthy Kids Global Alliance refuerza su liderazgo y colaboración a nivel mundial.

En el ámbito de la divulgación científica, ha presentado más de 38 comunicaciones en congresos mayoritariamente internacionales y ha publicado artículos en plataformas de gran alcance como The Conversation, Diario Sanitario o Fissac. Ha impartido talleres de metodología de investigación en universidades de prestigio como Harvard University y la Universidade Federal do Paraná. También es editor asociado en revistas indexadas, así como evaluador externo de proyectos científicos internacionales. En el ámbito de la formación, ha dirigido una tesis doctoral defendida y actualmente supervisa otras cinco en curso, además de haber tutelado más de 10 trabajos de fin de grado y máster. Su compromiso con la promoción del talento se refleja también en la atracción de investigadores a proyectos relevantes y en la obtención de contratos pre y postdoctorales competitivos.



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Turno General

Ha liderado proyectos basados en datos de acceso público y promovido el cumplimiento de principios éticos rigurosos, como la aprobación de protocolos por comités de ética y la protección de datos personales. Además, su participación en comités internacionales y redes globales refuerzan su influencia en la comunidad científica. Finalmente, sus aportaciones han sido reconocidas con múltiples premios de investigación, incluyendo el Premio Extraordinario de Doctorado de la Universidad de Murcia, el Premio Curta Ciência por la Universidade Federal do Paraná o los Premios Estrategia NAOS por el Ministerio de Consumo de España.



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Turno General

Área Temática: Ciencias físicas
Nombre: SOUTO GONÇALVES DE ABREU , SAMUEL FRANÇOIS
Referencia: RYC2024-048348-I
Correo Electrónico: samuel.abreu@cern.ch
Título: Precision predictions for collider physics and beyond

Resumen de la Memoria:

My research covers a broad range of topics, from more formal investigations on the analytic structure of Feynman integrals all the way to more phenomenological studies such as the resummation of jet-vetoed cross sections. I am mostly known for my contributions to the calculation of two-loop five-point integrals and QCD amplitudes, where for several years I have been consistently obtaining new state-of-the-art results that can be used to improve the precision of theoretical predictions for collider physics experiments.

Feynman integrals are ubiquitous in perturbative (quantum) field theory. They are a crucial ingredient to obtain precise theoretical prediction for scattering processes in QCD. These integrals are notoriously difficult to evaluate. During my PhD, I have developed new mathematical tools to expose and organise the analytic structure of Feynman integrals. Since then, I have applied this expertise to compute state-of-the-art results for multi-leg two-loop Feynman integrals, which have had a strong impact in collider physics but also on more formal theories.

My experience on the analytic structure of Feynman integrals has allowed me to develop new approaches to compute scattering amplitudes for multi-leg scattering processes. For instance, I was the first to compute the two-loop amplitudes for the production of three jets at hadron colliders, and have since continued to develop these computational tools to obtain new results for multi-scale processes for LHC physics.

My research trajectory, covering both formal investigations as well as collider-physics oriented calculations, gives me a broad view of the field of theoretical high-energy physics and puts me in a strong position to continue to contribute new state-of-the-art results. In the next years, I will develop my research along three different directions. These directions will build upon the computational tools I have developed in the last years as well as allow me to broaden my research horizons.

The first direction is a direct continuation of my past work. I have been consistently obtaining new results in this direction, and I will continue applying my expertise to contribute to improving the landscape of precise predictions for multi-scale collider processes. I will target the calculation important processes for LHC physics, such as the production of Higgs boson in association with two jets, or the production of four jets.

The second direction will be to explore new directions in LHC collider phenomenology. Many of the bottlenecks in these calculations are similar to the ones I had to overcome in the calculation of multi-scale integrals and amplitudes. I already have ongoing collaborations in this direction, and will perform the first jet-vetoed Higgs cross section at the next-to-next-to-next-to-leading order in both logarithmic and fixed-order accuracy in QCD. I will also explore how new techniques to compute amplitudes in the vacuum can be used in dense QCD media such that of heavy-ion collisions.

The final research direction I will explore in the coming years is the impact of these tools in the calculations required for future colliders. Given the imminent decision on whether such a collider will be built and the ongoing European strategy process, it is paramount that we show that we have a path towards delivering the required theoretical predictions.

Resumen del Currículum Vitae:

I work on high-energy particle physics, more precisely on computing theoretical predictions for collider experiments such as those at the LHC at CERN. One of the main challenges in computing these corrections is the calculation of scattering amplitudes in Quantum Chromodynamics (QCD). I have developed and used new mathematical tools to tackle these challenging calculations, and have been pushing the state-of-the-art in multi-leg two-loop amplitudes. I have published 34 papers, including 6 in Physical Review Letters (PRL) with many international collaborators.

After my university studies at Instituto Superior Técnico (PT), I won funding to do a PhD at The University of Edinburgh (UK) under the supervision of Einan Gardi. My PhD work studied the analytic properties of Feynman integrals, using new mathematical tools to find hidden structures and new relations between them. This established a new research direction in Edinburgh and culminated in my first publication in PRL. During my PhD, I spent one year at the CEA in Saclay (FR) to work with Ruth Britto funded by the LHCPhenoNet network.

During my first postdoc, I joined the group of Harald Ita and Fernando Febres Cordero in Freiburg (DE) and pioneered the development of numerical unitarity for two-loop amplitudes. A main goal of the community was the calculation of the amplitudes for three-jet production at the LHC at two loops, and we were the first group to achieve this important milestone. These results crucially relied on the new mathematical tools I developed and used in my PhD. I further established my independence by working with external collaborators, PhD students and young postdocs. I then won my first research grant post PhD to be a Chargé de Recherche at the Université Catholique de Louvain (BE). I obtained new results in multi-leg amplitudes and integrals, as well as in the analytic properties of Feynman integrals. The main highlights of my work during these two postdocs led to four publications in PRL.



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In 2020 I was awarded the Bhaumik fellowship, a four-year position between CERN and UCLA. After one year at CERN, I won a Royal Society Fellowship (an advanced five-year grant) and was offered a very prestigious staff position at CERN for 6 years. I declined the Royal Society fellowship in favour of the position at CERN, but since 2021 hold a permanent position in Edinburgh from which I am on leave. During this period, I pushed the state of the art in multi-leg two-loop calculations, and broadened my research in other directions of collider physics.

Aside from my research work, I am actively engaged in the community. I am regularly invited as a speaker at leading conferences of the field and to give seminars and colloquia at institutions in Europe and the US. I have mentored masters, PhD students and fellows in CERN-TH, and was the supervisor of a Marie Curie fellowship. I organised several international conferences, schools and many other smaller workshops. I am the TH representative for the organisation of CERN schools.

I am a referee for the leading journals of the field (PRL, Phys.Rev.D., JHEP, Physics Letters B, Computer Physics Communications) and for grants in the UK and Switzerland.



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Turno General

Área Temática: Ciencias físicas
Nombre: ZUMALACÁRREGUI PÉREZ, MIGUEL
Referencia: RYC2024-049805-I
Correo Electrónico: mzuma@aei.mpg.de
Título: Lensed coherent transients: new avenues in astrophysics and fundamental physics

Resumen de la Memoria:

Mi investigación se centra en la intersección de tres pilares de la teoría de la relatividad general: la cosmología, el efecto de lente gravitacional y las ondas gravitacionales (GWs). Mediante el estudio de estos fenómenos, busco abordar problemas fundamentales de la física y la astrofísica, como:

- ¿Qué es la materia oscura que domina la dinámica a escalas galácticas y de cúmulos?
- ¿Por qué se está acelerando la expansión del universo (energía oscura)?
- ¿Es correcta la teoría de Einstein a escalas cosmológicas?
- ¿Cómo se forman y colisionan los agujeros negros y las estrellas de neutrones?

He desarrollado herramientas innovadoras, como los códigos públicos `hi_class` y `GLoW`, que han transformado la capacidad de modelar la física de GWs y lentes gravitacionales. Mi contribución incluye avances teóricos, computacionales, fenomenología y análisis de datos.

Mi trayectoria científica está marcada por independencia y creatividad. He publicado 46 artículos con más de 6,900 citas (h -índice = 34) y recibido financiación competitiva (Marie Curie Global Fellowship, Proyecto anual de la Sociedad Max Planck). Actualmente lidero un grupo en el Instituto Max Planck para Física Gravitacional, centrado en la fenomenología de ondas gravitacionales, lentes gravitacionales y señales de física fundamental.

Mi futuro como investigador Ramón y Cajal estará orientado a explorar nuevas herramientas para descubrir e interpretar señales de ondas gravitacionales magnificadas empleando nuevos fenómenos de óptica ondulatoria. Estas innovaciones permitirán estudiar fuentes a alto redshift, sondear la materia oscura y proponer nuevas pruebas de la relatividad general, ampliando la capacidad de misiones como LIGO-Virgo, LISA y Einstein Telescope.

Resumen del Currículum Vitae:

Soy físico teórico especializado en cosmología, ondas gravitacionales y lentes gravitacionales. Tras obtener mi doctorado en la Universidad Autónoma de Madrid (2012), desarrollé una carrera internacional en instituciones de prestigio como la Universidad de Heidelberg (Alemania), NORDITA (Suecia) y la Universidad de California, Berkeley (EE. UU.), bajo el apoyo de la prestigiosa beca Marie Curie Global.

He realizado contribuciones clave en áreas como:

- Difracción de ondas gravitacionales: Desarrollé métodos para modelar señales magnificadas, liderando el código `GLoW`, una avance importante en el campo.
- Pruebas de energía oscura y gravedad: Introduje restricciones fundamentales en teorías modificadas usando ondas gravitacionales.
- Tests de gravedad cosmológica: Presenté nuevas firmas de teorías modificadas, modelos para resolver discrepancias cosmológicas y desarrollé el código `hi_class` para estudiar estos escenarios.
- Lentes gravitacionales de materia oscura: Establecí límites sobre objetos compactos y métodos para caracterizar su morfología, con impacto en áreas de la astrofísica y física de altas energías.

Como líder del grupo de Cosmología en el Instituto Max Planck, supervisé 5 postdocs, 3 estudiantes de doctorado y 7 estudiantes de máster, quienes han avanzado a posiciones de prestigio de todo el mundo. He organizado eventos internacionales, evaluado propuestas científicas (ERC, NASA Hubble Fellowship) y mis publicaciones han recibido amplia atención en medios especializados y generales. Mi producción científica incluye 46 artículos publicados en revistas internacionales (PRL, PRD, JCAP), con más de 6,500 citas y un impacto significativo en múltiples disciplinas.



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Turno General

Área Temática: Ciencias físicas
Nombre: POZAS KERSTJENS, ALEJANDRO
Referencia: RYC2024-050175-I
Correo Electrónico: pozas1992@gmail.com
Título: Bridges between quantum information and machine learning
Resumen de la Memoria:

My research interests center around the synergies between quantum information theory and other areas within physics, mathematics, and computer science. Much of my research focuses on the application of concepts inspired by quantum information theory to other disciplines. Throughout my career I have used the tools of quantum information theory for understanding phenomena in quantum field theory, thermodynamics, machine learning, and causal inference. These tools, at the same time, have enabled a better understanding of quantum information processing tasks in complex scenarios.

My research has developed along three main lines: the first encompassing the broad definition of “quantum information outside quantum information” as the application of quantum information theory to other disciplines; the second regarding the certification of quantum phenomena in complex networks; and the third exploring the synergies between various areas of physics (quantum mechanics, statistical mechanics, and quantum many-body physics) and machine learning.

Quantum information theory has changed how we understand the foundations of quantum physics, impacting fields such as the simulation of many-body systems and quantum thermodynamics. I have explored these influences in various areas. Within quantum field theory, I studied the information content of the vacuum and its extraction by probes interacting with it. A realistic modeling of the phenomenon revealed that much more entanglement than originally thought can be extracted from the vacuum state of a quantum field. I have also developed techniques to efficiently characterize quantum thermodynamic interactions, and to analyze causal influences mediated by quantum systems. I am currently interested in refining the methods that I have developed so they can be used to approach real-world scenarios.

The second line is the characterization of quantum phenomena, such as entanglement and nonlocality, in quantum communication networks where many parties process systems distributed by independent sources. Many standard tools are of no help in these situations, and new ones must be created. I have focused on the creation of such numerical techniques, and on the development of notions of multipartite entanglement and nonlocality that are of relevance in the context of networks. My works define the widely used notions of Genuine Network Multipartite Entanglement and Full Network Nonlocality. I am interested in the demonstration of such concepts in experiments and its use in the analysis of multipartite cryptographic protocols. I am also the main author of two comprehensive reviews, on nonlocality in networks and on semidefinite programming in quantum information.

I also work on how physics can help for machine learning tasks, either by speeding up computations or by opening new paradigms. I have shown that using physics-based solutions for machine learning produce algorithms that learn faster, more efficiently, and more robustly against interferences by an adversary. I have also demonstrated that tensor networks, a tool developed for the characterization of many-body quantum systems, can be used as ML algorithms with privacy-preserving guarantees. Finally, I have designed and analyzed quantum machine learning algorithms in state-of-the-art quantum computers.

Resumen del Currículum Vitae:

I completed my Degree in Physics from Universidad Complutense de Madrid in 2014 with honors including the excellence grade (Matrícula de Honor) in 26 out of 37 courses, three mentions to outstanding achievement from Comunidad de Madrid, and receiving the Extraordinary Degree Prize (Premio Extraordinario del Grado en Física). After that I was selected to the exclusive PSI Master's program in theoretical physics from Perimeter Institute (Waterloo, Canada), being the second student of Spanish nationality accepted to the program. The articles product of the research I did there have become standard literature in relativistic quantum information (two papers, >190 citations each).

After the Master's I obtained a La Caixa Foundation fellowship to do my PhD in Instituto de Ciencias Fotónicas under the supervision of Prof. Antonio Acín. I defended my thesis on October 15th 2019, obtaining the grade of excellent cum laude and the special PhD thesis award (Premio Extraordinario de Doctorado) of Universitat Politècnica de Catalunya.

During 2020 and 2021 I was a postdoc at the Mathematics Department of UCM. Then, I joined Instituto de Ciencias Matemáticas in Madrid until September 2023. Since then, I am a post-doctoral researcher at Université de Genève.

In 2018, my research received the "IBM-Q Best paper award" to the best research articles making use of the IBM quantum computing platforms and I was appointed Visiting Graduate Fellow at Perimeter Institute. I was also appointed Qiskit advocate in 2020, and Trusted Reviewer by the IOP in 2021. Also that year, I was offered a Group Leader position at the quantum algorithms division of BBVA R&D.

I have supervised several undergraduate research projects, TFG and TFM, and I currently supervise two PhD students. I have taught at Universitat Pompeu Fabra, Universitat Politècnica de Catalunya, Universidad Complutense de Madrid, and Universidad Politécnica de Madrid. I hold ANECA's accreditations for PAD and PCD. I have been part of the organizing committee for four conferences (1 national, 3 international), and I have experience as a referee for journals and grant proposals (QuantERA 2021).



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I have been advisor for articles in news outlets, and I have written two popular science articles in Revista Española de Física. I am also an advocate of open source in research, actively collaborating with the Open Source Office at UCM by delivering talks in quantum computer programming. I have participated in the development of the Qiskit quantum computing library. Being Qiskit Advocate, I mentored a project during the Qiskit Advocate Mentorship Program of 2021 (Elena Peña Tapia, now at IBM Zurich). I also have delivered training in quantum computing for private companies (Everis Madrid, 2019).

I do research in the certification of quantum phenomena and in the synergies between quantum information and machine learning. My record includes publications in some of the top journals of the field of Physics, and in Machine Learning journals and top conferences. Four of my papers have been featured as Editor's Suggestions. 19 out of my 26 papers do not have my PI as coauthor, and I already have my own, international network of theoretical and experimental collaborators. I am currently interested in quantum nonlocality in complex networks, and in the use of tensor networks for privacy-preserving machine learning.



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Turno General

Área Temática: Ciencias físicas
Nombre: ACCANTO, NICOLÒ
Referencia: RYC2024-049690-I
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Título: Controlling Nonlinear Excitations in Space and Time: Advancing Technology to Unveil Brain Mechanisms
Resumen de la Memoria:

From 2011 to 2016, I completed my PhD at ICFO, Barcelona, in the group of Prof. Niek van Hulst, where I developed pulse-shaping strategies to manipulate laser pulses in the time domain and achieve precise control of light-matter interactions within nanometric spatial regions (10 articles, 5 as 1st author).

After my PhD, I transitioned to neurophotonics, leveraging my expertise in 2P microscopy to advance brain research, first in the pioneering group of Prof. Valentina Emiliani, then independently with my own research group.

During my postdoc, I expanded a technique called computer-generated holography to enable simultaneous 2P excitation (or photostimulation) of hundreds of neurons in a large volume with single-cell resolution. This work led to two publications (Optica 2018, Scientific Reports 2019) and a patent licensed to 3i for commercialization.

In 2019, I became a permanent Inserm researcher and secured a grant (ANR-19-CE19-0001) to establish an independent research line within the Emiliani group. I supervised a PhD student and a postdoc to develop and validate 2P-FENDO—the first fiberscope capable of 2P imaging and precise 2P photostimulation of neuronal activity in freely moving mice. This transformative technology, published in Neuron, will profoundly impact neuroscience. Following this, I co-authored a perspective article for Neurophotonics (as last author), reviewing miniaturized microscopes and fiberscopes.

In 2023, I was awarded an ERC Starting Grant (2P-BRAINSCOPY) to establish my independent research group. Initially based at the Institut de la Vision, I moved my group to IBEC in Barcelona where I am currently introducing 2P holographic photostimulation of neurons. This groundbreaking technique, absent in the country until now, will boost Spain's neurotechnology landscape. The installation and further development of 2P-FENDO will position Spain as only the second country globally (after France) to adopt this transformative tool. As group leader, I have already published one research paper (Lorca-Camara et al., 2024), with two others (and a patent) in preparation. The first describes a breakthrough setup from my ERC project for large-scale neuronal investigation, while the second is an invited review soon to appear in ACS Photonics (under minor revision).

At IBEC, my group, Nonlinear Photonics for Neuroscience, develops cutting-edge optical tools to push the boundaries of optical microscopy and advance our understanding of brain mechanisms. Over the next five years, we will pursue three ambitious objectives, supported by robust funding (ERC Starting Grant, IBEC package, CaixaResearch grant pending, Generación del Conocimiento grant to be submitted) and a skilled interdisciplinary team.

Objective 1. Advance 2P-FENDO to achieve a larger field of view ($>1 \text{ mm}^2$), integrate 3D imaging via an electrically tunable lens, and enhance SNR using innovative laser sources and pulse-shaping strategies.

Objective 2. Combine multiple optical fibers, optimize pulse delivery for powerful infrared lasers, and apply advanced wavefront shaping to achieve precise imaging and photostimulation of neuronal circuits at ultra-large spatial scales (25 mm^2).

Objective 3. Collaborate with neuroscientists (e.g., Gisella Vetere's group) to address biological questions, such as studying traumatic memories in freely moving mice with the new 2P-FENDO.

Resumen del Currículum Vitae:

I am an expert in two-photon (2P) microscopy, ultrafast laser beam shaping, fiber optics, and optical micro-endoscopy. My research develops novel nonlinear optical technologies to address challenges in neuroscience. I have authored 20 peer-reviewed publications (3 more under revision/preparation) in high-impact journals, including Science, Neuron, Light: Science & Applications, and Optica, with over 900 citations. Over the past six years, I have delivered 10 invited talks, secured 4 grants as PI—including an ERC Starting Grant—and supervised several young researchers.

Master and PhD. After an international master's project (resulting in 2 high-impact publications, 1 as first author) between Cardiff University (UK) and the University of Florence (Italy), I completed my PhD at ICFO, Barcelona, in nonlinear nano-photonics under Prof. N. van Hulst. My work focused on ultrafast pulse shaping for 2P microscopy of nanoparticles. I published 10 research articles during my PhD, including 5 as first author and 1 as corresponding author, and received the GEFES 2016 prize for the best PhD experimental thesis in condensed matter physics in Spain.

Postdoc. As a Marie Skłodowska-Curie Fellow, I entered the neurophotonics field in Prof. V. Emiliani's pioneering group, where I developed new 2P techniques using holography for studying neuronal activity. My work resulted in two key publications (Optica, 2018; Scientific Reports, 2019) as leading scientist and a patented system (EP3385770A1) licensed to the 3i company for commercialization.

Early Researcher (2019-2023). As a permanent Inserm researcher, I secured an ANR grant to establish my research line. I supervised a PhD student and a postdoc to develop 2P-FENDO—the first fiberscope capable of 2P imaging and photostimulation in freely moving mice. This work culminated in a



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landmark publication (Neuron, 2023). I also co-authored a Neurophotonics perspective article (as last author) and contributed three papers as corresponding author, including two as last author.

Group Leader (2023-present). With my ERC Starting Grant, I established the Nonlinear Photonics for Neuroscience group, initially at the Institut de la Vision (IDV, Paris), now at IBEC, Barcelona. We are advancing 2P-FENDO and developing a new microscope for large-scale neuronal investigations, with two manuscripts and a patent in preparation.

My current collaborations include the groups of: G. Vetere (ESPCI, Paris, France, traumatic memory studies), P. Ruther (IMTEK, Freiburg, Germany micro-electrodes), and G. Gauvain (IDV, Paris, France, adaptation of 2P-FENDO to larger animals).

Dissemination and Training. My research has been featured in Sorbonne University's SUAVES exhibition and IDV's Paroles de Chercheurs initiative and in the video Paroles de Chercheurs-Institut de la Vision: Un duo de chercheurs entre neurosciences et optique. I have co-supervised 2 PhD students and 2 postdocs, with all trainees now advancing in academia or high-tech industries. I actively support ERC preparation programs for young researchers in France and have instructed specialized training courses, including the Cajal Neuroscience School and CNRS workshops on advanced optical methods.

I have reviewed for journals such as Optics Express, Neurophotonics, Nature Communications, and Science Advances.



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Turno General

Área Temática: Ciencias físicas
Nombre: SUÁREZ MASCAREÑO, ALEJANDRO
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Título: The quest for Earth-like exoplanets

Resumen de la Memoria:

I started my PhD in 2012 at the University of La Laguna, with an FPI grant. I worked under the supervision of Dr. Rafael Rebolo and Dr. Jonay I. González Hernández. During my PhD, I spent 3-months at the University of Geneva, working with Prof. Francesco Pepe (current director), PI of the ESPRESSO project. I obtained my PhD in November 2016 (Cum Laude) and moved to the University of Geneva as a post-doc researcher, with Prof. Stéphane Udry (director at the time). For more than 2 years, I worked on the analysis of stellar activity. In 2019, I returned to Spain to join the ESPRESSO and NIRPS projects and secured a Juan de la Cierva-Incorporación fellowship. In 2020 I joined the Terra Hunting Experiment, led by Nobel Prize Prof. Didier Queloz. In 2021 I became co-PI of the IACSAT Astro-1, the first space telescope to be designed and built by the IAC, and joined the ANDES consortium, devoted to the design and construction of a second-generation instrument for the ESO ELT. In addition, I became part of the science team of CHORUS, a future high-resolution spectrograph for GTC developed by the Chinese National Observatory.

Detection of Earth-like planets orbiting nearby stars:

The discovery and characterization of exoplanets is a major field of modern-day astronomy, driven by the quest for potentially habitable Earth-like worlds. In less than 30 years, more than 5500 exoplanets have been detected. These detections reveal a large population of exoplanets with masses between Earth and Neptune at short orbital distances, and even some Earth-sized exoplanets in very close orbits. However, the population of Earth-like planets remains elusive.

Radial velocities offer the best opportunity to unveil the population of characterizable habitable exoplanets in the solar vicinity. The precision of state-of-the-art instruments has reached 10 cm/s with the ESPRESSO spectrograph, sufficient for the detection of Earth-analogs.

Detecting signals with such small amplitudes is challenging. Stellar activity can induce apparent Doppler shifts of the stellar spectrum, causing periodic signals that obscure planetary signals and create false positive detections.

I have already proved to be capable detecting low-amplitude signals. Using ESPRESSO, I led the detection of two temperate Earth-mass planets orbiting the nearby star GJ 1002, only such discovery led from a Spanish institution. Before, I led confirmation of Proxima b, the Earth-mass planet orbiting in the habitable zone of Proxima Centauri, and the discovery of the sub-Earth Proxima d. Recently, I was heavily involved in the discover of the sub-Earth planet orbiting Barnard's star, the second closest stellar system to the Sun.

I will work to continue pushing the frontier of planet detection towards lower mass planets at longer orbital periods. I will work on improving our understanding of stellar activity, its effect on the RV measurements, and the modelling techniques. My work will advance the field of habitable planet discoveries, both providing objects that are top candidates for detailed atmospheric characterization and helping to populate the much-neglected small planet / large orbital separation region of exoplanet demographics. These discoveries have the potential to transform our understanding of how planetary systems, such as our own, formed and evolved.

Resumen del Currículum Vitae:

The focus of my research is the detection and characterization of terrestrial planets in the habitable zone of late type dwarf stars.

One of my most relevant results is the discovery of two habitable Earth-mass planets orbiting the nearby low-mass star GJ 1002, using a state-of-the-art statistical analysis, the only such discovery led by a Spanish institution. Previously, I led the confirmation of Proxima b. This work unveiled the presence of a sub-Earth planet candidate that was later confirmed. The planet, Proxima d, has lowest mass ever measured using RVs. I also led the characterization of the transiting planets of the very young star V1298 Tau. I found that the mass-radius configuration of these young planets is not compatible with the expectations coming from models of early evolution of planets. The planets of V1298 Tau resemble the gas giants of the solar system, suggesting planets evolve much faster than previously thought. In addition, I heavily contributed to the discovery of a sub-Earth planet orbiting Barnard's star, and evidence of a multi-planetary system, in 2024. Over the past years, my research has pushed the limits of current instrumentation and analysis techniques and enhanced our understanding of planets in general.

I have developed a significant part of my recent research as a member of the ESPRESSO consortium, that includes the IAC, the universities of Geneva and Porto, and INAF. I'm part of the NIRPS project, involving the universities of Montreal, Geneva, Porto and Natal, which is about to start its scientific operations, the HARPS-Terra Hunting Experiment, led by Nobel Prize winner Prof. Didier Queloz, and the ANDES consortium, which will build a second-generation high-resolution spectrograph for the future ELT telescope.

I am currently scientific Co-PI of the IACSAT Astro-1, a space telescope aimed to the study of Earth-like exoplanets and primitive asteroids. It is funded by the NextGenerationEU funds of the European Commission. Over the years I have obtained an FPI grant for my PhD, an FPI grant for a 3-month stay at the University of Geneva, and a Juan de la Cierva-Incorporación grant (IJC2018-035229-I) to work at the IAC.



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I have published 99 articles indexes in Q1 JCR journals. I am the first author of 11 publications in Q1 journals. Six of my first-author publications have been cited more than 50 times. In 2022 and 2024 I was invited to provide reviews talks at the EAS, and in 2022 at the Cool Stars conference. In 2019 I was invited to provide a review of the stellar activity of Proxima Centauri at the IAU Symposia 354.

I have been actively involved in supervising students at different levels. I am supervising, or co-supervising, two PhD thesis, with students Nicola Nari (September 2022 -) and Atanas Stefanov (November 2023 -). Both students have led publications in Q1 journals. Between 2022 and 2023 I supervised a MSc thesis at the Universidad Internacional de Valencia, by student Rafael Ontoria. I regularly work as referee for the journals MNRAS, A&A, ApJ and AJ. For the second time, after 2019-2021, I am a member of the Spanish time allocation committee for the observatories of the Canary Islands.

In 2024, I was awarded the R3 certificate, which recognized the quality and relevance of my research.



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Turno General

Área Temática: Ciencias físicas
Nombre: KHESTANOVA, EKATERINA
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Título: Optoelectronic characterization of materials with reduced dimensions
Resumen de la Memoria:

My research focuses on materials with reduced dimensionality, such as 2D materials and thin films, which exhibit diverse and tunable properties, ranging from superconductivity to excitons and strongly correlated phases. These unique characteristics make them highly promising for applications in nanoelectronics, quantum information technologies, and sensors. Reduced dimensionality often gives rise to novel phenomena and high tunability, yet the complex behavior of these materials necessitates a multidimensional approach to their study.

To address these challenges, I employ a multidisciplinary methodology, utilizing advanced experimental techniques, including cryogenic electron transport and state-of-the-art optical tools—many of which I have designed and built myself. Through my research, I have advanced the understanding of the mechanical, electronic, and optical properties of 2D materials, such as graphene and transition metal dichalcogenides (TMDs).

Recently, moiré materials have emerged as a groundbreaking platform for engineering flat bands in graphene and TMDs, leading to tunable strong electron-electron interactions. In these flat-band systems, low-energy excitations play a pivotal role, making the THz region of the electromagnetic spectrum indispensable for their study. However, while THz waves offer immense potential for investigating strongly correlated systems, this part of the spectrum poses significant technological challenges, requiring both experimental expertise and innovation.

Current THz techniques often lack the spatial resolution necessary for studying strongly correlated materials. I envision that nanophotonics-based approaches, akin to those used in Scanning Near-Field Optical Microscopy (SNOM), will be key to unlocking the potential of THz technologies for investigating reduced-dimensionality materials. By integrating these approaches, my goal is to bridge the gap between THz science and the study of strongly correlated systems, paving the way for novel insights and transformative applications.

Resumen del Currículum Vitae:

In recent years, a central focus of my specialization has been the development of a high-performance THz Scanning Near-Field Optical Microscope (THz-SNOM) and the establishment of a methodology for using THz near-field microscopy to investigate superconducting state. The growing interest within the scientific community in THz-SNOM highlights the relevance of this technique, and I am proud to have contributed to its advancement through my work.

I have conducted my research under prestigious competitive funding programs, including the JAE-Predoc Fellowship, President's Doctoral Scholarship, BIST-FBA Fellowship, and Marie Skłodowska-Curie Fellowship, across four renowned research institutions: ICMAB, University of Manchester, ITMO University, and ICFO. Working within four different research groups and collaborating with over 15 internationally recognized teams has significantly broadened my scientific expertise and allowed me to establish a strong network of experts in areas such as theory, material characterization, and experimental techniques.

To date, I have published 27 peer-reviewed articles (7 as first or equally contributing author) with over 2,900 citations (H-index: 17) in high-impact journals such as Nature Materials, Nature Communications, and Science. I also hold an active patent related to my research.



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Turno General

Área Temática: Ciencias físicas
Nombre: FERRAZ DE ARRUDA, GUILHERME
Referencia: RYC2024-050412-I
Correo Electrónico: gui.f.arruda@gmail.com
Título: Doctor

Resumen de la Memoria:

Dr. Guilherme Ferraz de Arruda received his Ph.D. in Computer Science and Applied Mathematics from the University of São Paulo, Brazil. He also holds a Master's in the same area and a degree in Electrical Engineering from the same institution. In his last function, he held the position of Team Leader at the CENTAI Institute in Turin, Italy.

The researcher is interested in the study of complex systems and has explored various approaches ranging from physics and statistical mechanics to mathematics and computer science. During his master's degree, Dr. Arruda studied machine learning (ML) techniques, focusing on their applications and how we can use ML to study complex systems. For his Ph.D., his research focused on propagation processes in multilayer networks. In the same period, he spent a year at BIFI in Zaragoza, working with Professor Yamir Moreno and funded by FAPESP. Shortly after, he joined ISI as a researcher, focusing on the mathematical foundations of complex systems. More specifically, he focused on the study of the structural and dynamical characterization of multilayer networks and higher-order interactions such as simplicial complexes and hypergraphs. Despite his broad interests, his main focus is on physics and statistical mechanics approaches to understanding complex systems.

During the Ramón y Cajal, Dr. Arruda plans to study higher-order networks from a control theory perspective. Control is the ultimate proof of understanding how a system behaves. While our knowledge of complex systems has grown, it often simplifies complex to pairwise interactions. This proposal advances our understanding by formalizing higher-order systems beyond conventional pairwise relationships. For example, social interactions often occur within groups; reactions in chemistry often require many reactants to generate their products; in gene expression, many genes may be required to express a given phenotype. To incorporate these types of interactions and overcome the pairwise limitation, we propose the use of higher-order networks, which aim to introduce a comprehensive language that formalizes higher-order systems, creating a general framework for modeling dynamic processes that incorporate data-rich structures and hopefully unifies both hypergraphs and simplicial complexes. Furthermore, the plan is to explore innovative strategies for controlling these systems, using both open-loop and closed-loop approaches. Ultimately, the goal is to provide a fundamental control theory of higher-order systems that provides the necessary toolbox for studying, understanding, and controlling these systems. Some fundamental questions are: What are such systems' natural and general mathematical representations? What are their structural and dynamical bounds? Can we control/observe these systems? How can we design efficient control strategies? Despite its theoretical focus, this proposal is interdisciplinary, with potential applications in various domains. This proposal embarks on an ambitious and timely endeavor to develop a control theory for higher-order systems. This endeavor is consistent with the candidate's expertise, an electrical engineering background combined with his studies and contributions to the field of complex systems, and, more recently, his contributions to seminal papers on the study of higher-order systems.

Resumen del Currículum Vitae:

Dr. Guilherme Ferraz de Arruda received his Ph.D. in Computer Science and Applied Mathematics from the University of São Paulo, Brazil. He also holds a Master's in the same area and a degree in Electrical Engineering from the same institution. In his last function, he held the position of Team Leader at the CENTAI Institute in Turin, Italy, where he managed a team of 7 researchers (5 researchers and two Ph.D. students). He has published 31 scientific papers, one book, and three book chapters. Since his Ph.D., he has actively participated in the most important conferences in the field of complex systems, giving 17 contributed talks and being invited to give five talks at special events. According to Google Scholar, Dr. Arruda has an h-factor of 20, an i10-factor of 25, and a total of 2720 citations. Most of his citations came after his Ph.D.; he has 2552 citations after 2018. Dr. Arruda has also been involved in 5 different projects funded by public institutions in Brazil since 2010, in four of which he played the role of co-PI. The total amount of funding was approximately €99,100,000 (using the exchange rates extracted on the first day of the project). From these projects, he was able to develop his research and cover the project expenses. Currently, Dr. Arruda is a participant in an MSCA Doctoral Network entitled BeyondTheEdge, where he will be co-advisor of a Ph.D. student. Nevertheless, he also applied for the ERC Starting Grant in 2023 with a project entitled MACHEN: Modeling, Analyzing, and Control of Higher-Order Networks. Both the MSCA Ph.D. network and the ERC proposal focus on the study of higher-order networks, to which he was invited for the interview.

Dr. Arruda has served as an academic editor for Complexity Journal since 2020. He has served as a reviewer for more than 20 journals, including Physical Review Letters, Nature Communications, Physical Review X, Physical Review E, Physical Review Research, SIAM Journal on Applied Dynamical Systems (SIADS), Information Sciences, Transactions on Network Science and Engineering, and many others. In 2020, he received the IOP Trusted Reviewer award. Despite journal reviews, he also served as an External Individual Evaluation (Phase 2) for an ERC Synergy grant in 2023. Regarding conferences, he was on a review panel for the 9th and 10th Conferences on Complex Networks and their Applications held in Madrid, Spain, and also for NetSciX, held in Venice in 2024. In addition, he was elected to the Council of the Complex Systems Society for two terms, the first from 2018 to 2020 and the second from 2020 to 2023. He is also a member of the Network Science Society.

Despite his research activities, Dr. Arruda taught a regular discipline (online due to COVID), Scientific Thinking and Research Methods, with Prof. Dr. Marsiel Pacifico at UEMS, Brazil, from 10/25/2021 to 12/06/2021. He also gave an online mini-course entitled Complex Systems: Epidemic and Rumor Spreading Processes in Complex Networks at 1st Escola de Física e Engenharia Física at the Departamento de Física/ICN, from 31/5/2021 to 2/7/2021, with a duration of 6 Hours. He also gave a lecture entitled "Advanced Network Models: multilayer and higher-order networks" at the prestigious Lake Como School in May 2024.



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Referencia: RYC2024-048719-I
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Título: Indirect searches for new physics at the LHC in the top quark and Higgs sectors

Resumen de la Memoria:

My research focuses on the study of the properties of the top quark and the Higgs boson as a means of conducting indirect searches for new physics at the CERN LHC. This is supported by a program precision measurements of Standard Model quantities, that I also perform. I contribute to the following four areas, to which I have contributed with 36 publications in high-impact journals:

- 1) I perform indirect searches for new physics in the EFT framework, which look for anomalies in experimental observables at the LHC that could be generated by BSM particles present at a higher energy scale. I am one of the main experts on the topic in the CMS Collaboration, currently being the convener of the top quark group and having been the convener of its EFT section. I have also performed substantial phenomenological work independently from CMS.
- 2) I am a major contributor to precision measurements of top quark production at LHC, with a focus on production modes in association with the electroweak and Higgs bosons. One of the main results I have obtained is the most precise measurement of the top quark Yukawa coupling.
- 3) My measurements rely on our ability to identify the particles produced in the collisions, so I have firstly performed substantial contributions to muon and identification, improving both my own research and the scientific outcome of other studies in the CMS Collaboration. Stemming from my contributions, I was selected to be convener of the muon group.
- 4) In the coming years, the HL-LHC will deliver a much larger integrated luminosity and the detectors will need to be upgraded to cope with the more challenging experimental conditions. In order to ensure the continuity of my research program, I have contributed to the upgrade of the muon system, the pixel detector and, currently, to the L1 trigger upgrade.

My research activities take place in international institutions leaders in the field, such as UZH and CERN. I have profited from the expertise of researchers in these institutions to gain experience on detector instrumentation, which has enabled my contributions to the area and also paves the way for future contributions.

In addition, most of my research takes place in CMS, a collaboration of 5500 scientists from 241 institutions in 54 different countries. I regularly hold scientific coordination positions in this collaboration, as indicated above. Moreover, I lead different multi-institutional collaborations in the context of my own research. Finally, I have performed my phenomenological work in the context of my own research project, also in collaboration with researchers from other international institutions, independently from CMS.

The goal of my future research is to extend the effective energy reach of the LHC using indirect searches for new physics, allowing us to detect the presence of new particles above the energy scale accessible for direct production. In this application, I put forward a coherent program of searches aiming to probe all possible new interactions generated by such particles, relying on the search for enhanced production of rare processes and on high-precision measurements of more common ones. This work will be complemented with contributions to the upgrade, operation and calibration of the LHC experiments that are key to the success of my research project, and with case studies for future colliders.

Resumen del Currículum Vitae:

I am a researcher at the European Organization for Nuclear Research (CERN) specializing in high-energy physics, with 4.5 years of postdoctoral experience in leading institutions in the field: CERN (since 2024) and the University of Zurich (UZH, 2020-2023). My research focuses on the study of the top quark and the Higgs boson at the CERN LHC and has been awarded several prizes for its excellence. I have a strong publication record, consisting of 36 articles published or accepted in high impact journals and 13 talks given at high-profile international conferences. In addition, I have made substantial contributions in instrumentation, having contributed to the upgrades of the muon system, the tracker and the L1 trigger of the CMS detector.

During my career, I have raised more than 200k euros of external funding, including one project (115 kCHF) of which I was the principal investigator, which has resulted in the publication of three articles independently from CMS. I have contributed to six additional research projects.

I have a leading role in other aspects in my field: since 2024, I am the convener of the top quark physics group (100+ researchers) in CMS, driving the top quark physics program of the collaboration. I am the youngest researcher (4 years after the PhD) in CMS' history to hold this position, which was awarded after a record of contributions to the top quark physics field and after my tenures as convener of the EFT group and as the ttH convener of the LHC Higgs working group. In addition, I am peer reviewer for four scientific journals and regularly contribute to the organization of conferences and workshops.

My research strongly relies on the experiment's ability to identify final state particles produced in the LHC collisions, which hinges on the detector performance. I have made substantial contributions to muon reconstruction in CMS, group in which I have served as a convener and sub-convener. My work on the topic was recognized with a CMS achievement award in 2019. I also have a sustained contribution record to several aspects of the CMS detector operation and upgrade, including the upgrades of the muon system, pixel detector and L1 trigger system for the HL-LHC. These are showcased in 2 of my articles and various technical notes.



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In addition, I have extensive experience in teaching and student supervision. I have supervised one PhD thesis, five Master's and seven Bachelor's theses on topics related to my research. In addition, I have taught 520 hours at UZH, 200 at the University of Oviedo and 8 in the University of Cantabria, have been part of 3 thesis committees and been an external reviewer of another 2.

My work as a researcher followed an outstanding academic record that includes two Bachelor's degrees in Physics and Mathematics, a Master's degree in High Energy Physics, and my PhD. My PhD thesis was funded by a competitive grant and covered searches for supersymmetry and precision measurements of associated top production. It was awarded several prizes for its excellence, including the prize for the best experimental thesis by the Royal Spanish Society of Physics.

As a reflection of my research and academic activities, I have been certified as associate and assistant professor (profesor contratado and ayudante doctor) by the Spanish Research Certification authority (ANECA).



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Turno General

Área Temática: Ciencias físicas
Nombre: QUINTERO NODA, CARLOS CRISTO
Referencia: RYC2024-048428-I
Correo Electrónico: cqnoda@gmail.com
Título: Unlocking the Secrets of the Sun: Advancing Solar Exploration with Cutting-Edge Observations, Numerical Modeling, and Innovative Astronomical Instrumentation

Resumen de la Memoria:

I am a researcher in solar physics and a leader in topics such as the analysis of observations, the development of inversion codes, and the design and implementation of astronomical instrumentation. During my PhD, I gained experience analysing spectro-polarimetric data and became proficient in inversion codes, i.e., on the inference of the physical properties of the atmosphere from the observations. I used those tools to understand the high-speed plasma flows ubiquitous in the quiet Sun and proposed an explanation of their impact on the energy balance of the solar atmosphere.

However, the data available during my PhD was limited because of the lack of access to various atmospheric layers. So, I embarked on leading the development of new instrumentation in the shape of the Sunrise Chromospheric Spectropolarimeter (SCIP), the updates on the Gregor Infrared Spectrograph (GRIS), the European Solar Telescope (EST), and the spectropolarimeter Based on mirror-slicEs for the near-infraRed (EMBER). In all the cases, I am/was the Project Scientist leading the design of various subsystems and managing different team members. I have published 9 first-author publications since 2016, with scientific supporting studies for those projects. Those contributions were also crucial to funding the instruments, particularly for SCIP. Moreover, while doing this work, I realised that inversion codes were not optimised for the size of the data those projects would produce. So, I led the development of the inversion code DeSIRE, which was coded in such a way that it is one order of magnitude faster than the other inversion codes.

My recent most significant achievement was preparing the EST's main publication. This comprehensive 36-page, 2-column publication serves as the primary reference for the EST. This task required a deep understanding of the project's scientific objectives, technical details of each subsystem, and effective management of contributions from all project participants. My leadership in this project and my ongoing contributions to international collaborations highlight my expertise in spectral line polarimetry. Also, my commitment to fostering the next generation of researchers is evident in my leadership and mentoring activities. I have helped students complete their master projects or PhD dissertations and publish competitive research publications in Q1 journals. I have supervised 2 PhD theses and 2 master's students and tutored 6 PhD, 2 Master's, and 1 summer student. My proficiency in data analysis and instrument and numerical code development is well-documented in my extensive list of published works, most of them as the first author. I have published works with colleagues worldwide, including researchers from India, Japan, Korea, the US, the UK, China, Germany, and Italy. My role has been crucial in promoting and bringing the community state-of-the-art instrumentation and numerical tools to extract the most from the upcoming observations. Thus, one of my main activities has been preparing every aspect, including instruments, numerical tools, and the community's younger members, to get ready to learn the most from the Sun. Specifically, how the energy is transported through different atmospheric layers and how the different solar phenomena could impact our life on Earth.

Resumen del Currículum Vitae:

As an expert in solar spectro-polarimetry, I have contributed to three main areas. Firstly, I have analysed observations to understand the energy balance of the solar atmosphere. Secondly, I have developed numerical codes to improve the spatial resolution of the images through the so-called spatial deconvolution techniques and codes to infer the physical parameters of the solar atmosphere through the so-called inversion codes. Thirdly, I have had significant roles in developing solar instrumentation, designing state-of-the-art spectropolarimeters, and upgrading current instruments. Thus, my contribution is widespread in many areas, with 24 first-author papers, 1 corresponding-author paper, and 10 second-author publications among my 75 publications. My research has gained international recognition, leading to invited talks in international meetings and workshops and helping as a scientific advisor in science working groups of missions like Sunrise, Solar-C, and the Daniel K. Inouye Solar Telescope.

Regarding leadership, I had leading positions on 4 international projects where I worked as a Project Scientist. I am still the Project Scientist of two of these projects, that is, the spectropolarimeter Based on mirror-slicEs for the near-infraRed (EMBER) for the European Solar Telescope (EST) and the Gregor Infrared Spectrograph instrument in the Gregor telescope. I am also the PI of one research project and one instrumental project with a funding of 250.000 euros at the Instituto de Astrofísica de Canarias (IAC). I also led the team in developing the numerical code DeSIRE, which allows the analysis of future observations with unprecedented speed and reliability. Also, I still work at the forefront of data analysis as I have obtained yearly observing time as a principal investigator for best-class telescopes since 2017. Moreover, I received the R3 certificate in 2023. All of this has been done in parallel with raising my two wonderful daughters, who were born in 2018 and 2023.

Concerning mobility, I moved to Japan in 2015 after completing my PhD at the IAC. There, I worked for 4 years at the Japan Aerospace Exploration Agency (JAXA), Asia's most renowned institution for space astronomy. Then, I moved in 2019 for 1 year to the Rosseland Centre for Solar Physics. I have worked for the last 5 years at the IAC as a Project Scientist for the EST and now GRIS and EMBER. I also spent short periods in international institutions in Europe and the US. Those stays were related to developing my research skills and enhancing international collaborations.

Regarding student tutoring, I have supervised 2 PhD thesis and 2 master's students and tutor 6 PhD, 2 Master's, and one summer student in the last 6 years. Also, I taught university subjects such as astrophysical techniques (1 ECTS in 2013 and 1 ECTS in 2024) at the University of La Laguna and the basics of radiative transfer (1 ECTS in 2019) at the University of Oslo. I also taught how to use inversion codes in in-person workshops and online seminars. I also engage in outreach activities at JAXA and now annually at local schools in Tenerife. Also, I regularly contribute with instrumentation articles to the EST newsletter.



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In summary, my profile corresponds to an expert on solar physics capable of producing cutting-edge contributions to data analysis, numerical code and instrumental development.



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Turno General

Área Temática: Ciencias físicas
Nombre: MUÑOZ DE NOVA, JUAN RAMÓN
Referencia: RYC2024-050437-I
Correo Electrónico: jrmnova@fis.ucm.es
Título: Interdisciplinary applications of relativistic quantum field theories

Resumen de la Memoria:

I have played a key senior role in two historical experiments: the first observation of Hawking radiation and the first observation of quark entanglement, in turn the highest-energy entanglement observation ever, the latter being the implementation of a foundational work of mine which launched the field of Quantum Information (QI) in High-Energy Physics (HEP).

My PhD, supervised by F. Sols and I. Zapata, focused on Hawking radiation (HR) in Bose-Einstein condensates (BEC). My PhD work is cited in 2 Natures and 4 Nature Physics and used in a preliminary observation of HR by the world-leading experimentalist, J. Steinhauer, who as a result offered me a postdoc at the Technion. There, after years of exclusive dedication working in all fronts of Physics (analytical, numerical, and experimental), I achieved the first conclusive observation of HR, a Holy Grail of Physics, including the groundbreaking measurement of the Hawking temperature. The discovery was published in Nature, with me as first author, the first Nature from this field since Hawking's work 50 years ago. Within an even more senior role, I co-authored the first observation of the evolution of an analogue black hole, another milestone published in Nature Physics, confirming the stationarity of HR and discovering a novel mechanism of stimulated HR.

After my postdoc, I developed the HARBEA (HAWking Radiation BEyond the Analogue) project, of which I was Co-PI along with F. Sols, within a Marie-Curie fellowship co-funded by the competitive UNA4CAREER program. This innovative project proposed interdisciplinary applications of HR, a well-established effect only after my experimental work at the Technion, demonstrating the potential for technological transfers of my research. This contrasts with the mainstream approach in the community, still restricted to study gravitational problems.

Here emerges my other main research line: I published (with Y. Afik) the first study of entanglement in top quarks and the first quantum tomography protocol in HEP. This proposal led to the first observation of quark entanglement and highest-energy entanglement observation ever, published in Nature, which I co-authored as Short-Term Associate (STA) of ATLAS at LHC. An STA from outside HEP is extremely unique, and thus it is a huge honor in my career. I proposed the use of quantum discord and steering to detect New Physics, a work published in PRL. My research on QI in HEP has a huge impact and spawned a whole research field, as can be seen from the celebration of dedicated conferences, the intense media coverage, and the high citation rate of my works. It was selected as one of the highlights of 2023 by Nature Reviews Physics.

Other international collaborations: 1) Black-hole lasers (started during a 5-month stay with I. Carusotto at the BEC Center of Trento), discovering their phase diagram and formulating the concept of spontaneous Floquet state; 2) $\nu=0$ quantum Hall (QH) state in graphene (started after a 3-month stay with E. Demler at Harvard), discovering novel QH states with two spontaneously broken symmetries; 3) Analogue gravity in optical lattices (with D. Guéry-Odelin); 4) QI with bottom quarks (with A. Soffer and Y. Katz).

Resumen del Currículum Vitae:

I graduated in Physics in 2011 at Universidad Complutense de Madrid (UCM), obtaining the Extraordinary Award of Undergraduate Achievements, with a grade of 9.66/10, and "Matrícula de Honor" in 39 courses, also qualifying among the best 750 students (top 1%) of the whole University. I obtained my Master's Degree in Fundamental Physics at UCM in 2012, with a grade of 9.83/10. I obtained my PhD at UCM in 2015, summa cum laude with European Honors, after performing a 5-month stay at the BEC Center of Trento and a 3-month stay at Harvard.

I performed a 3.5 year postdoc with J. Steinhauer, the world-leading experimentalist in analogue gravity. I was co-PI of the HARBEA project (along with F. Sols) under a Marie-Curie fellowship, funded with 35532 EUR by the UNA4CAREER program, which searched for applications and interdisciplinary exports of Hawking radiation and other analogue gravity concepts.

My research deals with applications of (special and general) relativistic quantum field theories. I am the first author of the first conclusive observation of Hawking radiation, a Holy Grail of Physics, published in Nature. I also co-authored the first observation of the evolution of an analogue black hole, published in Nature Physics. Along with Y. Afik, I published a seminal work that has spawned a whole research field of QI in HEP, including the highest-energy detection of entanglement in History, published in Nature, which I co-authored as Short-Term Associate of ATLAS, something extremely unique.

I have published 19 research articles (including 2 Natures and 1 Nature Physics), 1 conference paper with ATLAS, and 2 arXiv preprints, collecting more than 1000 citations in Google Scholar, over 350 just last year. My research on QI in HEP was selected as one of the highlights of 2023 by Nature Reviews Physics.

My research has been covered worldwide in more than 100 interviews and articles, and in social media, where Youtube videos on my research collect more than 6 million views. I have given 30 talks and attended 23 conferences (most of them as invited speaker and sometimes as the inaugural keynote speaker), chairing 2 sessions, moderating 1 expert panel, and being twice a panel expert. I am convener of a forthcoming conference at the Galileo Galilei Institute. In total, I have given 30 talks including seminars, most of them as an invited speaker at prestigious institutions such as the Max-Planck Institute, LPT at Paris-Saclay, CERN, or IFT at Universidad Autónoma de Madrid.



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I teach 80 hrs/year of several Physics courses at UCM. I have supervised 10 TFG (Trabajo de Fin de Grado) and 3 Master Theses. I was member of a TFG tribunal and of the PhD Committee of A. Tnourji at Clermont-Auvergne. I have reviewed for 15 journals, including Nat. Comm., PRL and PRX Quantum. I am Trusted Reviewer of IOP and RSEF member. Two of my articles are Highly-Cited Papers and three of them are in the 98th citation percentile in Web of Science. I have or will soon have 6 articles with more than 100 citations.

In summary, I have a world-unique profile, with a marked international character (4 years abroad in top research centers in 3 continents, including Harvard), interdisciplinary nature and high impact at both the scientific and outreach level, combining theoretical and numerical expertise with direct participation in historical experiments of different fields.



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Turno General

Área Temática:

Ciencias físicas

Nombre:

MARTÍNEZ SOLER, IVÁN JESÚS

Referencia:

RYC2024-050360-I

Correo Electrónico:

ivanjms88@gmail.com

Título:

Atmospheric Neutrinos: A Window into Particle Physics and New Physics Challenges

Resumen de la Memoria:

My research focuses on neutrino physics, leveraging current measurements and making predictions for next-generation experiments. Working within various theoretical frameworks that share the common feature of neutrinos being massive particles, I have explored these scenarios using a wide range of neutrino data, from Earth-based to astrophysical sources. My goal is to advance our understanding of neutrino properties and explore the expectations for future experiments.

Although the Standard Model (SM) has been remarkably successful, it is not considered the final theory of Nature due to several theoretical and observational shortcomings. A critical challenge is explaining the flavor oscillations observed in neutrino evolution, which can only occur if neutrinos are massive particles -- a property the SM does not account for.

Over decades, significant experimental and theoretical efforts have been devoted to fully characterizing the neutrinos. Atmospheric neutrinos have played a pivotal role in this endeavor. Through my research, I have examined how atmospheric, accelerator, and reactor neutrino experiments complement each other in determining the parameters of the three-neutrino mixing scenario, the simplest scenario that explains the flavor oscillations. I have also explored how future atmospheric measurements can address current uncertainties.

Despite progress in measuring neutrino oscillations, a fundamental question remains: what is the origin of neutrino masses? Treating the SM as a low-energy effective field theory, the dimension-five Weinberg operator provides a mechanism for generating neutrino masses via heavy right-handed states while predicting Majorana masses for these states. Higher-dimensional operators introduce additional new physics phenomena, such as NSI. I have investigated these scenarios in light of current experimental constraints and future sensitivities.

The discovery of astrophysical neutrino sources has opened exciting new opportunities to study neutrino properties. At the MeV scale, supernova neutrinos offer critical insights, while above the TeV scale, sources like AGN provide unique data. I have used observations from these sources to search for BSM scenarios involving new neutrino interactions and small Majorana masses.

However, one of the key limitations in these analyses is our incomplete understanding of the atmospheric neutrino flux. Whether as the primary focus of study or as a background in other searches, uncertainties in this flux limit our ability to draw precise conclusions. In some energy ranges, the flux calculations are over two decades old, and their uncertainties rely on oversimplified parametrizations that obscure the underlying physics.

To address this issue, I plan to conduct a comprehensive study of the atmospheric neutrino flux across its full energy range, quantifying its uncertainties with greater precision. I will utilize advanced tools, such as FLUKA, to perform detailed 3D simulations of cosmic ray interactions with the atmosphere.

The results of this analysis will inform a re-evaluation of the aforementioned scenarios using both current and future data. This work will be critical for combining atmospheric neutrino measurements consistently, exploring BSM scenarios that influence neutrino production and detection, and enhancing our understanding of astrophysical neutrino sources.

Resumen del Currículum Vitae:

I have built my scientific career at leading international institutions. I began at the "Instituto de Física Teórica UAM-CSIC," where I completed my PhD in 2018. This was followed by five years as a postdoctoral researcher at Fermi National Accelerator Laboratory and Harvard University. Since 2023, I have been an Assistant Professor at Durham University.

I have contributed to over 30 research articles, all published in high-impact, open-access journals. To disseminate my results, I have participated in more than 40 international conferences and workshops, several as an invited plenary speaker. For instance, I gave the plenary talk "Physics of ν Osc. with Atmospheric ν Detectors" at the XXXI International Conference on Neutrino Physics and Astrophysics in June 2024, held in Milan, Italy. Additionally, I have presented seminars at prestigious institutions, such as the Bohr Seminar at the University of Manchester (UK) on "Atmospheric Neutrinos and Their Physics Potential" and at the Kavli Institute for the Physics and Mathematics of the Universe (IPMU) on "Present Bounds on Non-Standard Interactions from a Global Oscillation Analysis."

Throughout my career, I have actively supported the development of young scientists through teaching, mentoring, and advising. At Durham University, I currently teach two modules: "Relativistic Electrodynamics", which serves over 100 students, and "Computing Projects," where I mentor three groups of four students each. I have also mentored four Master's students in their research projects and served as an academic advisor to more than 10 students. Presently, I am supervising Joseph Tudor's PhD thesis. Beyond Durham, I have mentored undergraduate and PhD students at Harvard University, including Santiago Giner and Miaochen Jin.

Beyond individual mentorship, I have supported broad student training initiatives. In the summer of 2024, I co-organized "YETI 2024: The 3 Neutrino Problem", a school for UK-based PhD students.



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Over the years, I have engaged in outreach activities to inspire scientific curiosity among young students and the general public. During my undergraduate studies, I contributed to "Semana de la Ciencia" for three consecutive years and hosted a science segment on "Onda Regional", a local radio station in Murcia. I have also co-organized outreach events at Harvard and Durham, introducing high school students to topics in high-energy physics.

My contributions to the scientific community extend beyond research and mentoring. I have served as a referee for a range of journals, including "Physical Review Letters" and "Journal of High Energy Physics". I have also reviewed grant applications for programs such as the Leverhulme Trust and participated in advisory roles, including the Particle Physics Advisory Panel (PPAP) Community Meeting in June 2024.

To foster collaboration and discussions on neutrino physics, I have co-organized several workshops, both in person and online. Notable examples include "NuPhys2023: Prospects in Neutrino Physics" in London in December 2023 and the online workshop "Neutrinos from Home" in April 2024.



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Turno General

Área Temática: Ciencias físicas
Nombre: MIRET ROIG, NÚRIA
Referencia: RYC2024-051353-I
Correo Electrónico: nuria.miret23@gmail.com
Título: Star cluster formation and dispersion with dynamical ages

Resumen de la Memoria:

My research focuses on star and planet formation, specifically, on how young stars interact and disrupt the parent molecular cloud and the mechanisms driving brown dwarf and planet formation.

My most recent contributions are toward understanding the formation and dispersion of star clusters from their parent molecular clouds. I developed a method to estimate the duration of the gas-embedded phase by comparing isochrone fitting with dynamical traceback ages (Miret-Roig et al. 2024), combining my expertise in dynamical traceback ages (Miret-Roig et al. 2020) and my observational experience (PI of 18 nights at major telescopes). I have led (Miret-Roig et al., 2022b, 2025) and participated in a detailed census and characterization of the Scorpius-Centaurus OB association (Sco-Cen), where feedback played a major role in propagating star formation inside-out. The proximity of Sco-Cen offers a unique opportunity to study star formation in high resolution, it is an excellent laboratory to measure the duration of the gas-embedded phase and the dispersion of young star clusters.

Additionally, I continue working to unravel the origin of brown dwarfs and free-floating planets. As a PhD student, I led a study suggesting that many FFPs form in planetary systems and are eventually ejected (Miret-Roig et al. 2022a). Currently, I am collaborating with other international researchers to determine the disk fraction and the atmospheric composition of these objects. Upcoming observatories like JWST, ELT, and GaiaNIR will play key roles in advancing our understanding of these objects, and I am actively involved in these missions.

My research plans include building on my extensive observational expertise, collaborating with numerical simulation experts, and leveraging unique Spanish opportunities to address open questions in star and planet formation. My work will focus on three main objectives:

1. Determining a comprehensive census of young stars, brown dwarfs, and free-floating planets in the nearest 100 pc from Earth. Combining Gaia astrometry with imminent spectroscopic surveys and machine learning tools designed to work with the strong projection effects in the solar vicinity. I am applying for complementary funds to hire a Ph.D. student to work on this project.
2. Timing the formation and dispersion of star clusters comparing precise isochrone and dynamical traceback ages. I have already obtained >100 high-resolution spectra in Sco-Cen (ready for scientific use) and received 152 kEUR of research funds to that end.
3. The origin of brown dwarfs and FFPs participating in international projects using JWST, ALMA, ELT, and GaiaNIR.

I plan to bring back the extensive international experience, skills, and knowledge I have gathered over seven years abroad to the Spanish scientific community, profit from the robust network of star formation experts in Spain, and consolidate my research line.

Resumen del Currículum Vitae:

I have eight years of continuous research experience (seven abroad) focused on star and planet formation. My research investigates how young stars interact with and disrupt their parent molecular clouds and the mechanisms behind brown dwarf and planet formation. Key contributions include developing techniques to determine the age of young stars from their dynamics and identifying large, complete samples of co-eval stars, including the least massive objects formed in stellar nurseries.

Since 2016, I have authored nine first-author publications, with over 250 citations (h-index: 14). This includes two Nature Astronomy articles and a review. I have also co-authored 34 publications with over 650 citations, including five publications as a second author and two publications in Nature. These achievements have been possible thanks to collaborations with an international network of researchers from 11 institutes across nine countries, involving experts in multi-wavelength observations and simulations. I have broad experience in photometric and spectroscopic observations, having completed 18 observing nights at major telescopes, including the VLT and GTC. I am also an expert in using large-scale surveys like Gaia and APOGEE, which have been integral to my research.

I have secured over 278,000 EUR in research funding, including the Beatiu de Pinós postdoctoral fellowship (152,864 EUR), the MERAC Prize 2022 for Best PhD Thesis in Observational Astrophysics (125,000 EUR), and the Science and Technology Thesis Prize from the University of Bordeaux (1,500 EUR). In my early career, I was awarded several undergraduate grants, including one from the Spanish Ministry of Education and a Ciencia en Acción award.

I have given four invited talks at international conferences, including a plenary at the EAS 2022, two oral presentations, and eight posters. I have also been an invited lecturer for the IAA-CSIC Severo Ochoa Advanced School on Star Formation (2021, 2023), where I delivered four lectures and chaired a session. Additionally, I have chaired and organized scientific sessions, including the EAS23 panel.

I am passionate about public outreach and have delivered eight public talks, including a TEDx presentation, written four blogs (including two for Nature Portfolios), and participated in multiple podcasts and media interviews. I am also committed to sustainability and serve as an active member of the



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Sternwarte Sustainability Group and a Climate Fresk facilitator. Additionally, I advocate for gender equality by mentoring students and giving talks in schools to encourage future scientists.

I have mentored and supervised one PhD, three MSc, and three BSc students at the Universities of Bordeaux and Vienna, three of whom are currently pursuing PhDs. One MSc thesis was presented at the EAS annual meeting and is being prepared for publication, while another student's summer project contributed to a Nature publication. I have taught 380 hours at the University of Vienna, co-organized the institute colloquium, and led weekly group meetings.

Alongside leading independent projects and collaborating on international initiatives, I continually develop my soft and transferable skills. Recently, I completed courses in gender equality in science, science communication, application writing, university teaching, and climate change. During my PhD (2017-2020), I participated in specialized doctoral schools on Gaia data and astro-statistical tools.



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Turno General

Área Temática: Ciencias físicas
Nombre: CIRERA SALINAS, BORJA ARCADI
Referencia: RYC2024-049194-I
Correo Electrónico: borjacirera@gmail.com
Título: Nanofabrication of Novel Low-Dimensional Materials

Resumen de la Memoria:

My central research line, focused on the nanofabrication and atomic-scale characterization of innovative low-dimensional materials, began at the Technical University of Munich (TUM) in the group of Prof. Johannes V. Barth. Simultaneously with the rise of bottom-up approaches as a new paradigm for fabricating atomically precise nanoarchitectures, I joined a Master program at TUM. Among the different strategies, on-surface synthesis emerged as a powerful tool to engineer new materials. I centered my investigation on new on-surface protocols to produce all-carbon low-dimensional polymers. I expanded my research interests during my PhD at the Universidad Autónoma de Madrid (UAM), exploring inorganic bottom-up strategies. Specifically, I embedded technologically relevant rare earths in low-dimensional materials, known for their unique optical, magnetic and catalytic properties. Simultaneously, I continued investigating intra- and intermolecular on-surface reactions, discovering a new family of polymers featuring exotic non-trivial topological states. After obtaining my PhD, I did a one-year bridging Postdoc at IMDEA Nanoscience in the group of Prof. David Écija, as one of the 13 nodes of the European A-Leaf project, aiming to mimic natural photosynthetic protocols in electrochemical cells. I applied inorganic bottom-up growth strategies to obtain atomically precise metallic alloys, envisioned to perform as affordable next-generation catalysts for green fuel production.

In February 2019, I joined the Physical Chemistry Department led by Prof. Martin Wolf, a world-distinguished scientist specializing in ultrafast dynamics of elementary processes on surfaces at the Fritz Haber Institute (Berlin). I benefited from their experience in optical spectroscopy, while simultaneously contributing with my expertise in scanning probe techniques (SPM), to design and optimize one of the firsts SPM worldwide combined with atomic-scale Tip-enhanced Raman scattering (TERS). This cutting-edge technique, facilitating access to the local electronic, vibrational and optical properties, represented a major advance in characterizing the physico-chemical properties of nanostructures. I explored different organic and inorganic nanostructures exploiting my extensive background in bottom-up nanofabrication to rationalize the complex contributions of chemical and electromagnetic enhancement factors to the observed Raman signal in plasmonic nanocavities. The simultaneous access to the population of excited states in single-molecule junctions allowed exploring dynamic processes such as heating-cooling phenomena. This research resulted in the fundamental understanding of how energy is injected and dissipated into single molecules, which is crucial for controlling on-surface reactions. My current research as a principal investigator at ICMM-CSIC (Madrid) combines my different strengths, focused on pioneering nanofabrication approaches driven by photo-activated processes. My objective is to manipulate the atomistic mechanisms within plasmonic nanocavities to engineer low-dimensional materials, thereby introducing ground-breaking tools that enhance spatial control and selectivity on relevant supports beyond noble metals.

Resumen del Currículum Vitae:

Since April 2023, I am leading the tip-enhanced Raman scattering (TERS) research line on low-dimensional materials at the Material Science Institute of Madrid (ICMM-CSIC). In this role, I have secured 400 k€ in funding as Principal Investigator (PI) through the Atracción de Talento CAM 2023 program, enabling me to establish an independent research team. This includes the acquisition of new instrumentation and the supervision of two Ph.D. students. I successfully designed the first scanning probe microscope (SPM)-TERS system in Spain, and established an independent research line based on light-matter interactions within plasmonic nanocavities. My increasing visibility as an independent researcher is reflected in my participation in Ph.D. committees, publications as corresponding author, organization of international conferences, and being selected as a 2023 Emerging Investigator by PCCP. These accomplishments earned me the R3 certificate as an established researcher.

Before this, I gained extensive expertise across multiple institutions, starting in the E20 group in Munich. There, I developed novel on-surface synthetic approaches probed with low-temperature (LT)-SPM, contributing to 3 publications (2 as first author). During my Ph.D. at the Universidad Autónoma de Madrid (UAM), I explored on-surface reactions and developed inorganic approaches involving lanthanides with applications in nanomagnetism and catalysis as part of various national projects and collaborations with industry (Repsol). After receiving my Ph.D. in 2018 (cum laude), I joined the European A-Leaf project for a 1-year bridging Postdoc at IMDEA Nanoscience (Madrid). This period in Spain significantly enhanced my expertise in scanning probe techniques (VT-, LT-, photon-STM, and nc-AFM) and complementary spectroscopic methods (XPS, XML, XMCD). I benefited from collaborations within the UAM campus, several synchrotron campaigns (4 at ALBA, 3 as co-proposer, and 1 at Elettra, Italy), and research stays in collaborating groups (TUM, Germany and Nanosurf, Czech Republic), resulting in 10 publications (7 of them as first author) and 1 book chapter. I later moved to the Fritz Haber Institute in Berlin, where I contributed to the design and optimization of the first SPM-TERS system in Europe capable of sub-molecular resolution. During this period, I began leading independent projects, which resulted in 13 high-impact publications (6 as first author, 1 as corresponding).

In summary, I published 27 works (16 first author, 3 corresponding author) in peer-reviewed international journals (all in Q1, including 1 Nat. Nano, 3 Nano Lett., 1 ACS Nano, 3 Small, 2 ACIE, 2 Nat. Comm. and 1 JACS). My H-index is 16 with more than 1000 citations. 5 were selected for the journal cover, including Nat. Nano. I mentored 1 Bachelor, 4 Master and 3 PhD students, currently co-supervising two PhD candidates and one TFM at the ICMM. I have participated in 2 industrial collaborations and 9 projects, 2 of which consisted in establishing international bilateral networks with world-renowned research institutes (IMS in Japan and FZU in Czech Republic). I presented the main results in various conferences and workshops (23 contributions, 5 as invited speaker) and actively took part in outreach activities in both institutional actions and personal dissemination initiatives.



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Turno General

Área Temática: Ciencias físicas
Nombre: ILLANA SISÓN, ANDRÉS
Referencia: RYC2024-051232-I
Correo Electrónico: aillanasi@gmail.com
Título: Nuclear structure and shape studies using complementary techniques in stable and radioactive facilities
Resumen de la Memoria:

I obtained my PhD in experimental nuclear physics at the Complutense University of Madrid in June 2014. During my PhD, I worked in the nuclear physics group at IEM-CSIC with my supervisor, Dr. Andrea Jungclauss. During this period, I have been focusing on gamma spectroscopy, more accurately in magnetic moments with radioactive beams, which was the topic of my thesis, Coulomb excitation, and DSAM techniques. I had the responsibility to prepare and mount the chamber of my experiment and I started to be involved in the MINIBALL collaboration. During this period, I participated in two Spanish national projects founded by MICINN. After my PhD, I got an internship in the same group to finish an article related to my thesis work and to setup the new beamline at Centro de Micro-Análisis de Materiales (CMAM) in Madrid.

In June 2015, I started my first postdoc at KU Leuven under the Research Foundation Flanders. For 2 years, I represented this nuclear physics group in the MINIBALL collaboration, providing manpower and carrying out several experiments at ISOLDE. I analyzed the first HIE-ISOLDE experiment. I also started to be involved in the IDS collaboration.

In 2017, I won the INFN post-doctoral fellowship for non-Italian citizens (individual funding). In July 2017, I started the fellowship at INFN-LNL, where I split my research time between the MINIBALL/IDS collaboration, working and leading several experiments at ISOLDE, and supporting the research activities that the gamma group has at GANIL and INFN-LNL. I helped with the final construction, mounting, and commissioning of the NEDA array with the gamma array AGATA and I participated in most of the experiments performed during the NEDA/AGATA campaign. I supported all the experiments carried out at Legnaro with the Galileo array and PRISMA. I was named the local contact person for the Recoil Filter Detector and the fast-timing array at INFN-LNL.

In July 2019, I got a post-doctoral research position at the University of Jyväskylä under the Academy of Finland project "Structure of intruder states in heavy nuclei". This project was devoted to feasibility studies and the development of transfer reaction techniques in investigating the intruder states in the neutron-deficient lead region using the MINIBALL and ISS spectrometers at HIE-ISOLDE. In addition, I have been contributing to the research activities at JYFL and was one of the people in charge of the maintenance and preparation of the JUROGAM array, SAGE, and other ancillary detectors for each experiment (9 experiments/year). During these years, I started new research lines and built a network between different research groups, mainly in Europe. In January 2021, I became the beamtime coordinator, the PAC scientific secretary and TAC coordinator of the laboratory. This is the second-highest role in any accelerator laboratory. The JYFL provides more than 6000h/year of beamtime for national and international groups including non-EU and is also supported by the EUROLABS and RADNEXT EU funding projects.

At the end of 2022, I was awarded with a Marie Curie research co-found post-doctoral fellow under the UNA4CAREER project of UCM to return to Spain. I started in January of 2023. Currently, I lead my own project at UCM and at the same time, support the research activities of my current group and supervise a PhD student.

Resumen del Currículum Vitae:

In total, I have more than ten years of experience in experimental nuclear physics, four as a PhD student at IEM-CSIC, one as a scholarship researcher in the same group I did the PhD, and more than 8 as a post-doctoral fellow in different research institutions in Europe, which are KU Leuven, INFN-LNL, JYU, and UCM. In 2017, I won the INFN post-doctoral fellowship for non-Italian citizens, and in 2022 a Marie Curie research co-found post-doctoral fellow. During my career, I dedicated all my efforts to studying nuclear structure properties via in-beam gamma-ray spectroscopy using different reaction mechanisms and beta-decay spectroscopy. I had the opportunity to learn new techniques in every place I have been, with the asset of having experience at large-scale international radioactive and stable beam facilities.

As a sample of my independent research and leadership, I got 13 different proposals approved as a spokesperson in various laboratories. All of them have the same goal to understand the shell evolution along isotopic chains and nuclear shapes but with different techniques. At ISOLDE, I have 3 proposals: a beta-decay fast-timing study of the neutron-rich Zn isotopes (IS622), 191-198Pb (IS744), and the neutron-rich Ge isotopes (IS771). At JYU, I have 7 proposals: octupole correlations in 110Xe nucleus (JM23) and in 114Ba (JM44), lifetime measurements of excited states in 86Mo (JM38), mirror energy differences in 45Sc/45Cr (JM47), electron spectroscopy in 185Hg (S28), Multi-Nucleon transfer reactions at RITU (JR162), and beta decay of 76Cu at IGISOL (I314). In LNL, I have 3 proposals one with GALILEO, LNL18.02 (the Coulomb excitation of 116Sn), and 3 with AGATA+PRISMA; LNL22.43 (testing an alloy target for plunger experiments) and LNL22.101 (lifetime measurements for neutron-rich Zn and Cu nuclei). Currently, only 4 are waiting for beam time.

In addition, I have 4 letters of intention (LOI) approved, two at TRIUMF dedicated to developing neutron-rich Cu beams (S1632LOI and S2323LOI), and 2 at ISOLDE for neutron-rich Tb beams (I217) and neutron-deficient Ba beams (I240).

Up to date, I participated in more than 100 experiments around Europe (ISOLDE-CERN, GANIL, IGISOL, JYFL, and INFN-LNL) and I leathtered or co-leathtered 11 of them. I was in charge of several setups and campaigns at INFN-LNL (Recoil Filter Detector and the fast-timing array) and JYU (SAGE and Jurogam3). I have been the co-ordinator of Jurogam3 since January 2020.

In January 2021, I became the beamtime coordinator, the PAC scientific secretary and TAC coordinator of the laboratory. This is the second-highest role in any accelerator laboratory.

In summary, I published 59 articles (5 as first/primary author), 19 proceedings (4 as first/primary author), and 32 INFN-LNL Annual reports (7 as first/primary author). These publications include 1 Nature Communication, 1 Communication Physics, 7 Physical Review Letters, 1 Physics Letter A, 9 Physics Letter B, 26 Physical Review C, 6 European Physical Journal A, among others.



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Turno General

I am currently preparing 3 articles. I attended 40 conferences or workshops, and I was invited to give 5 seminars. I co-organized 3 workshops. I am a member of 3 scientific organizations (COFIS, RSEF, and EPS). Up to date, I supervised 4 bachelor's thesis, 3 CERN summer students, and 5 master's students. I am co-supervising one PhD student.



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Turno General

Área Temática: Ciencias físicas
Nombre: MARTÍN DOMÉNECH, RAFAEL
Referencia: RYC2024-048766-I
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Título: Chemical and physical processes in the interstellar medium and their connection to the origin of life

Resumen de la Memoria:

The origin of life on our planet relies on a rich prebiotic chemistry that took place on the surface of the young Earth, probably triggered by the exogenous delivery of complex organic molecules (COMs) and other species with prebiotic interest. The origin of these molecules can be traced back to the interstellar medium (ISM), the place where stars (and planets) form. My research is devoted to chemical and physical processes in the ISM and their connection to the origin of life, pursuing a multidisciplinary approach to astrochemistry through:

- Laboratory experiments studying the formation of COMs and other molecules with prebiotic interest in the solid phase of the ISM, as well as the interplay between the solid and gas phases.
- Gas-phase observations of COMs and other species with prebiotic interest in star-forming regions.

Some highlighted contributions include:

- Characterization of the thermal desorption of cometary ices. These results were used to analyze the data collected by the ESA-Rosetta mission on comet 67P.
 - Development of a calibration strategy for quadrupole mass spectrometers (QMS) to quantify the gas-phase molecules in any experimental setup, that is now routinely used in many laboratories.
 - Characterization of the photon-induced desorption of ice chemistry products formed upon UV irradiation of a H₂O:CH₄ ice mixture. This included quantification of photodesorption yields (an essential input in astrochemical models) following the QMS calibration strategy mentioned above, and the first report of a relation between the measured yields and the underlying photodesorption mechanisms.
 - First detection of the prebiotic molecule CH₃NCO in the gas-phase of a sun-like protostar, using own and archive ALMA observations.
 - Characterization of the chemistry induced by energetic processing of the CO-rich ice layer. This pathway had not been previously studied in the literature, and could significantly contribute to the formation of COMs in the coldest regions of the ISM. Irradiation of CO:N₂:H₂ ice analogs led to the formation of complex organics, including HNCO. This HNCO formation pathway could represent a significant contribution to the total budget of this species in the ISM.
 - Detection of hot corinos (warm and compact regions around forming protostars rich in organic chemistry) in the Serpens molecular cloud, including the fourth hot corino detection toward a Class I source to that date. The results suggested a continuity in the complex organic composition of hot corinos during protostellar evolution, with implications to the formation of planets and the origin of life.
- Currently I am PI of the SAPPHIRE project that addresses the goal of constraining the sulfur chemistry in the ISM. The first series of experiments revealed that formation of S chains is common in energetically processed S-bearing ices, and that formation of OCS in interstellar ices can take place in a wide range of temperatures.

Moving forward, I plan to continue this line of research combining laboratory experiments in state-of-the-art laboratories and astronomical observations with observatories such as ALMA and JWST. In the short-term, I plan to focus on the refractory fraction of interstellar sulfur that could be locked in polycyclic aromatic sulfur heterocycles (PASHs), whose formation has not yet been characterized in the laboratory.

Resumen del Currículum Vitae:

My 12-year research career encompasses my PhD at the Centro de Astrobiología (CAB, Spain), a postdoctoral fellowship at the Center for Astrophysics (CfA, United States of America), and my current position as PI of the SAPPHIRE three-year project. My PhD formation was funded by the Spanish Ministry of Economy (MINECO) through a ["Formación de Personal Investigador" \(FPI\) grant \(BES-2012-056303\)](#). During my PhD I also obtained a ["Ayuda para Estancias Breves" \(EEBB-I-2015-10333\)](#) grant from MINECO that funded my internship at the Institute d'Astrophysique Spatiale (IAS) in France. I was doctorated with cum laude and international mentions in 2017. I was then hired by the Harvard College Observatory to work at the CfA, first as a postdoctoral fellow and later as a research associate. In 2022, I was awarded a three-year ["Postdoctoral Junior Leader Fellowship"](#) by La Caixa Foundation (with a success rate lower than 10 per cent), that funded the SAPPHIRE project with EUR 297900 (LCF/BQ/PI22/11910030). This project aims at constraining the interstellar chemistry of two essential elements for the origin of life: sulfur and phosphorus. Previously, I had been awarded a prestigious ["MSCA Individual Fellowships Seal of Excellence"](#) by the European Commission in 2021 for the SAPPHIRE project (ID 101059501).

I have published 38 peer-reviewed articles (13 as first author) in international journals, and one book chapter (Springer) with over 1000 citations and an H-index of 20 according to Scopus. I also have 20 contributions in international conferences, as invited or contributed speaker and poster presenter.

During my career I have collaborated with researchers from Spain, France, Germany, Italy, Denmark, USA, and Taiwan. I was involved in the interdisciplinary research network European Cooperation in Science & Technology (COST) Action CM1401 ["Our Astrochemical History"](#), and I have recently joined COST Action CA22133 ["The birth of solar systems \(PLANETS\)"](#). In addition, I am co-I and member of the Laboratory & ab initio calculations work team of the GEMS Large Program, formed by 34 scientists from 7 countries.

I have mentored three research intern projects at the CAB and the CfA, and collaborated in the supervision and mentoring of a PhD student at the CfA. I have been a lecturer of the "CO photodesorption" working group in the ["Astrochemistry's cool"](#) international school at the Universidad Internacional Menéndez Pelayo in 2014, and of the class "Simulating interstellar ice in laboratory: reactivity" at the ["Multidisciplinary school of Astrochemistry"](#) international school celebrated at the CAB facilities in 2024.



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Turno General

I have acted as referee of 13 publications of international journals (Nature Astronomy, A&A, MNRAS, ApJ), and as an external reader for a senior thesis at Harvard University. I have been invited to participate as a panelist in a NASA Astrophysics Research and Analysis Program (APRA) Review Panel, and as a member of the Recurring Evaluation Panel of the NASA Solar System Workings (SSW) Program. I am also part of the pool of experts that the national Agencia Estatal de Investigación (AEI) organism in Spain contacts to evaluate and perform follow-up of different research projects.



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Turno General

Área Temática: Ciencias físicas
Nombre: VITAGLIANO, GIUSEPPE
Referencia: RYC2024-048278-I
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Título: Understanding phases of matter with entanglement theory

Resumen de la Memoria:

I plan to extend my past line of research to embrace a much larger field, namely at the crossroad between quantum information and condensed-matter theory, and give it a more ambitious scope, to try to tackle long-standing central questions in the theory of complex quantum phases of matter.

Broadly speaking, I aim at applying entanglement theory to the analysis of complex many-body systems, more specifically their equilibrium properties in different phases, as well as their (out-of-equilibrium) phase transitions. The main research questions develop along three main lines, looking at complementary aspects of the overall goals, that are: (1) Improvement of the entanglement-theory methods applicable to many-body systems, with a particular focus on realistic measurable quantities; (2) Implementation of such methods in ultracold atoms, also as a test-bed for the analysis of complex many-body systems; and finally (3) Development of novel tools for the analysis of disordered systems, for addressing some of the most challenging open questions in condensed-matter theory.

Central questions are: How is entanglement connected with crucial properties of quantum matter? How can we systematically find observable properties of complex phases connected with entanglement, especially in disordered systems? My goal is to deepen the characterization of phases which cannot be described in simple terms (e.g., by a change of symmetry) and are realized by strongly correlated quantum constituents, such as topological phases of solid-state systems. I also aim at implementing my methods in experiments, especially with ultracold atoms, thereby improving some aspects of the state-of-art of quantum simulations. Finally, I also aim at systematically developing novel entanglement-based methods to help efficiently model complex many-body systems. Thus, highly controlled systems like ultracold atoms will play the double role of being a system of interest and also a test-bed for finding and implementing novel theoretical modelings based on entanglement analysis of real data.

To achieve these goals I will first improve current methods for quantifying entanglement with observables measurable in many-body experiments and relate entanglement quantifiers with response functions, e.g., via fluctuation-dissipation theorems. I aim to derive analytic scaling laws for these thermodynamic entanglement quantifiers in different phases of matter. First abstractly, in universal toy models. Afterwards, I plan to employ these methods in ultracold atoms, thereby improving the state-of-art experiments in a platform that is designed to be a simulator of general complex many-body systems. Finally, the plan is to apply these methods to investigate the role of entanglement in complex disordered systems, searching systematically into universal behavior. The final goal is to use entanglement-based analysis of complex systems to systematically find more efficient ansätze for their description.

Complementarily to past approaches on entanglement in many-body physics, I will exploit the use of measurable entanglement witnesses, which can be implemented in experiments and allow a further-reaching investigation. Furthermore, I focus also on nonzero temperatures, as well as disordered systems, where a systematic classification of phases based on universal features is still lacking.

Resumen del Currículum Vitae:

I did my studies in Pisa (after an excellent track in high-school with numerous prizes, e.g., Mathematics and Physics Olympics) and defended my degrees with highest honors *cum laude*. My contribution to research started with my masters' thesis, which I did in Barcelona with a grant from the University of Pisa, supervised by José Ignacio Latorre and Pasquale Calabrese and resulting in a high-impact publication (currently with > 100 citations).

I was awarded a PhD grant in the prestigious SISSA institute in Trieste, which I declined and moved to the group of Gèza Tóth in Bilbao, where I worked on quantum information and foundations, developing the tools currently employed to detect entanglement in cold-atom experiments. Already during my PhD I showed a high degree of research maturity, being the main driving force of my projects and even the starter of international collaborations with experiments. My works had a widespread impact and even reached the general public, with two of my works reported in several popular articles.

I then moved to Vienna where I was awarded a Lise-Meitner grant, becoming a PI in the group of Marcus Huber. I worked on entanglement and many-body physics, also contributing to a review on entanglement detection. I also worked on quantum thermodynamics, with particular focus on refrigeration. I was the leading author in an invited book chapter and participated in a quite wide collaboration network that aims at investigating thermodynamics in the quantum regime from an experimental perspective.

I then contributed to write an interdisciplinary research proposal, that was funded within the "Young Independent Research Group" FWF program (PIs: Guryanova, Baumeler, Budroni). I was co-leading the research line on temporal quantum correlations, together with Costantino Budroni and also contributed to the overall organization of the group, which I joined after the end of my Lise-Meitner grant. There, I widened my investigation on quantum foundations including questions related to causality, metrology and time measurements. I was also the leading author of an invited perspective article on temporal quantum correlations.

I was also developing my totally independent research line, connecting entanglement, thermodynamics and quantum metrology, which led me to write two research projects, both eventually funded by FWF Stand-alone grants. During this period I co-supervised MSc and PhD students, (Shuheng



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Turno General

Liu and Julia Mathé among others) and younger researchers, which can be witnessed by several recent papers where I am the last author. I was also external committee member of a PhD thesis (Merid Tufa, Addis Ababa University).

I am currently the PI of two FWF grants, with my own group (3 PhDs + 1 postdoc to join soon) at Atominstitut (TU Wien), and I obtained the Italian habilitation as an Associate Professor in condensed matter theory.

From the publications side, I have 5 preprints and 22 publications in high-impact journals (e.g., 1 Science, 1 Nat. Rev., 4 PRL (1 Editor's suggestion), 1 invited PRA perspective and 1 invited book chapter). I also participated in over 35 international conferences (6 as an invited speaker) plus 3 as an organizer. Moreover, I had several visits (1-2 weeks) in various universities all over Europe, plus a 3-month visit at the University of Pisa (Pasquale Calabrese group) during my PhD.



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Turno General

Área Temática: Ciencias físicas
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Título: In vivo range verification in proton therapy based on prompt gamma-ray imaging, as well as dosimetric optimization in brachytherapy and collision prevention in radiotherapy

Resumen de la Memoria:

My scientific career focuses on medical radiation physics. The 52 publications, with 13 papers as first author (including 1 Review and 1 Comment), 2 papers as last author, as well as 1 Patent, a book chapter, 6 invited talks and 51 refereed articles with an average length of 945 words (obtaining the IOP trusted reviewer status and Outstanding Reviewer Award), and h-index of 15, highlight my independence. Furthermore, I have attended numerous international conferences (obtaining an IEEE Best Paper award). I collaborate internationally with several groups at USC, CERN, UPV, OncoRay and MGH, an exchange facilitated by my command of Spanish, English, German, French and Catalan.

Throughout my research in three different countries (Germany during my PhD, USA during my postdoc, and Spain now as a distinguished researcher) and institutions, I have authored key publications about range verification of proton therapy treatments based on prompt gamma-ray detectors. As a PhD student, I was second author of a seminal paper (Golnik 2014) proposing a new methodology for proton range monitoring based on timing measurements, that has been cited more than 153 times and that is now being pursued by several institutions, and first author of the clinical test (Hueso 2015), with more than 83 citations. I was co-inventor of the associated patent.

After my PhD, I moved to Harvard Medical School and Massachusetts General Hospital, to work on the translation of a prompt gamma-ray spectroscopy setup to the clinics. I devoted three years to this project as postdoctoral fellow and was in charge of the data processing as well as the implementation of a robotic actuator system and laser alignment for accurate positioning. I published the results obtained with heterogeneous phantoms as first author (Hueso 2018), a paper that was selected as featured article and as Breakthrough of the Year by Physics World, accumulating 108 citations. The effort culminated with the first worldwide in-human prompt gamma-ray spectroscopy measurement in January 2020, published at the AAPM annual meeting, awarded with the "Best in Physics" multidisciplinary distinction and a further report on Physics World. We also conducted the first worldwide comparison of clinically applied prompt gamma-ray prototypes (Hueso 2024).

Having identified the advantages and shortcomings of multiple range verification systems throughout my career in different institutions (Compton camera, Timing, Spectroscopy), I then proposed a disruptive measurement geometry that could be the best compromise for clinical application in a widespread basis. I shared this personal idea with the scientific community with a theoretical paper based on analytical models and Monte Carlo simulations (Hueso 2020) and obtained 357250€ funding between 2020 and 2026 for the project titled "Novel cost-effective proton range verification based on coaxial prompt gamma-ray monitoring", as well as a JAE-PRE funding to hire a PhD student and the RADNEXT and PTCOG Physics Project awards. As PI of this project, I co-funded two postdocs (Brzezinski and Roser) and an engineer (Casaña). This highlights my potential and opens up the horizon for becoming a group leader. I also reached the interview stage of the ERC Starting Grant 2022, of LaCaixa ResearchHealth 2023, and received the R3 certificate and the Young Investigator Medical Imaging Award.

Resumen del Currículum Vitae:

I studied Physics and did the Master of Advanced Physics at University of Valencia, and received the Premio Nacional de Fin de Carrera. In 2012, I obtained a Marie Curie Early Stage Researcher fellowship to start my PhD and research on proton therapy at Technische Universität Dresden, Germany, within the initial training network ENTERVISION, and was coinventor of a patent. Since then, I have published 13 papers as first author and 2 as last author, in topics ranging from brachytherapy to collision detection in radiotherapy and prompt gamma-ray imaging with Compton cameras, collimated cameras or timing spectrometry, with special focus on detector characterization for medical applications in proton therapy. My PhD work obtained a thesis recognition award by HZDR, and a Best Student Paper Award by IEEE. In 2016, I did a research internship with a private company at Target Systemelektronik in Wuppertal, Germany, working on detector electronics development and neutron-gamma radiation discrimination for homeland security, and reinforcing communication channels between academia and the private sector. In 2017, I moved to Massachusetts General Hospital (Harvard Medical School) with a postdoctoral research fellowship to collaborate on the translation to the clinics of a prompt gamma-ray spectroscopy camera, that was tested with patients in early 2020. The resulting paper (10.1088/1361-6560/aad513) was recognized as Breakthrough of the Year by the Physics World magazine. Other awards I earned during my career were: Best in Physics distinction (at AAPM/COMP 2020), the Excellence Certificate by Generalitat Valenciana, the Silver Medal in XVIII Spanish National Physics Olympiad, and PTCOG 62 Physics Project Funding (9000€).

Currently, as a Distinguished Researcher at IFIC, I am the PI of the project "Novel cost-effective proton range verification based on coaxial prompt gamma-ray monitoring" funded by GVA with 357250€ between 2020 and 2026. In 2022 and 2023, I applied to the ERC Starting Grant and LaCaixa Research Health call and advanced to respective interview phases. Furthermore, I was awarded the Bruce H Hasegawa Young Investigator Medical Imaging Science Award by IEEE. I am also co-PI of the outreach project "El tragaluz cuántico" (27000€) by FECYT <https://ific.uv.es/~ferhue/tragaluz/>, and I am part of the Scientific Advisory Board of the Horizon Europe project "NOVO" funded by the EIC Pathfinder Open program.

Overall, I have demonstrated creative talent, leadership and independence, as well as high productivity. I teach at two different Masters at University of Valencia and was awarded a competitive JAE-PRE project by CSIC to hire a PhD student. I am supervising four pre-docs (Javier Pérez, Iris García, Pablo Martín-Luna and Declan Garvey), see e.g. Martín-Luna 2024 and 2025 papers with me as last author. I regularly contribute to the ROOT open-source software development of CERN, and I am a maintainer of the AMIDE medical imaging software. During the first months of the Covid-19 pandemic, I participated in the development of accessible and open-source ventilators within the KiCad OpenVentilator Group. Moreover, I am referee of more than 50 manuscripts, and was selected as a reviewer of three grants from France and Argentina. I have held four outreach talks and two posts in divulgative blogs about physics and software programming for science.



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Turno General

Área Temática: Ciencias físicas
Nombre: PRAT MARTI, JUDIT
Referencia: RYC2024-048406-I
Correo Electrónico: jpratmarti@gmail.com
Título: Cosmología observacional con lentes gravitacionales

Resumen de la Memoria:

Propongo desarrollar un programa de investigación centrado en maximizar la información cosmológica de surveys de próxima generación, particularmente LSST. Mi trayectoria investigadora se ha centrado en la cosmología observacional, especialmente en el análisis de lentes gravitacionales y estructura a gran escala, logrando mediciones de parámetros cosmológicos con una precisión sin precedentes (~5%) a través del Dark Energy Survey (DES).

Mi propuesta se estructura en tres objetivos principales:

Liderar el análisis cosmológico de los datos del primer año de LSST, aprovechando mi experiencia con DES Y6 y la infraestructura que he desarrollado (TXPipe). Mi papel fundamental en el desarrollo de TXPipe, el framework oficial de DESC para procesar datos de weak lensing y clustering de LSST, me posiciona idealmente para este objetivo. Esta infraestructura, validada exhaustivamente con simulaciones, será crucial para obtener los primeros resultados cosmológicos de LSST.

Extraer más información de los mapas de materia que tenemos del Universo, utilizando inferencia basada en simulaciones y homología persistente con aprendizaje automático. Esta metodología innovadora, que he desarrollado durante mi Schmidt AI in Science Fellowship, permite ir más allá de las estadísticas tradicionales de dos puntos para modelar señales no gaussianas.

Establecer conexiones interdisciplinarias para transferir conocimiento y herramientas entre cosmología y otros campos. Mi experiencia colaborando con investigadores del Instituto de Ciencia de Datos de UChicago y mi posición actual en Nordita me permite fortalecer las conexiones entre las comunidades de física teórica y observacional.

La propuesta es particularmente oportuna dado el inminente inicio de las observaciones de LSST en diciembre de 2025. El cronograma del proyecto coincide perfectamente con la duración potencial de la beca (2026-2030), permitiéndome liderar el análisis de los primeros datos de LSST.

Mi programa combina metodologías establecidas donde tengo experiencia demostrada con enfoques innovadores en inteligencia artificial. Los impactos esperados incluyen: producir las mediciones más precisas hasta la fecha de las propiedades de la energía oscura a partir de surveys galácticos, fomentar colaboraciones entre cosmología y ciencia de datos, y crear herramientas de código abierto que permitan análisis cosmológicos reproducibles.

Esta investigación representa varios avances significativos respecto a mi trabajo anterior: va más allá de las estadísticas tradicionales de dos puntos para capturar información no gaussiana, establece conexiones interdisciplinarias más amplias, desarrolla marcos de análisis para volúmenes de datos sin precedentes, y lidera la transición de surveys actuales a los de próxima generación.

Resumen del Currículum Vitae:

Como cosmóloga observacional, he realizado contribuciones fundamentales para comprender el contenido y la evolución del Universo a través del Dark Energy Survey (DES). Mi logro principal ha sido liderar análisis críticos dentro de DES que midieron parámetros cósmicos con una precisión sin precedentes mediante lentes gravitacionales débiles y mediciones de estructura a gran escala. Como co-líder del Grupo de Trabajo de Weak Lensing de DES desde 2021, dirijo un equipo de 80 científicos en el grupo de trabajo más grande de la colaboración, coordinando el análisis del conjunto completo de datos de seis años y supervisando la revisión interna de aproximadamente 20 artículos anuales.

Lideré el desarrollo de TXPipe, un framework de software público para el survey de próxima generación del Observatorio Vera C. Rubin (LSST-DESC), que permite mediciones robustas de la distribución de materia cósmica. Como Schmidt AI in Science Fellow y actualmente como investigadora en Nordita, estoy avanzando el campo mediante el uso de inferencia basada en simulaciones y homología persistente con aprendizaje automático para extraer información de orden superior de mapas de masa de weak lensing, yendo más allá de las estadísticas tradicionales de dos puntos.

Mi investigación ha generado 8 publicaciones como primera autora (248 citas) y 108 publicaciones en total (8,177 citas). Mi trabajo ha sido reconocido internacionalmente a través de invitaciones para presentar en conferencias importantes, incluyendo la reunión AAS (2022) y cinco coloquios en instituciones destacadas. He obtenido más de \$20,000 en becas competitivas para colaboraciones internacionales, incluyendo fondos de la Real Academia Sueca de Ciencias y el Instituto de Ciencia de Datos de UChicago.

He contribuido activamente a la formación de la próxima generación de científicos, con especial atención a grupos subrepresentados en física. He supervisado cuatro estudiantes de grado, incluyendo dos estudiantes afroamericanas, co-supervisado dos estudiantes de doctorado y mentoreado a numerosos investigadores en etapas tempranas de su carrera dentro de DES. Esta mentoría ha resultado en dos publicaciones lideradas por estudiantes (Gagnon et al. 2024; Chicoine et al. 2024). Impartiré un curso en el programa de máster en física teórica de la Universidad de Islandia en marzo de 2025.

Mi compromiso con el impacto social incluye la organización de ScientiFika desde 2024 y el liderazgo del Grupo de Trabajo de Participación Comunitaria en la Universidad de Chicago (2020-2023). A través de iniciativas como el Chicago's South Side Art Contest, he construido puentes entre la academia y escuelas locales, complementando estas actividades con charlas públicas y actividades prácticas para estudiantes. Mi liderazgo científico incluye servir en el Consejo de Colaboración de LSST-DESC, presidir el comité del Coloquio Niels Bohr de Nordita, y actuar como revisora para NSF, NASA y revistas científicas importantes.



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Turno General

Área Temática: Ciencias físicas
Nombre: DIERIGL, MARKUS
Referencia: RYC2024-049582-I
Correo Electrónico: markus.dierigl@gmail.com
Título: Symmetries in Quantum Gravity

Resumen de la Memoria:

Throughout the history of physics symmetries have played a pivotal role. In recent years our understanding of them has been revolutionized to include their action on extended, rather than point-like, operators, called generalized symmetries. So far, however, they have mainly been discussed in theories without gravity.

In this project I will take on this important challenge and derive universal constraints on theories of quantum gravity with generalized symmetries. This combination of generalized symmetries and universal properties of gravitational systems allows to utilize the remarkable recent progress in both fields to provide insights into the hitherto unknown laws of quantum gravity, their manifestation in our Universe, and their implications at low energies. Applying these new laws to supersymmetric theories, I will show that all consistent low-energy supergravity theories necessarily have a string theory origin. I will further apply the constraints to restrict phenomenological models describing the dynamics of Nature.

The key strategy of my proposal is to investigate the gauging and explicit breaking of generalized symmetries, required by the absence of global symmetries in quantum gravity. Gauging demands the absence of anomalies, which would break the symmetries via quantum effects. I will classify these for generalized symmetries including the presence of quantum gravity fluctuations of the underlying spacetime manifold. The breaking of symmetries requires the inclusion of new objects, whose structure, properties, and applications I will explore systematically.

Both, the classification of these general anomalies as well as the classification of symmetry-breaking objects uses the mathematical formalism of bordism groups. Generalizing these to include localized degrees of freedom, SymQuaG uncovers a full web of novel anomalies in order to derive universal consistency constraints, which are then tested in the laboratory of string theory and beyond.

Resumen del Currículum Vitae:

My scientific background in generalized symmetries predates even the seminal work on “Generalized Symmetries” by Gaiotto, Kapustin, Seiberg, and Willet. In recent years I focused my research on the investigation of generalized symmetries in quantum gravity. In particular, I studied the breaking of symmetries in gravitational theories via anomalies and symmetry-breaking defects (during my research positions at the LMU, UPenn, Utrecht U). With several important research results (anomaly in type IIB string theory, new branes in string theory,...) I have become one of the world’s experts on anomalies for (generalized) symmetries in quantum gravity and continue to produce highly relevant results for string theory and beyond. For that, I learned the modern techniques for describing anomalies via deformation classes of spacetime manifolds with a given symmetry structure (e.g., orientation, spin, gauge fields), given by bordism groups. In fact, I am one of the few physicists who uses these involved mathematical calculations in algebraic topology to extract physical consistency conditions, via the absence of anomalies and (generalized) global symmetries in gravitational theories.

My status as one of the experts in the field is further corroborated by the successful application for an ERC Starting Grant in the 2024 call with title “Symmetries in Quantum Gravity”, which I am about to start in October of 2025. Beyond that, numerous invitations to present my work in research seminars and conferences demonstrate that my research is of great interest to a broader audience.

In the future I, together with my research team financed by the ERC grant, intend to extend my research beyond the already impressive applications to string theory setups and obtain a fully general classification of anomalies involving generalized symmetries and their breaking via defects. This promises the derivation of universal rules for any gravitational theory with a consistent ultra-violet completion and will shed new light on the inner structure of Nature.

Track record: (dated: January 13, 2025)
Number of papers: 30 (citable via Inspire)
Total citations: 1101 (Google Scholar)
h-index: 20
i10-index: 28

Beyond my research successes I was actively teaching throughout my academic career. In the past years I taught master’s courses on “String Theory I”, “String Theory II”, “Anomalies”, as well as a Seminar on “Generalized Symmetries in Quantum Field Theory”. Despite the high level of these courses the students’ feedback was overwhelmingly positive. Some of my best students continued to finish their master’s thesis under my supervision and treated subjects ranging from string gas cosmology to non-invertible symmetries.

I plan to continue my teaching activities passing on the knowledge to the next generation and producing an active and fruitful teaching and research environment.



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Turno General

Área Temática: Ciencias físicas
Nombre: FERNÁNDEZ ALVAR, EMMA
Referencia: RYC2024-051377-I
Correo Electrónico: emmafa86@gmail.com
Título: Unveiling the Milky Way past in the Galactic Archaeology era.

Resumen de la Memoria:

My research focuses on reconstructing the origin and evolution of our Galaxy based on i) the expectations of the current cosmological paradigm, the Lambda-Cold Dark Matter model, in terms of hierarchical formation of galaxies and ii) the nucleosynthesis of chemical elements in stars and the chemical enrichment of galaxies over time. My main works aimed to understand the role of merger events in the build-up of the MW, and their impact in the current configuration of the main MW components (the discs and stellar halo). Among my main contributions are the first derivation of the star formation history of the Gaia-Sausage/Enceladus galaxy (last major merger occurred in the MW at ancient times that formed most of the inner regions of the Galactic stellar halo) from its chemical composition, which allowed the estimation of its mass, key to constrain the impact of the merger history in the configuration of our Galaxy. I discovered the very metal-poor tail of the thin disc, which challenges previous ideas about the disc formation. Finally, I recently submitted a study with the first determination of the star formation history of the thin and thick Milky Way discs. These results are at the vanguard of GA research. My research expertise is broader than the average of researchers in my area. It covers the main tools to perform Galactic Archaeology (GA): automatized analysis of large spectroscopic databases, chemo-dynamical characterization of stellar populations, and the use of chemical evolution models, dynamical models of the Milky Way (MW), cosmological simulations of MW-like galaxies and star formation histories inference. Currently there are no individual researchers able to perform such a comprehensive analysis, despite calls from the astrophysics community for a holistic approach.

After completing my PhD in Spain, I undertook three postdoctoral positions abroad, expanding my methodological toolkit. I returned to Spain with a María Zambrano Grant for the attraction of international talent, working with Dra. Carme Gallart (IAC), Dra. Arianna Di Cintio and Dr. Chris Brook (ULL) at the Astrofísica y Cosmología Teórica group at ULL. Currently, as a beneficiary of an MSCA fellowship, I am pioneering the synergy between the CMD fitting technique and classical GA approaches, an innovation that will bring crucial precision to age estimation in GA. With 36 refereed publications in Q1 journals and an H-index of 21, my research has accumulated more than 8,000 citations. I actively disseminate my work through international conferences and invited seminars. I am a key member of several GA consortiums, including HRMOS (where I serve as PI from the IAC side), SDSS, Pristine, and WEAVE. Additionally, I collaborate with the ISSI team on "The Early Milky Way" to explore the early stages of Galactic formation.

Resumen del Currículum Vitae:

I obtained my PhD thesis in 2015 at ULL with an Astrofísico Residente Fellowship at the IAC, with the work: 'The distribution of chemical abundances in halo stars of the Milky Way'. My PhD in Spain was followed by 3 postdoctoral positions abroad. I returned to Spain with a María Zambrano Grant for the attraction of international talent, working with Dra. Carme Gallart (IAC), Dra. Arianna Di Cintio and Dr. Chris Brook (ULL) at the Astrofísica y Cosmología Teórica group at ULL. I am currently a beneficiary of a MSCA fellowship (since November 2023) to perform the innovative synergy of the CMD fitting technique (new to GA) with the classical GA approaches to add the age dimension.

My research career up to now has resulted in 36 refereed publications indexed in the 1st quartile (Q1) of the Journal Citation Reports (JCR) in the Astronomy and Astrophysics area, with a total of 8,155 citations. I have an H-index of 21 according to the ADS. I disseminated these scientific results with a total of 44 communications (39 oral presentations and 5 posters) in International and National Conferences, and invited seminars at Research Institutions around the world. I am currently involved in several international GA consortiums, including HRMOS (where I serve as PI), the Sloan Digital Sky Survey, the Pristine survey, and the WEAVE spectroscopic survey. I am also part of the ISSI collaboration team "The Early Milky Way", led by Dr. Else Starkenburg, which explores the early stages of Milky Way formation.

In addition to my research, I have taken an active role in academic life at the institutions I have worked with, including organizing group meetings and journal clubs. I am the PI of the "Galaxy Evolution in the Local Group" research group at IAC. I am a referee for Q1 journals, including ApJ and PASJ, and an evaluator for the Agencia Estatal de Investigación (Spain) and Agencia I+D+i (Argentina). I have co-supervised Bachelor's and Master's theses at University of Côte d'Azur and ULL, and I am currently co-supervising the PhD thesis of Alicia Rivero at IAC/ULL. I have also taught Bachelor (94 hours) and Master (102 hours) courses at UNAM and ULL. I am deeply committed to science outreach and public engagement. I participate in various activities, including open doors events, seminars for amateur astronomers, school astronomy education, and promoting gender equality. Additionally, I was invited to contribute to the Encyclopedia of Astrobiology with an entry on Galactic Archaeology.



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Turno General

Área Temática: Ciencias físicas
Nombre: RUBIO ABADAL, ANTONIO
Referencia: RYC2024-049092-I
Correo Electrónico: tonirubio.abadal@gmail.com
Título: Quantum Science with Arrays of Neutral Atoms

Resumen de la Memoria:

Neutral atoms have become a highly versatile platform for quantum science and technology. In particular, the manipulation and imaging of trapped individual atoms has led to very successful studies on quantum simulation, both in optical-lattice and in optical-tweezer experiments. My scientific trajectory over the last 10 years has focused on the experimental field of ultracold atoms in optical lattices, and has evidenced some of the opportunities offered by single-atom-detection techniques.

As a researcher in the Max Planck Institute of Quantum Optics, I used high-resolution imaging to prepare quantum many-body states of rubidium atoms, engineer their evolution and detect their density distribution at the single-atom level. This allowed me to realize studies on out-of-equilibrium quantum dynamics and explore open questions on themes like quantum thermalization and quantum magnetism. At the same time, these precise abilities have also enabled other research directions, such as collective quantum optics with atomic arrays or Rydberg-induced long-range interactions.

These last years as a postdoctoral researcher at ICFO, I have extended these single-atom imaging tools to the realm of alkaline-earth atoms in optical lattices. These steps were motivated by the potential these elements have to realize new exotic kinds of quantum-simulation models. Together with the strontium-lab team, I have built and demonstrated the first quantum-gas microscope for ultracold strontium. This achievement has been enabled by the development of two novel laser-cooling techniques, which exploit desirable spectral properties displayed by atomic strontium. This recent result was published in PRX Quantum in 2024 (Buob et al.).

The project that I propose for the following 5 years will build on my experience in single-atom imaging and laser cooling to address some of the current challenges in the field of quantum science with neutral atoms. My proposal, titled "Quantum Science with Arrays of Neutral Atoms", will harness certain properties of alkali and alkaline-earth atoms to prepare large atomic arrays, control their mechanical and electronic states with high precision and enable new approaches to quantum degeneracy.

The research line will be structured in three main scientific goals. The first goal will involve utilizing an ultra-narrow optical transition to manipulate and characterize the mechanical and electronic states of individual atoms. This result will be used to prepare low-entropy initial quantum states with high precision and repeatability. A second goal will be the study of atomic transitions with micron-sized wavelengths. These are heavily desirable transitions, as they can induce long-range interactions between atoms at subwavelength distances. The final goal of the project will focus in the development of quantum-gas assembly, based on a hybrid lattice-tweezer architecture. This technique will involve the design and realization of a new experimental system which will benefit from the tools and results developed in the two previous research goals.

The results of this research project will advance the field of neutral atoms and contribute to the development of a new generation of quantum simulators. The same unveiled techniques will also find applications in the fields of quantum metrology and quantum computing.

Resumen del Currículum Vitae:

I am an experimental physicist with an international research career, working at the interface between quantum optics, atomic physics and condensed matter. The focus of my research is in the field of ultracold atoms and their use as quantum simulators of condensed-matter models. I am currently a "La Caixa" Junior Leader postdoctoral fellow at ICFO, and I have been a postdoctoral researcher in the Strontium Lab of the "Ultracold Quantum Gases" group (led by Prof. Leticia Tarruell) since April 2021. Before my time at ICFO, I was a postdoctoral researcher in the Max Planck Institute of Quantum Optics (2020-2021) in the group of Prof. Immanuel Bloch. I realized my doctoral studies in the same group (2015-2020) with a PhD thesis, defended in the LMU Munich, awarded a "Summa Cum Laude" grade (2020). Previous predoctoral research experiences took place during my Master studies in ETH Zürich (2013-2015), at ICFO as a summer fellow (2013) and as an undergrad researcher in Universitat de Barcelona (2009-2013).

Scientific output:

I am author of 11 publications in peer-reviewed journals, all of them Q1 (h-index 10, Google Scholar, January 2025). These include Nature (1), Science (3) and Physical Review X (3, 2 of those as first author). My publications have received more than 2,300 citations with an average of 300 citations/year since 2016. My two first-author papers at PRX have >140 citations each. As a result of my scientific output, I have been invited to talk in 4 conferences, 3 international schools, one colloquium and 6 group seminars. Additionally, I have contributed to more than 30 international conferences and workshops through talks and posters. Over the last 8 years, I have participated in 5 European and 4 Spanish research grants.

Scientific awards and other merits:

In 2024 I was awarded a "La Caixa" Junior Leader fellowship (Retaining) for my project "Boosting quantum simulation with an optical atomic clock". As a postdoctoral researcher I have also been awarded a "Juan de la Cierva-Formación" contract (2022) and a "Severo Ochoa" Excellence Postdoctoral Fellowship (2021). I am also accredited as a tenure-eligible lecturer (profesor ayudante doctor) by both ANECA and the Catalan agency AQU. Before my PhD studies, I received an International grant for postgraduate studies from "Fundació la Caixa" (2013-2015), an ICFO Summer Fellowship (2013) and a "Beca de colaboración" research fellowship (2013) at the Universitat de Barcelona.

Experience in supervision, training and outreach:



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Turno General

As a postdoctoral researcher at ICFO I have formally supervised 3 Master's thesis students (in 2022, 2023 and 2024), all of them awarded an "Excellent" mark. I have also participated in 6 Master thesis and one PhD proposal committees. In addition, I have supervised two undergraduate students (2023) to build a setup for a master lab course at the University of Barcelona (Advanced Quantum Physics Lab). I have lectured in 3 international summer schools, and worked as a teaching assistant in LMU Munich for both Bachelor and Master courses. In terms of outreach, I have participated in several broad-audience outreach activities in Spain and Germany. These include a lecture in the "Ateneu Científic, Literari i Artístic" of Maó (Menorca, 2022), a talk during the "European Researchers' Night" (Barcelona, 2022) and four Science Slam talks (Munich, 2019).



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Turno General

Área Temática: Ciencias físicas
Nombre: CHAVEZ ANGEL, EMIGDIO
Referencia: RYC2024-048225-I
Correo Electrónico: emigdio.chavez@icn2.cat
Título: Nanoengineering for thermoelectric applications

Resumen de la Memoria:

My research focuses on exploring material properties at the nanoscale, with emphasis on thermal transport, phonon dynamics, nanoparticles, and thermoelectricity. My academic journey began during my Master's studies in Chile, where I investigated the optical and morphological properties of nanoparticles, collaborating with local researchers to publish ten indexed articles (2010-2017).

During my Ph.D., I specialized in nanoscale thermal transport, developing a novel thermal characterization technique that has become a standard for measuring nanostructure thermal conductivity. I also studied phonon confinement in silicon membranes, revealing the effects of surface imperfections and size on phonon behaviour and thermal properties. These efforts led to several breakthroughs, including insights into phononic crystals, optomechanical band gaps, and phononic dispersion relations in nanostructures.

At Universität Mainz, I transitioned to studying thermoelectric properties of superlattices, focusing on coherent-incoherent thermal transport. This involved thin-film fabrication, chip design, and X-ray spectroscopy, alongside programming tools for experiment automation and thermal conductivity analysis. Returning to ICN2, I explored thermal and optical properties of nanofluids, molten salts, and 2D materials while conducting thermoelectric characterizations of films and bulk materials (2016-2022).

Currently, I am a senior researcher in Prof. Mugarza's group, leading a national project to establish a multipurpose Scanning Probe Microscopy (SPM) platform at ALBA synchrotron. This cutting-edge platform integrates advanced spectroscopic techniques for atomic-level material characterization, forming a cornerstone of ALBA's Phase II upgrade to a fourth-generation synchrotron ring.

My work centres on two areas: developing electrochemical tip-enhanced Raman spectroscopy (EC-TERS) and studying phonon properties in 2D-twistronic materials, nanoporous graphene, 2D heterostructures, and forbidden phonon modes in layered materials. EC-TERS combines SPM's spatial resolution with Raman spectroscopy's molecular specificity, enabling in-situ analysis of nanoscale chemical and electronic processes, crucial for advancing catalysis, corrosion, and biological research. Additionally, I am investigating nanometric hot spots' effects on thermal transport, with implications for electronics, thermoelectric energy, and nanoscale heat management. My interdisciplinary approach aims to significantly advance these fields through innovative material characterization.

I have been the team-PI of 2 EU projects (nanopoly and 3D-Bricks) and I have been the PI of 2 internal SO projects. I am member of the scientific committee of two scientific pillars of ICN2: (i) Nanosolutions for Sustainable Energy Technologies and (ii) Artificial Intelligence Computational Platform.

Resumen del Currículum Vitae:

As a senior researcher specializing in the experimental and theoretical study of nanoscale material properties, my expertise encompasses phonon transport, magnetism, electrical and optical characterization. I have authored 77 indexed papers in prestigious journals such as Nature Comms, Nano Lett, PRL, Adv Mat, etc. I have also contributed 3 book chapters, and my work has garnered over 2,600 citations with h-index of 25.

My academic journey began with a Master's degree in Physics in Chile (2008-2010), where I focused on synthesis and characterization of ferroelectric nanoparticles. I then pursued a Ph.D. in Physics at the UAB (2010-2014), studying nanoscale thermal transport and phonon dynamics in semiconductors. Postdoctoral research at the Uni of Mainz in Germany (2015-2016) deepened my understanding of magnetism and the thermoelectric properties of thin films. Subsequently, I returned to Spain to contribute to a Severo Ochoa project, investigating the optical and thermal properties of nanofluids and molten salts for energy storage.

In 2019, I served as a temporary PI for the EU-funded Nanopoly project, focusing on the transport properties of 2D materials beyond graphene. In 2021, I joined an ERC project to lead research on phonon-phonon interactions in 2D materials. Since 2022, I joined the group of Prof. Mugarza's group to lead a national project aimed at developing a groundbreaking multipurpose Scanning Probe Microscopy (SPM) platform. This innovative facility, integrated with synchrotron spectroscopies and housed at the ALBA Synchrotron, enables advanced atomic-level material characterization.

A dedicated mentor, I have guided 6 Ph.D. (one officially) and 3 MSc (one officially) students. I have also served as a guest editor for two special journal issues on thermal transport, reviewed for over 30 journals, and taught as a tutor professor at the UPC. In 2019, I expanded my skill set by completing a postgraduate course in Artificial Intelligence with Deep Learning. My career is driven by a commitment to advancing scientific knowledge and fostering the development of future researchers.



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Turno General

Área Temática: Ciencias físicas
Nombre: LOPEZ SOLIS, ALVARO
Referencia: RYC2024-048318-I
Correo Electrónico: alvarolopezsolis@gmail.com
Título: Search for dark matter and Higgs boson with the ATLAS detector

Resumen de la Memoria:

The Standard Model (SM) of particle physics has been proven to describe extremely well the fundamental particles and their interactions. Despite its success, the SM cannot explain several cosmological observations nor address important conceptual questions, such as why the Higgs boson is so light compared to the Planck scale (naturalness problem), the nature and interactions of dark matter (DM), and why the masses of the fermions are so dramatically different from each other (fermion-flavour mass hierarchy), with the top quark being the heaviest elementary particle. My research efforts have therefore been meticulously directed toward seeking answers to these questions by defining several research directions in close collaboration with experimental groups around the world, with particular emphasis in the search for DM and supersymmetric particles. As a Ramón y Cajal researcher, I plan to continue this scientific adventure by searching for dark matter coupling to the SM via flavour violating couplings. I will also expand my research towards the measurement of Higgs couplings to c-quarks and his quartic coupling. The discovery of any deviation from the SM predictions would not only be a major breakthrough for high-energy physics, as it would profoundly transform our understanding of the universe, but it would also mark the beginning of a new era of revolutionary discoveries. Furthermore, a successful research program must have three key ingredients: performance, detector and analysis work. I will participate in all of these ingredients by improving the performance to identify c-jets and the jet charge, crucial for the success of my research proposal, and by joining the effort to build and commission the detector upgrades for the LHC high-luminosity phase or the effort to design the detector for future colliders.

Resumen del Currículum Vitae:

My research focuses on searching for new particles and exploring dark matter using data from the ATLAS detector at the Large Hadron Collider. I have played key roles in major projects, such as improving our understanding of supersymmetric particles and dark matter's potential connections to the Higgs boson. My work has set new benchmarks in these areas, providing critical constraints on existing theories.

These projects have been performed in an international environment and different laboratories across Europe. I completed my PhD at the LPNHE of Paris and pursued postdoctoral research in the University of Sheffield in the UK, DESY in Germany (largest particle physics community in Germany), and, starting from February 1st 2025, at the IFAE in Spain.

I have also contributed significantly to the ATLAS Collaboration's technical operations, including detector calibration, algorithm development, and performance optimization. I have also taken on leadership roles, with the coordination of two analysis teams in dark matter and supersymmetry searches as well as the coordination of two large groups within the ATLAS collaboration. I have also participated in the mentoring students at various levels and the teaching at university level of basic and advanced physics.

In addition to presenting my findings internationally, I have received several awards due to my contributions to particle physics, as well as a research grant of three years to continue my work in dark matter and ATLAS detector performance.



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Turno General

Área Temática: Ciencias físicas
Nombre: THOMAS , GUILLAUME
Referencia: RYC2024-051016-I
Correo Electrónico: guillaume88.thomas@gmail.com
Título: Unraveling the formation history and the gravitational potential of the Milky Way

Resumen de la Memoria:

I am an astrophysicist specializing in Galactic Archaeology and Dynamics. My main scientific interest is to understand: [1] What is the nature of dark matter? [2] How did galaxies like ours form and evolve? I position my work at the intersection of theory and observation, focusing on the chemodynamical properties of our galaxy, the Milky Way (MW), and the Local Group. My extensive research profile includes expertise in handling large photometric and spectroscopic datasets using advanced techniques such as machine learning and numerical simulations within various gravitational frameworks. I have developed tools for direct comparisons between observations and cosmological simulations, incorporating observational effects. This unique skill set allows me to lead diverse projects and collaborate simultaneously with both observers and theorists.

On the observational front, I specialize in combining and leveraging data from large multidimensional surveys to study the stellar halo of the Milky Way and dwarf galaxies using innovative methods, including supervised and unsupervised machine learning techniques. I have created several methods to measure the distances of stars for which Gaia parallaxes cannot be applied. These measurements have enabled me to investigate the disc-halo interface, the outskirts of the Milky Way, and its inhabitants, such as stellar streams and dwarf galaxies. Notably, I have discovered and analyzed several stellar streams, including one around the M92 cluster and the Cetus-Palca stream. Additionally, I compiled an updated census of galaxies bound to the LMC prior to its infall and I am leading an international project to homogenise large spectroscopic catalogs.

On the numerical modeling side, I am an expert in modeling stellar streams and their progenitors across different theoretical frameworks. Through these simulations, I have demonstrated that certain globular clusters and stellar streams could potentially indicate violations of the strong equivalence principle, as predicted by alternative gravity theories like MOND. I have also examined how the Galactic bar influences the morphology of stellar streams and shown their utility in measuring variations in the bar's pattern speed. Moreover, I proved that some density variations along stellar streams, previously attributed to dark matter sub-halos, were actually due to inhomogeneities in extensive surveys.

Leveraging my theoretical and observational expertise in Galactic Archeology and Dynamics, my project during the RyC aims to address key questions about the MW's accretion history, its chemo-dynamical evolution, and the properties of dark matter in our local environment. To accomplish this, I will use existing and upcoming large multidimensional surveys such as Gaia, UNIONS, LSST, WEAVE, 4-MOST, DESI, and Euclid. These surveys will provide detailed chemo-dynamical data for millions of stars in the MW disk and halo, as well as its satellite galaxies. This rich dataset, combined with idealized N-body and state-of-the-art cosmological hydrodynamical simulations, will enable me to answer various questions and establish critical constraints on the fundamental nature of dark matter and the processes driving the formation and evolution of MW-like galaxies.

Resumen del Currículum Vitae:

I am an astrophysicist, expert in the fields of Galactic Archaeology and Dynamics. The two main questions I aim to answer during my career are: What is the nature of dark matter? & How did a galaxy like our form and evolve? My approach is to place myself at the frontier between theory and observations, focusing mainly on the chemo-dynamical properties of our Galaxy, the Milky Way (MW), and of the Local Group. As such, I have built a complete & broad research profile, with expertise on handling large photometric and spectroscopic datasets using cutting edge techniques such as machine learning, and numerical simulations in different gravitational frameworks. Furthermore, I developed tools that allow to perform a direct comparison between observations and cosmological simulations, by folding in observational effects into simulations. This unique set of skills allows me to lead projects on a wide range of topics, and to collaborate with both observers and theoreticians at the same time.

In my PhD defended in 2017 and conducted under the supervision of Profs. B. Famaey & R. Ibata at the Strasbourg Observatory, I simulated the formation of MW stellar streams, in different gravitational frameworks. In 2017, I moved to Canada after having been awarded the NRC Postdoctoral fellowship to work at the Herzberg Astronomy & Astrophysics research centre (Victoria B.C.). There, I expanded my expertise to the analysis of large observational multidimensional datasets. This allows me to discover a new stellar stream and to pioneer the use of machine learning to measure the distance of stars for which Gaia parallaxes cannot be used, granting me the opportunity to study the outskirts of the MW.

Since 2020, I am part of the IAC, Tenerife, which I joined first with a highly competitive Juan de La Cierva fellowship, then with 2 successive postdoctoral contracts (including one funded by the Severo Ochoa program). I became deeply engaged in the preparation of the WEAVE Galactic Archaeology (GA) survey, serving as a member of the Survey Working Group, representing the GA survey for the thick disc and halo at low resolution (GA-LRhighlat). I have the status of WEAVE builder and Survey builder. My responsibilities encompass the preparation of observing blocks, overseeing communication among various SWG members involved in shared observations across WEAVE surveys, and leading a science verification experiment. Additionally, I am tasked with providing stellar distances and play an active role in shaping the observational strategy and target selection. At the same time, I gained interest in the dynamical analysis of Local Group dwarf galaxies and of their history (e.g. I made a census of the galaxies that were bound to the LMC).

To date, I have published 54 refereed papers, 11 of them as first author with more than 60 collaborators, covering a wide range of topics. These papers have a total of ~2065 citations, and I have an H-index of 28. I have given 28 oral presentations at international conferences, including 3 review and 3 invited talks, and 16 seminars in other centres. I supervised 4 students, co-supervised 5 others (including a PhD), and I was the scientific mentor of 4 others at all academic level. I was the co-chair of 2 symposiums and I co-organized a school for PhD and early-career researcher in 2023, and I am leading the AsteroSHOP international team.



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Turno General

Área Temática: Ciencias físicas
Nombre: STEFANEK, BENJAMIN
Referencia: RYC2024-050215-I
Correo Electrónico: stefanek.physics@gmail.com
Título: BSM Phenomenology in the Precision Era

Resumen de la Memoria:

The Standard Model (SM) of particle physics is a remarkably successful framework, completed with the discovery of the Higgs boson in 2012. However, it is widely acknowledged that the SM is incomplete, leaving open questions about the nature of the universe. My research trajectory has focused on answering these questions by working at the interface between theoretical high-energy particle physics and cosmology, with an emphasis on new physics beyond the Standard Model (BSM). My work takes a data-driven approach of looking for hints of BSM physics at the Large Hadron Collider (LHC), in precision experiments, and via cosmological probes combined with a top-down view guided by open problems in the Standard Model (SM). I am broadly interested in BSM physics and how it connects open problems in the SM and in cosmology, such as the existence of dark matter and neutrino masses, the flavor puzzle, and the Higgs hierarchy problem. Recently, my research has focused on four interrelated directions with an overarching theme of flavor physics. These directions are: 1) effective quantum field theories, 2) flavor symmetries and testing the accidental symmetries of the SM, 3) connections between the flavor puzzle and the Higgs mass, and finally 4) current and future collider physics.

My proposal aims to push the boundaries of our understanding by investigating what lies beyond the SM using the powerful tools of effective field theories. In particular, this research will employ the Standard Model Effective Field Theory (SMEFT) to search for indirect evidence of new physics in a model-independent way. By combining experimental data from the LHC, electroweak precision tests, and flavor physics, this project seeks to push boundaries to reveal new physics that might be hiding just beyond current experimental reach. A key focus will be on understanding how to connect measurements taken at different energy scales, allowing for a more comprehensive and consistent picture that will maximize the reach of current experiments.

The proposal also looks to the future, particularly to FCC-ee, a next-generation electron-positron collider planned for CERN. With the capability to produce over one trillion Z bosons, the FCC-ee program offers unparalleled indirect access to new physics via precision probes. By analyzing quantum effects too subtle for the LHC to detect, this collider will provide groundbreaking insights. For instance, precision measurements at the Z-pole and of the Higgs boson at FCC-ee could offer clues about the deeper structure of matter, including the potential for new particles or forces.

The timing of this research is critical. With the LHC entering a new high-luminosity phase and the FCC program on the verge of approval, this project will play a pivotal role in maximizing the scientific return from current and future experiments. It will also help shape the future of Europe's collider program by demonstrating the untapped potential of current experiments while simultaneously developing a smart strategy for the next generation.

The proposal is ambitious yet feasible, owing to my extensive experience in particle physics, particularly in SMEFT analyses, flavor symmetries, and electroweak precision tests. With a strong publication record in these areas, I am well-equipped to lead this groundbreaking work.

Resumen del Currículum Vitae:

I obtained my PhD in August 2017 at the University of Wisconsin-Madison working primarily on novel connections between new physics beyond the Standard Model (BSM) and cosmology. After that I held postdoctoral researcher positions at Johannes Gutenberg University Mainz (3 years, Germany), the University of Zurich (3 years, Switzerland) and King's College London (1 year, United Kingdom). In September 2024, I resigned from my postdoc at King's College to begin a 4+2 year fellowship at the Instituto de Física Corpuscular (IFIC) in Valencia, where my research is currently fully funded by a grant from the Generalitat Valenciana.

My research lies at the interface between high-energy particle physics and cosmology. I have authored 32 articles, 30 of which are published in high profile, peer reviewed journals (the rest are pre-prints pending acceptance). I have 2 papers published in PRL, the most prestigious journal in my field. I have accumulated 1400+ citations and a HEP index of 20. I am a referee for most of the major journals, including PRL. I have presented my work at over 32 international conferences/workshops, and I have been invited to give more than 27 invited talks or seminars at places around the world. I am a member of the LISA Cosmology Working Group. I am also a member of the BSM physics group for the FCC-ee feasibility study, and I am frequently invited to speak at FCC-related workshops.

I have extensive experience teaching at the bachelor level from my 5 years as a PhD student at the University of Wisconsin-Madison, as well as during my 3-year postdoc at the University of Zurich. My responsibilities included lecturing and grading, teaching exercise courses, preparing exercises and exams, and working one-on-one with students. Altogether, I have accumulated over 250+ hours of teaching experience.

In my first postdoc at JGU Mainz, I gained my first experience supervising a master's student in the group of Prof. Dr. Pedro Schwaller. I played a large role in proposing the master's thesis project for the student which resulted in a successful publication. Later we accepted the student for a Ph.D. program, where I continued to perform a supervising role. During my second postdoc at the University of Zurich, I mentored 6 master's and Ph.D. students in the group of Prof. Dr. Gino Isidori. Furthermore, a master's student that I helped supervise was accepted to continue as a Ph.D. student in the group. Finally, during my postdoc at King's College London, I mentored 2 Ph.D. students in the group. Altogether, that is 9 masters and Ph.D. students mentored/co-supervised.



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I have also already demonstrated the ability to write high-quality grant applications and win research funding. I won a Seal of Excellence Award from the European Commission for my Marie Curie fellowship application in 2023, and I have just started a CDEIGENT fellowship in Valencia, which is a personal grant from the Generalitat Valenciana. The grant has been awarded for a period of four years, and is extendable for another two years. The funding already granted for the first four years is 285.000 €. The extension of two years is granted based on the overall ranking of the call results, and I was ranked first place.



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Turno General

Área Temática: Ciencias físicas
Nombre: IORIO, GIULIANO
Referencia: RYC2024-048488-I
Correo Electrónico: giuliano.iorio.astro@gmail.com
Título: All the Stars Big and Small: Stellar and Binary Evolution as a Tool to Interpret Present and Future Datasets

Resumen de la Memoria:

Since my PhD, my research has focused on astrophysical topics ranging from stellar and binary evolution to gravitational-wave astrophysics, including the kinematics and dynamics of galaxies and Galactic archaeology. My work is highly interdisciplinary, combining observational data analysis, theoretical modelling, statistical methods, machine learning, and computational techniques, as well as scientific software development. My interdisciplinary expertise, alongside my scientific contributions, are evidenced by 57 peer-reviewed publications in leading journals, including 12 as corresponding author (7 as first author), in collaboration with 44 co-authors from 70 institutions, 59 of which are outside Italy. I have also developed and maintain open-source scientific software widely used in the community.

During my PhD, I focused on the dynamics and kinematics of dwarf galaxies, refining our understanding of their dark matter content. I applied innovative techniques to derive robust rotation curves of gaseous discs in dwarf irregular galaxies and conducted N-body simulations to study dwarf spheroidal galaxies. The datasets and tools I produced continue to be actively used by the research community.

As a Newton International fellow, my research has involved characterising the Galactic stellar halo by using the data from European Satellite Gaia. My pioneering work was the first to reveal the triaxial morphology of the inner Galactic stellar halo and has made a substantial contribution to the characterisation of a peculiar halo star population, likely debris from the Galaxy's last major merger. These studies pushed current datasets to their limits, addressing incomplete phase-space coverage, and anticipated insights from future photometric and spectroscopic surveys by 5–7 years.

Since 2019, my focus has shifted towards the stellar and binary evolution of both low- and high-mass stars. I developed SEVN, a rapid population synthesis code enabling the simulation of millions stars or binary systems within few hours. Despite its recent release (2023), SEVN is already widely adopted (featured in over 10 publications), particularly for studies of binary compact objects (black holes and neutron stars) as gravitational-wave sources.

Currently, as a La Caixa Junior Leader Fellow at the Institute of Cosmos Sciences of the University of Barcelona (ICCUB), I focus on the formation channels of a peculiar population of variable stars (RR Lyrae) in the Milky Way disc. These stars exhibit kinematic properties akin to young disc stars (2–8 Gyr old), although classical models suggest they should be much older or non-existent. Using detailed stellar and binary evolution models, I am exploring alternative formation channels, such as mass transfer in binary systems. Solving this conundrum promises to have groundbreaking implications for the nature of these stars and the formation and evolution of our Galaxy.

For the Ramón y Cajal Fellowship, I will continue to focus on stellar and binary evolution, aiming to update existing tools and develop new ones to maximise the scientific return from current and future datasets and instrumentation. This research is crucial for interpreting diverse astronomical observations and will complement many research groups at the chosen host institution (ICCUB, University of Barcelona)

Resumen del Currículum Vitae:

I hold a PhD in Astrophysics (2018) from the University of Bologna, following a cum laude Bachelor's degree in Astronomy (2011) and a Master's in Astrophysics and Cosmology (2014). During my PhD, I was awarded the prestigious "Borsa Marco Polo" grant to support a research visit at the University of Cambridge. Immediately after completing my PhD, I was awarded the highly competitive Newton International Fellowship (success rate <10%, PI: G. Iorio, £99.000), allowing me to join the Institute of Astronomy at Cambridge as an independent researcher. There, I advanced studies on the Galactic stellar halo using data from the European satellite Gaia, resulting in influential publications. One of the works derived from my fellowship received an honourable mention in the 2023 "Premio Giovani Ricercatori," a young researcher prize in Italy. Following the fellowship, I secured additional funding (PI: G. Iorio, £20.000 in total) to support collaborative projects with UK researchers.

In 2019, I joined the ERC-funded DEMOBLACK group at the University of Padova (PI: M. Mapelli), quickly becoming the coordinator for the work package on stellar and binary evolution. I developed SEVN, a state-of-the-art population synthesis code widely adopted for evolving large populations of stars and binaries and studying the astrophysical implications of gravitational wave events.

In 2023, I was promoted to a Junior Assistant Professor (RTD-A) at the University of Padova, where I designed and led master's and PhD-level courses. My leadership extended to coordinating the local branch of the Italian collaboration TEONGRAV (focused on gravitational wave theory), managing funds (approximately €18.000 per year), and organising workshops within the collaboration.

In 2024, I was awarded the prestigious "La Caixa" Junior Leader Incoming Fellowship (success rate <10%, PI: G. Iorio, €297.900), joining the Institute of Cosmos Sciences at the University of Barcelona. My current research focuses on exploring alternative formation channels for RR Lyrae stars in the Milky Way disc by combining advanced stellar and binary evolution models.

Throughout my career, I have contributed actively to the astrophysical community and society. As a referee for leading journals (e.g., MNRAS, ApJ, Astronomy and Computing), I provide regular peer-review services. Since 2021, I have been a member of the Italian Time Allocation Committee, evaluating proposals for the LBT-TNG-REM telescopes. In 2024, I was invited to review national grant proposals in Italy and the Netherlands (projects valued at €2k-3k each). I have supervised over 20 bachelor's and master's students and co-supervised 3 PhD students.

My consistent generation of innovative ideas has resulted in 57 refereed publications in top-rated journals, including 12 as corresponding author. My work has received over 2.280 citations (h-index: 27, source: ADS NASA). I have presented my research at more than 20 international conferences and workshops (including 4 invited talks) and delivered 6 invited colloquia and seminars at prestigious institutions. My collaborations span 44 co-authors from 70 institutions, with 59 based outside Italy. I have actively participated in large international collaborations such as LIGO-Virgo-KAGRA for gravitational wave source studies and am currently a member of the LISA, Einstein Telescope, and WEAVE collaborations.



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Turno General

Área Temática: Ciencias físicas
Nombre: SALA , PABLO
Referencia: RYC2024-049169-I
Correo Electrónico: pasatosa@gmail.com
Título: Condensed matter theory in the quantum information era
Resumen de la Memoria:

My research lies at the intersection of condensed matter and quantum information, dealing with strongly interacting systems in regimes that depart from the traditional close-to-equilibrium setting. The flourishing development of new experimental platforms and quantum devices motivates me to explore new frontiers in the physics of quantum many-body systems while looking for their application to quantum information tasks. The following questions, summarized in the figure below, guide my research: I) **What mechanisms can lead to a breakdown of thermalization?** Even in systems perfectly isolated from their environment quantum thermalization kicks in. With my collaborators, I discovered that a mechanism to avoid thermalization is the fragmentation of the Hilbert space, a phenomenon that we further explored in an experimental collaboration using ultracold atoms.

II) How does hydrodynamics emerge in closed quantum systems out of equilibrium? I realized that imposing unconventional conservation laws can lead to a universal slow relaxation.

At very low temperatures, collective phenomena involving many particles can emerge, ruled by the laws of quantum mechanics. **How robust are these phenomena to decoherence?** I discovered that some sources of decoherence can lead to highly entangled states and novel phases of matter. Moreover, my work found a remarkable stability of non-Abelian topological quantum memories to decoherence. III) **Can we realize novel behavior by combining quantum measurements and entangling unitaries?** I also investigate quantum phenomena that cannot be realized in the absence of measurements, and their potential experimental realization. We found that measurements can dramatically alter the universal properties of quantum systems tuned to a phase transition. \\

`\begin{figure}[h!]`

`\centering`

`\includegraphics[width=0.85\linewidth]{Research_statement.jpg}`

`\caption*{\footnotesize{\textbf{Three main research directions:}} I) Out-of-equilibrium dynamics and mechanisms to avoid quantum thermalization in isolated and open quantum systems. II) Stability of topological quantum memories to decoherence. III) Measurement-altered phenomena and application to quantum information tasks. }}`

`\end{figure}`

To address these questions I combine various analytical tools and mathematical results with numerical methods (e.g., variational techniques, including Gaussian states and tensor networks, and Monte-Carlo simulations). In the following, I discuss some of these research achievements as well as future research directions.

Resumen del Currículum Vitae:

My research focuses on condensed matter physics and quantum information, exploring many-body quantum dynamics, open quantum systems, and measurement-induced phenomena. My goal is to understand quantum many-body systems and their potential applications in quantum technologies. I have spent seven years in Germany (master's and PhD) and two years in the USA as a postdoc at Caltech. My work has led to 4 preprints and 16 publications in high-impact journals, including Phys. Rev. X, Nat. Comm., PRX Quantum, and Phys. Rev. Lett., with 3 works highlighted by editors. I have collaborated with 35 researchers across 7 countries, giving 30 talks, including 8 invited talks in 2024. I also review articles for journals and participate in outreach, such as radio programs and have collaborated with a professional writer. I have co-supervised 7 students (including 3 PhD students) and have over 250 hours of tutoring experience, delivering 9 tutorials in English.

I bachelor's degrees in Physics and in Mathematics (2010–2015), receiving an award for the second-best academic record in Physics. I completed a master's thesis at the Max Planck Institute for Quantum Optics (2014–2015) under Professors Cirac and Shi, followed by a PhD at the Technical University of Munich (TUM), under Prof. Pollmann's supervision, supported by a La Caixa fellowship (2017–2019). My PhD research led to the discovery of Hilbert space fragmentation, a new subfield I initiated. This work has been cited over 480 times. My PhD resulted in nine publications, including collaborations with Monika Aidelsburger and Immanuel Bloch on fragmented systems. I also co-supervised four students, resulting in three publications. My PhD thesis was a finalist for the 2023 Dissertation Prize in Condensed Matter Physics from the German Physics Society.

I am currently a third-year postdoctoral researcher at Caltech, holding a Burke Institute Prize fellowship. I collaborate with leading researchers from institutions like Berkeley, Caltech, Madrid, Princeton, Tokyo, and Yale. This role has helped me mature as an independent researcher, gaining experience in PhD supervision and leadership. My recent work explores quantum measurements and decoherence in many-body systems, contributing to the development of quantum technologies. Alongside my collaborators, I have made three key discoveries: First, we showed that decoherence can lead to stationary entangled states in open quantum systems. Second, we studied the stability of topological order against decoherence, providing insights into non-Abelian quantum memories and topological quantum computation. Third, we demonstrated that quantum measurements can lead to behavior beyond conventional paradigms, which can be observed in current quantum computing hardware and inform the ability to teleport many-body states with errors in near-term devices.



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As a postdoc, I have co-supervised three PhD students and am beginning to supervise a bachelor student. I have chaired sessions at the Summer Undergraduate Research Fellowships at Caltech (2023) and the American Physics Society March Meeting (2022). I also serve as a division representative in the Caltech Postdoctoral Association. Since April 2023, I have been accredited by the Spanish National Agency for Quality Assessment and Accreditation (ANECA) to be hired as a profesor contratado doctor.



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Turno General

Área Temática:

Ciencias físicas

Nombre:

DENKOVA, DENITZA

Referencia:

RYC2024-050001-I

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denitza.denkova@icfo.eu

Título:

Advanced microscopy and exploration of super-linear light-matter interactions for bio-imaging applications

Resumen de la Memoria:

My main scientific and technical contributions can be grouped in 4 research lines:

Research Line I: Development of SEE Microscopy

I pioneered Super-linear Excitation-Emission (SEE) microscopy, a super-resolution (SR) methodology enabling SR imaging in conventional confocal microscopes. This novel method uses upconversion nanoparticles (UCNPs) to achieve resolution enhancement through super-linear emission, uniquely improving resolution with reduced laser power. Operating at near-infrared wavelengths, SEE microscopy addresses limitations of traditional SR methods like phototoxicity and autofluorescence, providing >2x resolution improvement in 3D using low light doses suitable for live-cell imaging. This work, published in Nature Comm., inspired further advancements in SR imaging research, industry interest and collaborations.

Research Line II: Advancing In-Vitro Fertilization (IVF) Through Metabolic Imaging

I led the development of a novel imaging methodology addressing a key challenge in IVF procedures: oocyte and embryo evaluation. This label-free, non-invasive approach outperforms traditional evaluation tools, offering translational potential in clinical IVF. I patented this innovation and secured significant funding while leading collaborations with clinics, investors, and industrial partners. These efforts culminated in licensing the technology to a spin-off, raising €6M in investment.

Research Line III: Nanoscale Magnetic Field Imaging

I pioneered a method to image the lateral magnetic field of light with subwavelength resolution using hollow-pyramid Scanning Near-field Optical Microscopy (SNOM) probes, addressing a key gap in electromagnetic near-field characterization of plasmonic structures. These advances facilitated detailed studies of plasmonic systems, influencing ongoing research. My work received the Springer Thesis Award.

Research Line IV: Near-Field Imaging in Dielectric Nanostructures

I adapted SNOM techniques to study high-index dielectric nanoparticles, enabling experimental observation of photonic topological edge states and phase transitions. This research, established novel insights into topological photonics.

NEW RESEARCH LINE TO BE DEVELOPED: Super-linear Light-Matter Interactions (SLLIMIs) can result in surprising, beneficial optical phenomena and imaging modalities, yet they remain poorly understood and often misused. I aim to elevate the study of SLLIMI to a fundamentally new level by developing a comprehensive theoretical framework describing such interactions. This framework will be integrated into an open-source tool enabling it for the broad optical community. Further, I will use these developments to uncover and describe novel optical phenomena (such as novel 3D point spread functions and improved resolution deep in tissue) yielding enhanced 3D emitter resolvability. My new research line will leverage these theoretical insights to enable new imaging techniques with unprecedented depth and resolution (e.g., SR light-sheet microscopy, endoscopic SR). I will apply these advancements to transformative bio-imaging applications, including deep non-invasive neural activation and imaging, with implications for neuroscience and retinal disease research. By combining theoretical innovation with practical applications, this research line will establish a paradigm shift in SLLIMI studies and bio-imaging methodologies.

Resumen del Currículum Vitae:

I am a senior postdoctoral optical physicist passionate about developing innovative imaging methods to solve complex biomedical challenges. My career is built on five pillars:

P1: Scientific Excellence: With over a decade of experience, I have made significant contributions to biomedical and applied physics by bridging theory with experimental validation. My research has led to 15+ publications in top journals (e.g., Nat. Comm., PNAS, ACS Nano, PRL), 760+ citations, and an h-index of 14. Highlights include developing SEE (Super-linear Excitation Emission) microscopy at CNBP, a super-resolution (SR) imaging method enabling SR on standard confocal microscopes without modifications, democratizing SR for diverse disciplines. At IBEC, I developed METAPHOR (METAbolic evaluation through Phasor-based Hyperspectral imaging and Organelle Recognition), a novel imaging method addressing the critical challenge of oocyte and embryo evaluation in IVF, outperforming traditional approaches and offering clinical potential. During my PhD, I created a near-field imaging technique to capture the magnetic field of light, earning the Springer Thesis award. I've presented at 40+ conferences, including 2 invited talks and multiple awarded oral/poster contributions.

P2: Leading Multidisciplinary Research Lines and Teams: I have successfully initiated and led high-impact multidisciplinary projects, from concept to end-user application. In the SEE microscopy and METAPHOR projects, as well as during my work at Melexis, I showcased strong leadership by bringing together and directing cross-disciplinary, cross-institutional teams to address complex scientific and industrial challenges. At CNBP, I initiated CoLab, an online collaboration platform that won CNBP's commercialization award. Currently, at ICFO, I lead a project on 3D volumetric imaging of retinas to improve blindness therapies and co-supervise a PhD student. I have mentored early-career researchers and initiated IBEC's PhD-Postdoc mentoring program.

P3: Translational impact by interdisciplinary and industry collaborations: My applied research has fostered productive collaborations with industry partners (Olympus, M2, Bruker, Witec, Grifols). Combined with my work experience at Melexis, this has strengthened my ability to drive result-oriented projects and to translate academic research into real-world applications. This is exemplified in my METAPHOR project, where I conceived a patent, licensed to a spin-off company, raising >6M€ in funding.

P4: Strong international mobility, exposure and collaboration networks: Working in diverse teams across Bulgaria, Belgium, Australia, and Spain has enriched my scientific and technical capacities and fostered strong international collaborations. To support my international mobility, I obtained funding through securing competitive fellowships (Beatriu de Pinós and Marie Skłodowska-Curie Action-Individual Fellowships).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

P5: Community Empowerment and Outreach: My SEE microscopy democratizes SR imaging for budget-conscious labs and non-experts. I created CoLab, facilitating collaboration among >250 researchers. Passionate about effective communication, I've led oral presentation courses and organized 20+ outreach activities for diverse audiences.

Balancing motherhood (2 children in 4 years) with my career, I received the competitive "To the Mothers of Science" grant.



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Turno General

Área Temática: Ciencias físicas
Nombre: TOLDO, CHIARA
Referencia: RYC2024-048886-I
Correo Electrónico: toldo.chiara@gmail.com
Título: Black holes under the holographic lens

Resumen de la Memoria:

I am a researcher in the field of High Energy Physics, with focus on String theory and Black holes. Black holes are cosmic entities that form when massive stars collapse. Their intense gravitational pull is so powerful that not even light can escape, and understanding them requires merging General Relativity with Quantum Mechanics, a long-standing challenge in Theoretical Physics. It is difficult to see what black holes are made of, because they hide behind an event horizon, preventing us from discovering what lies inside of them. One aim of my research is to address this mystery. Among my main achievements, I have provided new analytic black hole solutions coming from solving the partial differential equations of theories of supergravity, and I have contributed to their microstate counting via localization in the dual field theory. I have moreover investigated the possible black hole configurations in AdS space and their thermodynamics, interpreting them via AdS/CFT. Lately I have been investigating the near extremal black hole regime and its description in terms of an effective two-dimensional dilaton gravity (JT) theory, which is solvable. This allowed me, together with my collaborators at Harvard, to probe fundamental aspects such as the quantum corrections to the density of microstates for rotating black holes, showing that without supersymmetry the apparent degeneracy at extremality is lifted. This approach yields valuable insights into the microscopic structure of quantum gravity. I plan on exploring more the properties of black hole event horizons, examining their shapes and possible distortions, using them to model non-gravitational systems that are outside the reach of current perturbative techniques. The research will also investigate new connections to chaotic systems and explore other kinds of horizons, such as cosmological ones.

Resumen del Currículum Vitae:

I am a researcher in the field of High Energy Physics, with focus on String theory and Black holes. My recent research is aimed at understanding the microstates and the stability properties of fast spinning black holes that exist in our universe. To date I am author of 27 preprints+ 2 (in preparation). After attending university in Italy, I have achieved my PhD in Utrecht under the supervision of Prof. S. Vandoren. I have then enrolled in postdoc positions in Columbia University NYC (one year of my employment there was funded by the NWO Rubicon Grant, NL), UC Santa Barbara, Amsterdam University. I am currently a Marie Curie Fellow with joint contract between Milano U. and Harvard University. From 2025 I will be a group leader in ULB Brussels, via a fixed-term 2+1 year MISU grant that allows me to hire 2 postdocs. During my career I frequently supervised junior colleagues, PhD students and master students, resulting in published research projects. I have been the PhD examiner of 3 PhD defenses and I have extensive reviewing experience for journals in my field. I fulfilled my teaching duties as a teaching assistant to Courses such as General Relativity, Advanced Quantum Mechanics, and have been invited to teach at advanced Doctoral schools. I gathered a total of more than 1m euro in funding for my research, and I have taken part in several outreach programs (in Europe and overseas).



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Turno General

Área Temática: Ciencias físicas
Nombre: ALARCON GONZALEZ, ALEX
Referencia: RYC2024-050321-I
Correo Electrónico: alexalarcongonzalez@gmail.com
Título: Cosmic Palette: A Physical Model for Understanding Galaxy Colors and the Cosmological structure in the Universe

Resumen de la Memoria:

My research focuses on cosmology and galaxy formation, primarily through weak gravitational lensing and galaxy clustering. I combine observational data from galaxy surveys and state-of-the-art simulations of the Universe to develop theoretical methods for the next generation of galaxy surveys. My expertise includes modeling galaxy photometry, nonlinear galaxy clustering, weak lensing cosmology and redshift estimation.

I have made significant contributions to major imaging surveys, including the Dark Energy Survey (DES) and Physics of the Accelerating Universe Survey (PAUS), where I held leadership positions and achieved builder status in both collaborations. This recognition acknowledges my infrastructure contributions and grants me permanent data rights and authorship for future papers. Some of my key contributions include:

- Designing a Bayesian framework for redshift distribution modeling (Myles & Alarcon et al. 2021, >150 citations), which became foundational for one of the most influential cosmological analyses of recent years (Abbott et al. 2022, ~900 citations).
- Developing a star formation history model rooted in galaxy formation physics (Alarcon et al. 2023), publicly available via the Diffstar repository and used in LSST and Roman simulations.
- Producing the most precise photometric redshift catalog to date using PAUS data (Alarcon et al. 2021), which has been widely adopted for weak lensing cosmology and galaxy formation studies.
- Co-leading the development of the PAUS redshift pipeline (Eriksen & Alarcon et al. 2019, BCNZ repository), central to the success of the survey, and used by multiple studies.
- Creating a hierarchical Bayesian redshift estimation model that combines photometry and clustering data (Alarcon et al. 2020). Co-leading the discovery and analysis of a high-redshift galaxy sample (redshift 1 to 3) in DES, which is key for CMB lensing studies (Sánchez & Alarcon et al. 2023).
- Serving as the DES Redshift Working Group convener, leading the DES Weak Lensing Redshift Calibration Analysis Team (resulting in 9 directly related publications), member of the DES Science committee, as well as chair of the DES Diversity, Equity, and Inclusion committee.

Currently, one of my central research lines is to develop a modern theoretical framework to simultaneously predict galaxy colors and the nonlinear galaxy large scale structure in the Universe. I will do so through a complete reformulation of the prediction pipelines of colors and large scale structure, leaning on previous prototype works I have developed with my collaborators. I will be using cutting-edge AI solutions, physical models inspired by ingredients of galaxy formation, and numerical simulations, while retaining the uncertainty quantification of Bayesian inference.

My main research line will be developed in two phases:

1. A Hierarchical Bayesian model of Galaxy SEDs.
2. Cosmic Palette: A framework for predicting galaxy colors and galaxy clustering from simulation-based forward modeling.

Resumen del Currículum Vitae:

I am an observational cosmologist with broad and multidisciplinary interests spanning the study of cosmology through weak gravitational lensing and galaxy clustering, and the study of galaxy formation and evolution. I obtained a PhD in Physics from Universitat Autònoma de Barcelona (Spain) in 2019, under the supervision of Prof. Enrique Gaztanaga. Right after that, I joined Argonne National Laboratory (USA) as a postdoctoral researcher, where I worked for four years within the CPAC group led by Katrin Heitmann.

Since November 2023, I have been a Junior Leader Fellow at the Institute of Space Sciences, funded by a 305K € grant for my project, "A Physics-based Hierarchical Bayesian framework of Galaxy SEDs." (PI Alex Alarcon), including a 114K € personal research budget. As part of this project, I hired and currently supervise a PhD student. I am also the PI of a 'Proyecto de Generación de Conocimiento', (19.625€), Cosmic Palette: A Physical Model for Understanding Galaxy Colors and the Cosmological Structure in the Universe, code PID2023-153229NA-I00.

I have authored or co-authored over 98 articles in top peer-reviewed journals, with more than 7,500 citations and an h-index of 44. As a corresponding author on seven papers (over 335 citations), and member of the main analysis team in a total of 17 (over 2,800 citations). I have given 19 talks at international conferences and meetings, including 6 invited talks. I am also dedicated to public outreach, delivering talks to diverse audiences. I regularly serve as a referee for top leading astronomy journals, and I have been the main organizer of several international conferences and a summer school.

I currently supervise three students, a PhD Student I hired with the Junior Leader funding, Gisela Camacho, a JAE-intro fellow Alejandro Cortes, in a project I submitted, and I am the TFG director of Elena Martinez. In the past I have mentored two other students, a PhD student, Giulia Giannini, and an undergraduate student, Raul Teixeira.

I have held several leadership positions, including being the Dark Energy Survey (DES) redshift working group convener, which is one of the main working groups; being a member of the DES Science Committee, which is the highest scientific organ in the collaboration, and being the DES Weak Lensing Redshift Calibration Analysis Team for five years.



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Turno General

Área Temática: Ciencias físicas
Nombre: LÓPEZ PAZ, IVÁN
Referencia: RYC2024-050777-I
Correo Electrónico: ivan.lopez@imb-cnm.csic.es
Título: Innovative radiation detectors for high energy and medical physics

Resumen de la Memoria:

During the next years, I will be carrying out my research lines within the IMB-CNM (Barcelona) Radiation Detectors Group. The RDG has access to the facilities necessary to achieve the goals of my research lines: a clean room equipped with CMOS-level micro- and nano-fabrication of devices, a radiation detector laboratory with an X-ray tube and probe stations, access to encapsulation, prototyping and mechanical workshop services, etc. Thus, I plan to push forward the state-of-the-art of wide band-gap semiconductor devices, such as silicon carbide and diamond, for radiation detection.

In particular, three main topics will be investigated:

Short term research lines (<7 yr)

L1. All-carbon diamond dosimeters for FLASH radiotherapy

L2. Production and characterisation of novel SiC radiation detectors

Long term research lines (>7 yr)

L3. New diamond detector structures.

L4. Exploring new WBG materials for radiation detection

Within the diamond dosimeter research line (L1), the aim will be to produce a diamond device in which the metallic component will be removed from the design to be replaced with graphite.

With this, low energy ions are measurable, and the device becomes tissue-equivalent for medical applications, such as dosimetry for the novel FLASH radiotherapy modality or its integration onto a prompt-gamma system for proton-therapy range verification. Technological processes to graphitise the diamond by means of scalable are being investigated, and their application can be extended to future detector structures in a longer term (L3).

Silicon Carbide is growing in interest as detector material alternative to Silicon, due to its radiation-resistance properties and the growing availability of high quality of 4- and 6-inch wafers. Typical SiC radiation detectors consist of a pn-junction, produced by epitaxy or the implantation of dopants, which is contacted by a metallic structure from which the resulting signal is collected. Under the GRACE project, the Radiation Detector Group at IMB-CNM has produced SiC diodes with 50 um epitaxial layer, in which metallic contact in the active region were replaced with a graphene layer. My recent work has proven the technology viable for applications in which the presence of metal is not desired. Within the research line (L2), I will be pursuing the application and optimisation of this technology to the medical field. Other Silicon Carbide detector designs have been proposed which are worth pursuing (L2) such as Low Gain Avalanche Detectors and 3D SiC detectors: The former profits from the already high electron-drift velocity to improve the timing resolution of the silicon LGADs by introducing a multiplication layer, while the later has the radiation hardness benefits that come from the column-like geometry and the higher radiation resistance of the SiC lattice. These designs could have immediate use-cases in e.g. High Energy Physics, where the increasing collision rates require higher radiation hardness levels of their instrumentation similar to the High Luminosity LHC.

Finally, I am interested in exploring new materials for radiation detection (L4) in a similar manner than my work with diamond (L4), such as perovskites, GaN or AlN with applications for gamma and neutron detection.

Resumen del Currículum Vitae:

My research has been focused on the development and characterisation of state-of-the-art solid state (silicon, silicon carbide and diamond) radiation detectors for High Energy Physics experiments and medical applications.

During my PhD in the IFAE (Barcelona) ATLAS pixel group, I worked on the characterisation of 3D silicon pixel sensors for their use in the AFP detector, funded by a Severo Ochoa scholarship.

This work included laboratory and several beamtest measurement campaigns. These studies were followed by the module assembly and quality control which I led, and later played a leading role within the AFP Collaboration in the installation and integration of the newly installed detector within the ATLAS experiment.

Those efforts proved successful with the first data taken with AFP, and the physics data analysis which I carried out.

In May '18, I joined the Diamond detector group in the University of Manchester where I gained experience in the R&D of diamond detectors.

During that time, I led the group's effort on the fabrication of 3D diamond detectors by means of a femto-second pulse laser, as well as preparing a Two-Photon Absorption TCT set-up.

To this end, I upgraded the read-out software and the beam path optics. I also participated in the study for the viability of 3D diamond detectors for dosimetry in radiotherapy.

In '20 I started my role based at the CERN research laboratory (Switzerland) as the ATLAS Roman Pot (ARP) detector Technical Coordinator (TC), and later was awarded a CERN

Senior Applied Fellow position as part of the ATLAS Detector Operation division at CERN to fulfil the role. As TC, my time was devoted to the people-power and resource

coordination for installation and maintenance of the ARP detectors. I led the installation of the upgraded Time-of-Flight detectors in the LHC tunnel in Aug '21, as well as the commissioning activities of the system.



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On '22, I joined the Radiation Detector Group at IMB-CNM-CSIC (Barcelona) within the AIDA-Innova project on the design and fabrication of Silicon Electron Multiplier prototypes in collaboration with CERN.

In parallel, I have been active in the SiC and 2D materials research line in the group, in particular with graphene-enhanced SiC detectors, of which I obtained first charge collection results and characterisation for radiotherapy dosimetry.

Since Jan '23 I was funded as PI (PIACeD project, 5k€) to develop diamond detectors with graphitic electrodes for medical dosimetry, by means of processes available in the centre, and produced a first proof-of-concept prototype. A follow up project was funded in '25 (CarDos4FLASH, 30k€).

With this, I effectively opened a new research line in the group on diamond radiation detectors, which was not present in the center.

Starting from Feb '24 I will be Team Member on a laCaixa Health call project "DosiFLASH", developing a full package 2D SiC dosimeter monitor for FLASH therapy treatment.

I have co-supervised 1 PhD student (+1 in the following weeks), 1 MsC thesis, 2 BsC degree thesis projects, 3 Summer student projects and a high-school project.

As well, I have given various tutorial clases to 1st year undergraduate Physics students at the UoM.

In conclusion, I have shown project management skills, leadership at a local and international collaborations and a wide technical skill-set that let me succeed in different projects.



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Turno General

Área Temática: Ciencias físicas
Nombre: GÓMEZ VALENT, ADRIÀ
Referencia: RYC2024-049138-I
Correo Electrónico: adriagova@hotmail.com
Título: Unraveling the Mysteries of the Dark Universe
Resumen de la Memoria:

The current standard model of cosmology, the Λ CDM, has been extremely successful in explaining a large variety of cosmological data, ranging from the small anisotropies observed in the CMB maps to the late-time acceleration of the universe. However, the improvement of the observational facilities at hand and the high-quality data taken with them (both, in terms of volume and precision) has brought some tensions into play between these data and the model, which might require the need of new physics beyond the flat Λ CDM paradigm. The most significant tension is the H_0 or Hubble tension, which stays already at more than 5σ C.L., but there are many others that have been measured with a lower statistical significance. Some examples are the S_8 tension with the large-scale structure (LSS) data, the so-called CMB anomalies, which have persisted over the years in the transition from WMAP to Planck, or the recent detection of cosmic birefringence from the analysis of CMB EB cross-correlations, which could be hinting to the existence of a new parity-violating interaction in the dark sector.

My expertise lies in testing the nature of dark energy (DE) and gravity, extracting model-independent insights from cosmological data, and placing constraints on models beyond Λ CDM. The advent of new data coming from the Euclid satellite, the Dark Energy Spectroscopic Instrument (DESI), the Vera C. Rubin Observatory's Legacy Survey of Space and Time (LSST) or CMB-Stage 4 CMB experiments, and their symbiosis through the analysis of cross-correlations (e.g. between weak lensing and galaxy clustering or LSS and CMB data), will allow us to better characterize the dark sector, the nature of gravity and, hopefully, find out the origin of the cosmological tensions that are afflicting the standard model, which is currently one of the main goals in cosmology.

My research in the next years will focus on the theoretical and phenomenological study of dynamical dark energy models beyond a rigid Λ and modified gravity theories, on their ability to loosen the tensions, not only in the light of the data at hand, but also with future (mock and real) data. Performing forecasts is important to assess how future facilities will impact on our current knowledge. I am also interested in performing model-independent analyses to extract as pure information as possible from cosmological data. Some of these projects can be carried out alone or involving in this task force also my master and PhD students. I will contribute in this way to the mentoring of the next generation of cosmologists. Of course, I also plan to work with my collaborators from Italy, France, England, Germany and Greece in several related projects. I will therefore keep my high degree of internationalization.

A revolution in physics might be waiting for us. Unveiling the origin of the cosmological tensions is a crucial step in our comprehension of the laws that govern the universe, especially those that dominate at large scales, and in the dark sector. My work will contribute to these important efforts. In addition, I will also develop outreach activities with the aim of disseminating the outcome of my research among the non-expert public.

Resumen del Currículum Vitae:

I am a Junior Leader $\bar{a}$ Caixa $\bar{a}$ Fellow at the Institute of Cosmos Sciences of the University of Barcelona (ICCUB). My expertise lies in testing the nature of dark energy (DE) and gravity, extracting model-independent insights from cosmological data, and placing constraints on models beyond Λ CDM. I have led or co-led 38 publications, with 84% ranked in the top quartile (Q1). They have received $\sim 4,780$ citations, and my h-index is 30. I have given 31 talks, 81% as invited speaker. I was named among the world's top 2% most influential physicists in 2022 and 2023, according to the $\bar{u}$ Updated science-wide author databases of standardized citation indicators $\bar{u}$ (Stanford University; DOIs: 10.17632/btchxktzyw.6 and 10.17632/btchxktzyw.7).

I completed my PhD at ICCUB under the supervision of Prof. Joan Solà, focusing on dynamical dark energy cosmologies. These studies have been influential in the field, with seven papers receiving over 100 citations each. My thesis, "Vacuum Energy in Quantum Field Theory and Cosmology", earned an Excellent Cum Laude with International Mention and was honored with the Extraordinary Doctorate Award by the UB.

After my time in Barcelona, I worked first as a DFG postdoctoral fellow in the group of Prof. Luca Amendola at the Institute for Theoretical Physics in Heidelberg (where I collaborated also with Prof. Christof Wetterich), and then as an INFN fellow in the group of Prof. Nicola Vittorio and Marina Migliaccio at the University of Rome Tor Vergata. In addition, I have performed research visits to prestigious institutions, as the University of Naples, the Institute of Cosmology and Gravitation of the University of Portsmouth or the University Paris-Saclay. This has let me establish a solid network of prestigious collaborators and acquire the skills to perform independent research.

Throughout my career, I have explored various theoretical frameworks, including running vacuum models, Brans-Dicke cosmologies, coupled dark energy, and early dark energy, focusing on their implications for cosmological tensions. Additionally, I am interested in improving the interpretation of the constraints extracted from Monte Carlo Markov chains and developing techniques to improve the efficiency of parameter space exploration.

I have supervised three master's students in Germany and Italy and one bachelor's student in Barcelona, all of whom have progressed to prestigious PhD or master's programs. Currently, I mentor one bachelor, two MSc, and two PhD students. Over my career, I have taught at the bachelor, master, and PhD levels across various institutions. At the University of Barcelona, I currently deliver problem-solving lectures in General Relativity and Electrodynamics.



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I am referee of Nature Astronomy, MNRAS, PRD, PDU, JCAP, EPJC, JHEAp, Scientific Reports, Universe, Annalen der Physik, among others, have worked as Topic Editor for Universe and Galaxies, and as Guest Editor of the Universe Special Issue "Cosmology in the high-precision era: observations, theory, and their symbiosis". I was co-chairman of the session "Status of the H_0 and σ_8 tensions: theoretical models and model-independent constraints" at the 16th and 17th Marcel Grossmann Meetings of 2021 and 2024, and was reviewer of the 2022 NASA Hubble Fellowship Program. I have also delivered outreach talks in high schools in Spain.



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Turno General

Área Temática: Ciencias físicas
Nombre: ARES ASENSIO, FILIBERTO
Referencia: RYC2024-050650-I
Correo Electrónico: faresase@sissa.it
Título: Strongly correlated extended quantum systems in and out of equilibrium

Resumen de la Memoria:

My research lies at the intersection between quantum mechanics and statistical physics. I am interested in strongly correlated extended quantum systems at low dimensions in and out of equilibrium, in particular exactly solvable models and their field theory description. My PhD thesis was devoted to studying entanglement entropy in fermionic and spin chains. Entanglement entropy is nowadays a main actor in physics as it encodes fundamental information about the investigated system. We discovered for this entropy novel symmetries and behaviours beyond the standard area and volume laws. To find them, we obtained new results in the theory of Toeplitz determinants, which given their generality might be relevant in other areas of physics and mathematics and have been later applied by other authors. The results of my PhD thesis led to 9 publications. In my first postdoc at IIP (Natal, Brazil), I continued exploring other properties of spin chains. In particular, exploiting my expertise on Toeplitz determinants, we were the first to use very recent results on their connection with Painlevé V equations and conformal field theories to understand the crossover between the critical and non-critical regimes. We also investigated entanglement in theories different from those considered in my PhD, such as minimal conformal models. We adopted some recent developments in conformal bootstrap to survey entanglement in these systems, deriving an exact conformal block expansion for the negativity. This result might shed new light on the entanglement between disjoint parts in interacting systems, a problem heavily studied in the last decade, and yet unsolved. When I moved to SISSA (Trieste, Italy), I started to study the interplay between entanglement and symmetries, a very fresh research line that has attracted much attention theoretically and experimentally. Leveraging tools from the theory of entanglement, we introduced a new quantity, the entanglement asymmetry, that measures how much a symmetry is broken in a portion of a system, superseding the traditional order parameters. This observable has proven to be a powerful instrument to identify new physics. With it, we discovered a quantum version of the counterintuitive and yet unexplained Mpemba effect (hot water freezes faster than cold water) at zero temperature, which we recently observed experimentally using the ion-trap setup of R. Blatt's group in Innsbruck by measuring the asymmetry. The quantum Mpemba effect provides new insights on how thermodynamics arises in isolated quantum systems. In my career, I have cross-fertilised cutting-edge sophisticated analytic methods (usually developing new ones) and numeric approaches, sometimes employing high-performance computing resources. I have consolidated expertise in entanglement measures, many-body systems and field theories and a proved capacity to broaden my knowledge, learn, and propose new ideas and research projects.

Resumen del Currículum Vitae:

I got the "Licenciado en Física" and MSc in Physics degrees at the University of Zaragoza. My career is divided in three stages: my PhD at the University of Zaragoza, my first postdoctoral stay at the International Institute of Physics (Natal, Brazil), and the postdoc position that I am holding at SISSA (Trieste, Italy). My PhD thesis was funded by an individual PhD grant from the Government of Aragón and was awarded with the Extraordinary Prize of the university. The results of my research have been published in 36 publications (+4 preprints under revision) in well-known peer-reviewed journals (most of them in Q1) co-authored with a wide number of scientists of different nationalities working at internationally prestigious institutions. This has allowed me to create an extensive international network for future projects. I have presented my scientific results in 22 international workshops as posters, oral presentations, or invited talks as well as in research seminars at different universities. I have participated in several Spanish, Brazilian, Italian and European research projects; in particular, I have been part of an ERC Consolidator Grant with Prof. Pasquale Calabrese as PI. Since 2023, I organise the weekly SISSA/ICTP statistical physics seminars, where international scientists present their latest results. I have participated in various outreach activities: several editions of the Hands on Particle Masterclasses and Dark Matter Day in Zaragoza and in the XII Week of Physics of the University of Santa Cruz (Ilhéus, Brazil), where I gave introductory lectures to entanglement for students of physics. I have co-supervised two master thesis at the University of Pisa (Italy) and a thesis for the obtention of the Research Diploma of the ENS at Paris-Saclay. Their quality is reflected in that results of two of them have been already published as peer-reviewed articles. Two of these students are now starting their PhD at universities of France and Germany. One of my main duties at SISSA is supervising and guiding the daily work of some of the PhD students of the group, with whom I have co-authored many of my last papers. I am regular referee in well-known scientific journals: Physical Review Letters, PRX Quantum, Physical Review B and E, Journal of High Energy Physics, Journal of Statistical Mechanics, Quantum, SciPost, Journal of Physics A. I was recognised in 2022 as Outstanding and Trusted Reviewer for my labour in Journal of Physics A.



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Turno General

Área Temática: Ciencias físicas
Nombre: PUJOL VALLRIBERA, ARNAU
Referencia: RYC2024-049740-I
Correo Electrónico: arnauvp@gmail.com
Título: Towards a holistic approach of malaria epidemiology through data science tools
Resumen de la Memoria:

Career and expertise:

My scientific career combines two distinct but complementary fields: cosmology and epidemiology. In my first experience in cosmology, I developed strong expertise on statistical data analysis, clustering, mapping and artificial intelligence (AI). Fascinated by the potential of multidisciplinary approaches in Science, and with the desire of applying my skills to address some of the main threads of humanity, I transitioned to malaria epidemiology through a Marie Skłodowska-Curie Individual Fellowship in 2021. After some key achievements in this field (see contributions below), I was awarded a La Caixa Postdoctoral Junior Leader Retaining Fellowship, where I was ranked the top candidate in all committees during the highly competitive selection process (success rate = 3.5%), for a project to develop new geo-spatial modelling approaches for malaria genomics. Shortly after, I was promoted to Junior Research Leader in ISGlobal, a role above the postdoctoral level designed to establish my own research group.

I have always been in top research groups, both in cosmology and epidemiology, using innovative methods in mathematical modelling and data science across a wide range of applications. My background makes me a unique profile, with a proven capacity to offer creative and multidisciplinary solutions to complex research problems, a quality that I believe is crucial for the future of scientific progress. My success in securing funding for interdisciplinary scientific projects underscores my ability to drive forward-thinking, impactful research that bridges multiple scientific domains.

Main scientific contributions:

In cosmology I studied galaxy formation, clustering and weak gravitational lensing (WL), a key probe of cosmology which describes the slight shearing of galaxy images due to light rays deflection by gravity. In malaria I focused on genomics, epidemiology and surveillance.

Galaxy formation/clustering:

I led two studies of the clustering consistency of galaxy formation models and subhalo finders in international collaborations. I tested the hypothesis that halo mass determines galaxy populations, finding that local density is more informative than mass.

WL:

I engaged in several international collaborations. I co-led the development of a new method to measure the bias between galaxy and matter distributions from WL and the development of the largest mass map of the Universe ever created at that time. I developed a new AI algorithm to calibrate the shape measurement of galaxy images that improved computational efficiency. I designed the optimal approach to simulate galaxy images for shape measurement calibration, requiring 100-1000 times fewer simulations.

Malaria surveillance and genomics:

I studied the spatio-temporal patterns of malaria burden in pregnant women and children and their key factors for malaria surveillance and compared parasite genetic populations between pregnant women and children. I developed a new method to monitor malaria outbreaks that easily connects with elimination implementations. In the GenMoz and GenMoz2 collaborations I am leading study designs, data analyses and the spatial connectivity analysis of parasite genetic populations. I supervised a PhD student, 3 master students, an epidemiologist and I am mentoring researchers in Mozambique.

Resumen del Currículum Vitae:

EDUCATION

2013-2016 PhD in Physics, Universitat Autònoma de Barcelona, Institut de Ciències de l'Espai
Cosmology with galaxy surveys: how galaxies trace mass at large scales
2010-2012 Master, Universitat Autònoma de Barcelona
High Energy Physics, Astrophysics and Cosmology
2006-2010 Bachelor in Physics, Universitat Autònoma de Barcelona
Speciality in Fundamental Physics

EXPERIENCE

2024-Present Junior Research Leader (La Caixa Junior Leader Postdoctoral Fellow), Malaria Department, Barcelona Institute of Global Health (ISGlobal)
2021-2024 Marie Skłodowska-Curie Fellow, Malaria Department, ISGlobal
2018-2021 Juan de la Cierva Fellow, Cosmology Department, Institute of Space Sciences (IEEC-CSIC)
2016-2018 Postdoctoral Researcher, Cosmostat Laboratory, CEA - Commissariat à l'énergie atomique et aux énergies alternatives
2013-2016 PhD Student, ICE/IEEC, Cosmology group
2010-2013 Researcher, ICE/IEEC, Cosmology group

Summary of publications:

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24 peer-review papers in high impact journals
10 articles as first author (9 as corresponding author), 2 as second
Total citations: 3,267 (Google Scholar)
h-index: 18 (Google Scholar)

Development of software:

- Malaria importation model: A software to estimate malaria importation combining epidemiology, parasite genomic and human mobility data.
- Neural Network Shear Correction (NNSC): A Python software that uses AI to model shear measurement bias (see C1.4).
- Epidemiological Foci Relating Infections by Distance (EpiFRlenDs): These Python and R softwares use the EpiFRlenDs algorithm to detect foci (clusters, outbreaks or hotspots) of infections from a given disease.
- Mission Critical Malaria: A browser game in Unity emulating malaria surveillance, developed in collaboration with Austin Peel (EPFL, Switzerland).
- ShapePipe: A galaxy shape measurement pipeline involving all the steps from object detection to shape measurement, in collaboration with the CosmoStat lab from CEA Saclay.

Main Funding and Awards:

- 2024 Prize Fernando Albericio for the best scientific article from 2023. Organiser: Spanish Researchers in Southern Africa Association.
- 2024 La Caixa Postdoctoral Junior Leader Retaining Fellowship. Score: 7.652/8/100, ranked 1st in all committees, success rate = 3.5%. Role: PI. 305,100€
- 2024 GenMoz2: Malaria molecular surveillance in Mozambique (phase 2). Funder: Bill & Melinda Gates Foundation. Role: Co-investigator and writing team. 6,999,728\$
- 2020 GenMoz: Plasmodium falciparum genomic intelligence in Mozambique. Funder: Bill & Melinda Gates Foundation. Role: Co-investigator and writing team. 5,910,780€
- 2020 Marie Skłodowska-Curie Individual Fellowship. Score: 93.6/100, success rate = 12.89%. Role: PI. 172,932.48€
- 2019 Juan de la Cierva Incorporación Fellowship. Score: 99/100, rank: 4/124. Role: PI. 87,000€
- 2012 FI PhD Fellowship. Funder: Generalitat de Catalunya. Role: PI. 45,600€

Other merits:

- Referee of many journals including Nature Communications, Communications Medicine, Astronomy & Astrophysics and MNRAS
- Participation in >50 international meetings and conferences, >50 presentations (20 invited speaker) given in meetings, conferences and institutions).
- Invited to 4 institutions to collaborate and give a presentation.



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Turno General

Área Temática: Ciencias físicas
Nombre: TORRES BOBADILLA, WILLIAM JAVIER
Referencia: RYC2024-050272-I
Correo Electrónico: wjtorresbo@gmail.com
Título: Formal and phenomenological applications of scattering amplitudes

Resumen de la Memoria:

I earned my undergraduate (2011) and master's (2013) degrees in Physics from the Universidad Nacional de Colombia. In 2017, I pursued a Ph.D. in theoretical particle physics at the Università degli Studi di Padova (UniPD).

Following my doctoral studies, from 03/2017 to 12/2018, I held a postdoctoral researcher position at the Instituto de Física Corpuscular (IFIC) and Centro Mixto Consejo Superior de Investigaciones Científicas (CSIC) at Universitat de València (UV). During this time, I was awarded the national grant "Juan de la Cierva" funded by the Spanish government, allowing me to continue my research at IFIC from 01/2019 to 09/2020.

In October 2020, I joined the theory department at the Max-Planck-Institut für Physik (MPP) as a postdoctoral researcher (E13) and was promoted to group leader (E14) in February 2022. Since October 2023, I have been part of the theoretical physics group at the University of Liverpool (UoL) as a research fellow.

My research interests are focused on elucidating mathematical properties of scattering amplitudes in classical and in quantum field theories, aiming to develop efficient computational methods for physical observables. Significant milestones in my career include:

Doctoral Research at UniPD: I developed techniques for computing one- and two-loop scattering amplitudes in QCD, boosting the precision in theoretical predictions. I investigated formal properties of scattering amplitudes in supersymmetric and string theories, by leveraging methods from algebraic geometry.

Research at IFIC: I reformulated the loop-tree duality theorem that led me to introduce the all-loop causal representation of multi-loop Feynman integrals, by studying geometrical properties of convex polytopes. I also contributed to the first calculation of the fifth post-Newtonian corrections through an effective field theory approach.

Research at MPP: I pioneered theoretical support for the MUonE experiment, by providing the highest theoretical prediction at low energies of the electron-muon elastic scattering. I also initiated the calculation of three-loop Feynman integrals, needed for theoretical predictions at high energies of Higgs boson production from parton-parton annihilation.

Current Research at UoL: I am investigating the anomalous magnetic moment of the muon and providing theoretical predictions for low-energy processes resulting from electron-positron annihilation into hadrons. My primary objective is to bridge the gap between theory and experiment by developing the most accurate Monte Carlo event generator. I am actively involved in leveraging insights of low-energy experiments (Kloe-II, CMD-3, and MUonE) to enhance precision and reliability of these theoretical predictions.

Resumen del Currículum Vitae:

My research interests are focused on elucidating mathematical properties of scattering amplitudes that allow for an efficient computation of physical observables, in classical and in quantum field theories. This field benefits from the synergy between formal mathematical insights and practical applications for computation of physical observables.

Since my doctoral studies, I have been focused on elucidating formal properties of tree-level and multi-loop scattering amplitudes in gauge theories that can lead to efficient evaluations of physical observables. Notable achievements include the first analytic computation of the renormalised two-loop QED electron-muon scattering amplitude, and the first computation of non-planar three-loop Feynman integrals needed for the analytic calculation of Higgs boson production from parton-parton annihilation.

When analytic evaluations are not feasible, I turn to numerical methods, particularly the loop-tree duality theorem. I pioneered the computation of two-loop scattering amplitudes in strictly four space-time dimensions, leading to a new framework for evaluating physical observables. This work culminated in the reformulation of the loop-tree duality theorem and led me to propose a representation of scattering amplitudes that only manifest physical information, referred to as causal representation. I also developed open-source automated software to support these calculations, significantly advancing our understanding and computational capabilities in this area.

By leveraging techniques from quantum field theories, I calculated classical observables within amplitudes' framework, in particular, corrections to the Newton potential using an effective field theory approach to General Relativity. My work includes the first calculation of the 5th Post-Newtonian correction to the Newton potential, and paves the way to calculation of higher corrections.

This research bridges quantum and classical theories, contributing significantly to gravitational wave studies and general relativity.

Motivated by the recent measurement of the muon anomalous magnetic moment, provided by the (g-2) collaboration at Fermilab and the strong support that UoL gives to the study of muon and low-energy physics,



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I have been focused on addressing the discrepancies between experimental results and theoretical predictions, particularly those related to hadronic contributions.

I am actively supporting the experiments: Kloe-2, CMD-3, and MUonE, which aim to establish a more refined experimental setup that encompasses hadronic contributions.

I am applying innovating methods developed in high-energy physics to the computation of low-energy physical processes, especially radiative return processes.

My ultimate goal is to develop a Monte Carlo event generator with the highest theoretical accuracy, specifically at next-to-next-to-leading order (NNLO).

This involves implementing multi-loop scattering amplitudes at low energies and revisiting NLO theoretical predictions while constructing the necessary machinery for NNLO computations.

In summary, this research line combines all my formal and phenomenological efforts in computing observables in classical and quantum field theories. It encompasses insights from both high-energy collider experiments and gravitational-wave physics, heavily relying on scattering amplitudes methodology to bridge the gap between theory and experiment.



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Turno General

Área Temática: Ciencias físicas
Nombre: ABDUL-MASIH , MICHAEL
Referencia: RYC2024-049939-I
Correo Electrónico: michael.abdulmasih@gmail.com
Título: Hidden in plain sight: identifying and characterizing massive interacting binaries with a combined spectrophotometric approach

Resumen de la Memoria:

Massive stars play an important role in the mechanical and chemical evolution of galaxies, and understanding the physical processes in the interior of these stars is vital to our understanding of their future evolution and eventual end products. It is estimated that as many as a quarter of all massive stars will merge with their companion at some point during their lives. The overcontact phase, when two stars begin to touch, is the evolutionary phase directly preceding a merger, and is one of the most important but least understood phases of massive binary evolution. Slight changes to the internal physics can have drastic effects on the future evolution of these systems. Despite the expected occurrence rate of ~1% (100s-1000s of sources) so far only 13 systems are known, preventing us from placing stringent evolutionary constraints.

During my career, I have worked to place the first constraints on this evolutionary phase. I performed the first quantitative spectroscopic analyses of O-type overcontact systems to determine their stellar and wind parameters including temperature, surface gravity, helium, and CNO abundances, in order to confront the leading evolutionary theories describing these systems. I then built a new spectral synthesis code specifically designed to handle the complex surface geometry of these systems, and I demonstrated that the traditional spectral synthesis techniques are not advanced enough to accurately determine the surface parameters (and thus constrain the internal mixing processes) of these systems. Additionally, I performed an analysis of the orbital stability of the known massive overcontact systems in order to determine how long-lived this evolutionary phase is. I found that not only is this phase very stable, but also that the mass transfer processes during this phase do not behave as theoretical studies predict, adding another unsolved piece to the puzzle. Unfortunately, however, given the small sample size, it is impossible to provide robust, meaningful and statistically significant constraints on this evolutionary phase. This is the basis for my proposed project.

The goal of this project is to systematically search for and characterize massive interacting binaries to provide these much-needed constraints in a statistically robust framework. Using a combination of photometric and spectroscopic data, I will expand the sample of known interacting binaries by more than an order of magnitude. Additionally, I will provide orbital solutions for each system in the sample and statistically evaluate the sample to compare with possible end products through population synthesis. Finally, I will spectroscopically analyze the sample to determine the surface temperature and surface abundances (direct measures of internal mixing). These results will then be compared with a grid of evolutionary models computed with different internal mixing and mass transfer prescriptions to determine which most accurately reproduces the observations. This project will provide unprecedented observational constraints for this important evolutionary phase and will provide a breakthrough in our understanding of massive binary star evolution.

Resumen del Currículum Vitae:

So far, my academic career has been marked by high levels of achievement, motivation and efficiency. I have repeatedly demonstrated my capabilities as an independent researcher, and I have proven myself to be a competent and productive member of the international astronomical community. My career has taken me to three different continents, demonstrating my international mobility, and I have proven that I am able to foster and maintain collaborations around the world.

After completing my BSc and MSc in the USA, I moved to Belgium to obtain my PhD in Astrophysics at KU Leuven. After my PhD, I was awarded the highly competitive independent ESO postdoctoral fellowship (≈280k). Following this, in 2023, I was awarded a La Caixa Junior Leader Fellowship (&#305k), one of the most prestigious independent fellowships available in Spain. My research focuses on obtaining state-of-the-art observational constraints to determine the future evolution of massive overcontact binary star systems. Not only have I performed the first and only quantitative spectroscopic analyses of O-type overcontact systems, but I have also developed a new state-of-the-art spectroscopic analysis technique specifically designed to model the highly non-spherical geometry of these systems. This open source code SPAMMS has proven to be a game changer as its applicability extends far beyond the niche of massive overcontact systems, having been applied to several other types of non-spherical systems so far. Using SPAMMS, I was able to prove the existence of a new internal mixing process unique to the overcontact phase and demonstrate the necessity of accounting for the surface geometry when performing spectroscopic analyses. My observational constraints have uncovered major shortcomings in our current theoretical understanding of this phase and have driven the field to reexamine the assumptions and physics present in our models.

My work has been recognized by the wider community several times throughout my career. I have been granted over 700 hours (equivalent to ≈2.1M) of telescope time as PI at observatories across the world through open call competition (>350h granted this past year) and have won more than &#595k in personal funds including my two independent fellowships and several smaller grants. I have been invited to give seminars at various institutes in Europe, and the Americas, and have also given 3 invited talks and >10 contributed talks at international conferences. Further, in 2022, I was an invited visiting scientist at the MIAPbP workshop in Germany focusing on the role of stellar multiplicity in stellar dynamics and evolution.

In addition to my 8 first author and 30 co-author peer-reviewed publications (h-index &#20; 19; 1689 total citations), I have actively contributed to the astronomical community in several ways. I have provided the community with several important open-source codes and continue to support and develop new ones. Additionally, I have helped teach several university courses ranging from first-year bachelor's level classes to final year master's



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level courses and I have been active in student supervision at all levels ranging from bachelor's to PhD. I have also refereed papers for several different astronomical journals and have served as vice commissioner of the Galaxies and Stars panel of the Spanish observation Time Allocation Commission.



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Área Temática: Ciencias físicas
Nombre: FERNÁNDEZ MENÉNDEZ, PABLO
Referencia: RYC2024-049537-I
Correo Electrónico: pablo.fernandez@dipc.org
Título: Advanced Combined Analyses for Precision Neutrino Oscillations

Resumen de la Memoria:

Neutrinos represent one of the most intricate areas in particle physics and one of the evidence for physics beyond the Standard Model. They encode significant implications for our understanding of the Universe and potentially conceal pathways to new physics. New-generation detectors and innovative reconstruction techniques bring us into the precision era of neutrino oscillations. However, a comprehensive analysis strategy is still needed to tackle the most challenging and fundamental measurements: the neutrino mass ordering, essential for determining neutrino masses, and the lepton charge-parity asymmetry (CP phase), expected to be key in explaining the baryon asymmetry of the Universe.

Various detectors exploiting different technologies collect data to achieve these physics objectives. Combined analyses of multiple datasets maximize the achievable sensitivity of these experiments. However, state-of-the-art methods fail to fully harness the information and synergies of the data.

This is the motivation behind the project. It addresses these hurdles from the ground up with an innovative and comprehensive analysis program. It will explore advanced statistical methods, enhancing the performance and capabilities of neutrino analyses and providing a detailed evaluation of systematic uncertainties and their correlations. These techniques will conclude with a highly efficient unbinned Bayesian method vastly outperforming current implementations. These tools will be made accessible to the scientific community at large through the open-source software PYNU.

With these advancements and fostering a more meaningful interplay between theory and experiment, a detailed combined phenomenological fit of published atmospheric neutrino data will be performed. Preliminary work on this matter has shown their potential. The results will guide and be used to promote the objective of conducting a joint analysis of experimental data from IceCube, ORCA and Super-Kamiokande to determine the neutrino mass ordering before the end of the decade.

Along with the construction of Hyper-Kamiokande, the project will apply the developed tools and gained experience in analyzing the first accelerator and atmospheric neutrino data of the next-generation LBL experimental program. The new techniques and capabilities will enhance the projected sensitivity and accelerate the quest for the precise measurement of CP violation in the lepton sector.

The candidate's accumulated expertise and the innovative and comprehensive analysis program presented will allow the measurement of two neutrino properties key to understanding the Universe. Further, the project provides new tools and approaches with far-reaching implications in the longer term of neutrino physics and other areas of particle physics.

Resumen del Currículum Vitae:

Pablo Fernández coursed his undergraduate studies in Physics at the University of Oviedo and UAM and finished in 2012. In 2011, he started his research career as an undergraduate, focused on neutrino physics, and began participating in the EGADS project and the Super-Kamiokande (SK) experiment. In 2013, he profited from a grant to obtain his Master's in Theoretical Physics at IFT. During his PhD studies, he worked as Professor Ayudante Doctor at the UAM, teaching physics courses for different Bachelor's degrees (248h). In 2017 obtained his PhD with the qualification sobresaliente cum laude, dealing with the construction, instrumentation and operation of EGADS, and the calibration and analysis at EGADS and SK. Further, he developed the entire neutrino physics program of SK, T2K and Hyper-Kamiokande (HK) experiments in the context of efficient neutron-tagging.

After his PhD, he joined the IFIC neutrino group to work on the DUNE experiment and its prototype protoDUNE-SP while keeping his involvement in SK and T2K. In 2017, he joined CERN as PJAS to work on installing protoDUNE-SP and led the calibration and installation of temperature sensors and cryogenic instrumentation. During the operation, he was appointed coordinator between the SPS beam and the protoDUNE-SP detector. At the same time, he was appointed installation coordinator of the cryogenics and calibration systems for the DUNE far detector, expert for the T2K, SK, and reactors combined analysis, and an institutional representative for the WCTE experiment.

In 2020, the U. of Liverpool hired him to work on the WCTE, SK, T2K, and HK. The main activities involved calibrating and monitoring the SK detector, co-leading the atmospheric neutrino oscillation working group, and analyzing the official SK results. For T2K, he acted as the leading expert for the T2K and SK joint fit using the VALOR software. For HK, he developed studies on atmospheric neutrinos, investigated light sources for HK calibration, and devised an innovative neutron tagging algorithm based on machine learning. At this point, he also started an independent research in neutrino phenomenology.

In September 2021, he was hired by the DIPC as a postdoctoral researcher to lead the group in HK and WCTE experiments, with partial involvement in the NEXT and SK experiments. For WCTE, he led the design and construction of the detector and is the technical coordinator for the experiment. Given the expertise from WCTE, he is also leading the design of the new near detector for HK, IWCD. He has also founded the #957;ACA group, a dedicated forum for HK Spanish collaborators to coordinate contributions and discuss funding strategies. He also contributes to the simulation, reconstruction and analysis of atmospheric and long-baseline neutrinos in HK.

In parallel, he pioneered the combined analysis of atmospheric neutrino data, a paradigm shift in the quest for the precise measurement of oscillations. This work also addressed the long-standing issue of adequately treating atmospheric neutrinos in phenomenological studies.

His extensive background and accumulated expertise allow him to lead the development of novel analysis software, PYNU, focused on flexibility and speed to perform combined fits, including techniques beyond existing software in the field. These methods are being introduced to both experimental and phenomenological studies.



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Turno General

Área Temática: Ciencias físicas
Nombre: GATTI, MARCO
Referencia: RYC2024-049031-I
Correo Electrónico: marcogatti29@gmail.com
Título: Weak lensing in the era of precision cosmology: redshift distributions, shape catalogues, mass mapping and non Gaussian statistics

Resumen de la Memoria:

During my career, I have established myself as a leading international expert in analyzing large photometric datasets, with a focus on weak lensing data and higher-order statistics. I am dedicated to developing new methods to optimize information extraction from current datasets to rigorously test the Λ CDM model and its extensions. Simultaneously, I work on techniques to mitigate observational and astrophysical systematics. I am an active member of the Euclid consortium and deeply involved in the Dark Energy Survey (DES), contributing to nearly every stage of DES analysis over the years. My work ranges from pixel-level tasks to leading advanced cosmological analyses.

During DES Y1 and Y3, I pioneered the clustering- z technique for inferring galaxy redshift distributions. We introduced a joint likelihood framework that combines clustering redshift and photometric methods, effectively marginalizing over systematic effects. In DES Y3, I co-led the creation of the largest weak lensing catalog to date and assessed systematic effects on galaxy shape measurements and weak lensing observables. I also co-led the production and characterization of DES Y3 weak lensing mass maps, the largest derived from a photometric survey. I developed an analytical pipeline to model the second and third moments of these maps, which yielded the most precise constraints on S_8 from weak lensing at the time of publication.

Using DES Y3 weak lensing data and Compton- y maps from Planck and ACT, I measured the weak lensing-thermal Sunyaev-Zeldovich correlation at an unprecedented significance level and used these results to test baryonic feedback mechanisms. I also discovered that weak lensing map-based higher-order statistics are significantly influenced by source galaxy clustering, a previously overlooked effect. Additionally, I contributed to the first weak lensing analysis combining multiple higher-order statistics using a robust simulation-based inference framework, enhancing weak lensing cosmological constraints.

Currently, I am leading the creation of DES Y6 weak lensing catalogs using the Bayesian Fourier Domain method, expected to double the galaxy count from DES Y3. I am also developing the pipeline for simulation-based inference analyses of photometric data from Euclid DR1. Through my work with UPenn's Data-Driven Discovery Initiative, I explore machine learning applications in cosmology.

Looking ahead to the future, I aspire to increase my involvement in the next generation of surveys (e.g., Euclid), leveraging the expertise I've gained from working on various aspects of photometric surveys during my time with DES. Additionally, I am keen on extending the new tools I have developed (i.e., the non Gaussian statistics simulation-based framework) to extract more information from current data. This includes incorporating small-scale physics, such as baryonic effects, and exploring the potential of CMB observables, such as CMB secondary anisotropies. Furthermore, I am highly interested in broadening the framework to test cosmological models beyond Λ CDM. This could encompass examining models like early dark energy or binned $\sigma_8(z)$ models, as mentioned in my research statement. These explorations are now feasible, as my collaborators and I now have the necessary tools to generate simulations that go beyond the vanilla Λ CDM model.

Resumen del Currículum Vitae:

I graduated in Physics from the University of Genoa in 2012 and earned a Master's in Astronomy and Astrophysics at University La Sapienza in 2014. I conducted doctoral research on galaxy surveys at the Institut de Física d'Altes Energies as a Severo Ochoa La Caixa fellow and became a postdoctoral researcher at the University of Pennsylvania in 2020. In January 2024, I was awarded the KICP fellowship at the University of Chicago, starting in summer 2024. In total, I won 3 postdoctoral fellowships (one declined), a PhD fellowship, and 2 Master-level fellowships.

I currently have around 130 original publications in leading peer-reviewed astronomy journals, and an h -index of 45. These include around 110 authored through collaborations and about 20 with small groups of collaborators. Of these, I am the corresponding author for 12 publications, which have collectively accumulated more than 750 citations. Additionally, I am among the first-tier authors (meaning I made major contributions) in another 25 papers. Within the DES collaboration, I have published more papers as the first author (10 in total) than any other member since the inception of DES. I have been invited to present my work at more than 25 conferences and seminars across the US and Europe. I have supervised, and continue to supervise, several undergraduate and graduate students (i.e., Master and PhD students), co-authoring multiple publications with them. I am part of the DES mentoring program, which provides extra career support to early career scientists within the collaboration. Due to my infrastructure contributions to DES, I have been awarded Builder status since 2021. I have also been appointed co-coordinator of the DES Shear Catalog Analysis Team (2019-2020), and co-coordinator of the DES Mass Mapping and Forward Modelling Team (2021-2024), and I currently co-coordinator of the DES Beyond 2pt Analysis Team (2024-), the Euclid Forward Modeling Work Package (2024-), and the Euclid US meetings (2024-). Since 2019, I have co-organized more than 25 dedicated sessions at 10 different DES workshops and meetings.

Since 2017, I have been serving as a referee for Monthly Notices of the Royal Astronomical Society (MNRAS), Astronomy & Astrophysics (A&A), the Astrophysical Journal (ApJ), Publications of the Astronomical Society of Japan (PASJ), the Journal of Cosmology and Astroparticle Physics (JCAP), and the Open Journal of Astrophysics. I am also serving as a referee for the UKRI Funding Service, the national UK funding agency. I have been engaged in various outreach activities, including conducting seminars for high school students, developing and organizing hands-on activities with students, and giving interviews to national and international newspapers. In 2023, I have been awarded the Italian habilitation to academic professorship by the



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Italian Ministry of Education. I have won three grants as co-PI and PI, awarding computational resources for more than 200k GPU hours (corresponding roughly to 900k dollars).



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Turno General

Área Temática: Ciencias físicas
Nombre: MILOWSKA, KAROLINA
Referencia: RYC2024-051436-I
Correo Electrónico: kz.milowska@nanogune.eu
Título: Atomistic simulations of low-dimensional systems for sustainable energy generation.
Resumen de la Memoria:

Over the years I have built strong track record in theoretical studies of broad range of condensed matter systems employing first principle methods. I am interested in the mechanical, optoelectronic and transport properties of low-dimensional forms of carbon (LDC) and hybrid halide perovskites (HPP) and designing new hybrid nanomaterials using first principle calculation methods.

My research on LDC evolved since my PhD studies when I investigated the impact of covalent functionalization of carbon nanotubes (CNTs) and graphene (G) on their mechanical and electrical properties employing ab-initio methods. My research focus moved to the composite materials that contain LDC and to understanding the interaction at the interface between carbon and other materials. In particular, my research on CNT-metal composites determined two possible routes of improving the connection between CNT and metal matrix. My large scale DFT calculations, partially independently resourced, predicted that alloying Cu matrix by transition metals or functionalizing CNTs improves the electro-mechanical interface. Moreover, I identified and explained physical mechanisms governing the optimal electrical transport performance of Cu-CNT composites. My studies have also been extended to the non-covalent functionalization of CNTs. My transport calculations provided insights into permanent resistance reduction of halogen-doped CNT networks. The investigation of thermoelectric properties of single-walled carbon nanotube films doped with nitrogen-bearing compounds predicted simple and inexpensive method for tuning the doping level of CNTs. My independent side project also revealed the role of G flakes in boosting conductivity of CNT-G wires. Finally, study of G flakes showed pristine graphene flakes are 2D amphiphiles which can be efficiently used as a new-generation surfactants in applications ranging from oil extraction to paper processing. Similarly, short and thin pristine carbon nanotubes are 1D amphiphiles which would enable the sustainable usage of CNTs.

HPP became my main interest during my first postdoc position (LMU). Their soft crystal lattice allows greater tolerance to the lattice mismatch, making them promising for heterostructure formation and semiconductor integration, while their low-dimensional forms with versatile structures and size-dependent properties provide an interesting playground for physicists and chemists to study the structure-property relationships and physics of low-dimensional systems. My theoretical model of exciton transition energy explained the quantum size effect in metal halide and organic-inorganic hybrid perovskite nanoplatelets.

In the future, I would like to combine those two areas - to use LDC materials as contacts, hole/electron transport layers to improve charge extraction and a part of active layer to stabilize, direct efficient charge transport while reducing charge recombination and trapping at the grain boundaries and protect low-dimensional forms of perovskites from environment. This new approach will not only improve stability of perovskites, reduce the mismatch between different types of materials but it is expected to improve the optoelectronic properties of the device and lower the fabrication costs. It involves the new idea of exploiting recently discovered amphiphatic nature of LDC.

Resumen del Currículum Vitae:

Since Jan 2022 Dr Karolina Z. Milowska is an Ikerbasque Research Fellow at CIC nanoGUNE working on low-dimensional systems for sustainable energy generation. Prior to this she was working in international and interdisciplinary groups at top universities in three different countries (Poland, Germany, UK) where she was involved in the full range of research, teaching and administrative activities. She spent 5 years at the University of Cambridge (UK) as Research Associate investigating thermoelectric properties of CNT-metal composites (Jan-Sep 2016) and designing reactive nanoparticles for in situ catalytic cracking of hydrocarbons (Nov 2017- Dec 2021). As a postdoctoral research fellow (Jul 2013-Sep 2015) at Ludwig-Maximilians Universität München (Germany) she was engaged in modelling and experimental work in the field of controlled self-assembly, photocatalysis, and optoelectronics. In Dec 2013, she obtained PhD degree in physical sciences at Institute of Theoretical Physics, University of Warsaw (Poland). Her PhD thesis focused on functionalization of carbon nanotubes (CNT) and graphene (G) for composites and nanodevices was qualified as outstanding by Faculty Council.

Her research is concentrated in the fields of condensed matter physics, quantum chemistry and computational material science. She is interested in the mechanical, optoelectronic and transport properties of various low-dimensional materials, in particular CNTs, 2D materials and organic-inorganic perovskites (HOIP) and designing new hybrid nanomaterials using numerical simulations and theory.

Despite career breaks she managed to perform excellent research. Her theoretical model of exciton transition energy explained quantum size effect in low-dimensional metal halide and HOIP nanoplatelets. Her studies on carbon composites revealed the role of G flakes and halogens in boosting conductivity of CNT-G wires and CNT films. Her latest works in carbon field explaining amphiphatic nature of pristine G flakes and CNTs have a potential to become a breakthrough that will enable the long awaited commercialization of G and macro-scale applications of CNTs. The quality of her research was recognized as outstanding since the early stage of her career. She received several prestigious fellowships. In Dec 2012 she received an award for outstanding achievements granted by Ministry of Science and Higher Education of Poland (1 of 100 in all disciplines). She successfully applied for and managed computational grants on HPC systems and supercomputing services (>18 millions CPUh; Tier-0 levels in Poland, Germany, Spain). In 2023, she was awarded PRELUDIUM BIS 4 grant for carbon research and Proyectos de Generación de Conocimiento 2022 grant for the developing SIESTA numerical package. She published 35 papers in peer-reviewed international journals (>2500 citations; h-index of 18 on Scopus). Her expertise in carbon and P materials has been recognized by 41 journals for which she reviewed >350 papers. She was a referee in the Polish Fulbright Senior Award 2024/25 & 2025/2026 editions.



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She is strongly committed to undergraduate and graduate teaching and supporting young researchers. Currently she is supervisor of 3 PhD students. In 2022 she initiated participation of CIC nanoGUNE in Europractice and is now managing nanoGUNE membership in this scheme. She is a member of American Physical Society.



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Turno General

Área Temática: Ciencias físicas
Nombre: RUIZ CHÓLIZ, ELISA
Referencia: RYC2024-050290-I
Correo Electrónico: elisaruizcholz@gmail.com
Título: Ultra-low background detector development for axion searches

Resumen de la Memoria:

SCIENTIFIC AND TECHNICAL CONTRIBUTIONS

As a pre- and postdoctoral researcher, I have made significant impact in several international collaborations and experiments (IAXO, CAST, FASER, TREX, and NEXT) in the field of particle physics, rare event searches, axion physics and dark matter research. These fields are highly prominent and attract considerable interest within the scientific community. Axion physics is a very hot topic, with many international experiments delving into regions of their parameter space with detection techniques as diverse as helioscopes or collider experiments. I have made significant contributions to such field, publishing 26 peer-reviewed papers (15 in Q1) and presenting my work in national and international conferences.

Relevant contributions:

- Contribution to the CERN Axion Solar Telescope (CAST) experiment during its last data taking period, that resulted in the most restrictive limit on the axion-photon coupling for a wide range of the axion mass.
- Contribution to the International Axion Observatory (IAXO) and BabyIAXO experiments and the understanding of their physical reach and limitations, that resulted in the re-design of the active shielding strategy.
- Contribution to the TREX project (TPCs for Rare Event eXperiments) R&D in Gaseous Time Projection Chambers (TPC) and Micropattern Gas Detectors (MPGD) for rare event searches and low background expertise.
- Transversal studies within the field of the Micromegas detectors to simulate, model and experimentally test the performance of different gas mixtures.
- Contribution to the Forward Search Experiment (FASER) experiment to detect ALPs and high-energy neutrinos in the Large Hadron Collider (LHC).
- Dissemination of IAXO and BabyIAXO status and research results at international conferences and meetings on behalf of the IAXO collaboration.
- Contribution to development of software: REST (Rare Event Searches with TPCs)
- Science communication to society
- Open Science

INTERNATIONALIZATION AND MOBILITY

I have been part of international collaborations (IAXO, CAST, FASER) and worked at major research centers, including CERN, CEA Paris-Saclay, and Johannes Gutenberg University Mainz. Currently, as a scientist at the Canfranc Underground Laboratory (LSC), I contribute to the Hyper-Kamiokande and NEXT collaborations. During my 5-years postdoc in the JUG, I developed detectors for both the IAXO and the FASER collaborations. These contributions enhance low-background expertise, optimize detector performance, and support key experiments in axion and particle physics.

INDEPENDENCE AND LEADERSHIP

I am a highly specialized scientist at the LSC, overseeing ultra-low radioactivity detector activities. I renovated and supervised the ETAP Micromegas lab, built a clean room. I've led beam measurements at the Mainz Microtron and CERN, received RD51 funding for novel Micromegas detectors, and fostered collaborations within PRISMA+ and IAXO. I co-direct students, teach, and lead the IAXO's Outreach group.

LINE OF RESEARCH TO BE DEVELOPED

I propose a LiquidO-based veto for BabyIAXO. Its opaque scintillator and WLS fibers offer neutron absorption and event topology, reducing background by 100x and enhancing axion detection from solar and supernova sources.

Resumen del Currículum Vitae:

I have contributed to the CERN Axion Solar Telescope (CAST) experiment in its search for solar axions and other exotic particles, achieving the most restrictive limits on the axion-photon coupling over a wide range of axion masses. I have also demonstrated CAST's capabilities as a haloscope, excluding previously unexplored parameter spaces of axion masses. Additionally, I set improved limits on the chameleon-photon coupling using two different detection techniques.

I have been actively involved in the development of the baseline detection technology of the International Axion Observatory (IAXO) and its precursor, BabyIAXO. This includes demonstrating their sensitivity to axion-photon and axion-electron couplings and addressing various theoretical scenarios where axions detected by IAXO could solve outstanding problems in physics. I modeled axion-photon oscillations to determine the axion mass and developed an accurate solar axion ray-tracing model for BabyIAXO.

Rare event searches require ultra-low radioactive backgrounds for competitive sensitivity, and I have significantly contributed to advancing low-background techniques for particle detectors. This includes simulating all background sources of the TREX-DM detector and developing methods to quantify cosmogenic tritium production at sea level. As an expert in Micromegas detectors, I have demonstrated their exceptional capabilities for rare event searches, including solar axions, neutrino-less double beta decay, and WIMPs. I have expanded the know-how of this detection technology through studies involving different designs, gas mixtures, and systematic characterizations, establishing Micromegas as a versatile and reliable detection technology.

I have also contributed to the FASER experiment, which searches for light, weakly-interacting particles produced at the ATLAS interaction point of the LHC. My work includes achieving world-leading constraints on dark photons and proposing a novel pre-shower detector that extends FASER's physics reach. As a member of three international collaborations (CAST, IAXO, and FASER), I have worked at renowned research centers, including CERN



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(Switzerland), CEA Paris-Saclay (France), Johannes Gutenberg University Mainz (Germany) with its PRISMA+ cluster of excellence, and the Canfranc Underground Laboratory (Spain).

I have presented my research at national and international conferences, where I have spoken on behalf of the IAXO collaboration and delivered an invited talk at the Quantum Universe Day (University of Hamburg). I am the spokesperson for my research group in the biannual IAXO Collaboration Meetings and have actively participated in these since 2017.

I received RD51 Common Project Funding to commission a novel Micromegas detector at CERN, coordinated radiopurity measurements with high-purity germanium detectors at LSC, and led the ETAP Micromegas laboratory, overseeing beam measurements at large-scale facilities and fostering collaboration between research groups.

Beyond research, I co-developed the REST software framework for particle detection experiments and have organized outreach activities, including the International Dark Matter Day and Summer School events at JGU. I am an active science communicator in both traditional and digital media. I have co-supervised two PhD students, three Master's students, and one undergraduate student, supported undergraduate practicums, and taught laboratory courses.



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Turno General

Área Temática: Ciencias físicas
Nombre: GUTIÉRREZ AVENDAÑO, CLAUDIA PATRICIA
Referencia: RYC2024-050959-I
Correo Electrónico: klaudisp@gmail.com
Título: Core-Collapse Supernovae in low-metallicity hosts
Resumen de la Memoria:

My research focuses on characterising the spectral and photometric properties of core-collapse supernovae (SNe), particularly hydrogen-rich SNe (SNe II), to understand their diversity and constrain their progenitors and explosion mechanisms. Key topics of my work include:

1. Characterising Optical Spectra of SNe II: During my PhD, I conducted the first comprehensive study of SN II spectra, analysing the largest sample to date (~1000 spectra of 124 SNe). In three key papers [1, 2, 3], I described the evolution and diversity of optical features in SN II spectra. Notably, I identified and explained the origin of the absorption features detected on the blue side of the hydrogen lines. This feature, which I named “Cachito” in 2017, is widely recognised and used within the SN community. I also connected SN II properties to progenitor star parameters. Additionally, I contributed to studies of blueshifted H α lines, light curve morphologies, rise-time durations, SN II colours, NIR spectroscopic diversity, bolometric light curves, and their modelling [3–21].

2. SNe II as Metallicity Probes: I participated in a pioneering study showing that SN spectral lines are sensitive to metallicity through spectral modelling [8]. I further supported these findings by combining SN and host galaxy data [10, 22], providing strong evidence that SNe II can serve as reliable metallicity probes.

3. Understanding Extreme SNe: Deep observations have revealed many peculiar events in the local Universe. I have led several studies that combine observations with modelling to understand the origin of these extreme events for both H-rich and H-poor SNe. As a result, I have led five works [24, 25, 30–32] and supervised two more [26, 32].

4. Linking the SN properties with their environmental parameters: I have led studies investigating how environmental parameters, such as dust, influence SN diversity. My research has demonstrated that narrow absorption features in SN spectra can provide valuable insights into reddening (dust) and circumstellar interaction, offering clues about SN progenitors. Additionally, I supervised a study that found SNe II are brighter at higher redshifts, likely due to greater host galaxy extinction at lower redshifts [35–38].

5. Other Transients: The discovery of extreme transients has challenged our understanding of stellar evolution and explosions. I contributed to studies characterising the first observed kilonovae and fast transients [39–41]. Recently, I led the analysis of a luminous, fast-blue optical transient, identifying it as the tidal disruption of a star by an intermediate-mass black hole [42]. My results suggest that events we can pinpoint quiescent IMBHs by analysing these events.

While my research spans diverse phenomena, my overarching goal is to improve our understanding of SN progenitors and physical properties. Most studies to date focus on SNe in metal-rich galaxies. To address this bias, in this R&C fellowship, I propose characterising the physics and explosion mechanisms of CCSNe in metal-poor environments, investigating how the environment influences SN properties and diversity. This project will fill critical gaps in our knowledge, offering new insights into the evolution of massive stars and informing studies of high-redshift transients.

Resumen del Currículum Vitae:

As a researcher, I have worked on the observational aspects of supernovae (SNe) and their impact on stellar and galaxy evolution. More specifically, I am interested in understanding the influence of galaxy properties on parent stars, explosion mechanisms, observational parameters and the origin of peculiar and extreme SNe. I have also been involved in several projects that seek to improve the use of SNe as distance indicators and at observing and interpreting gravitational wave counterparts and fast transients. My research has led to a deeper knowledge of the diversity and properties of SNe and their progenitors.

I received my PhD in astronomy from the University of Chile (Chile) in 2016, working on the analysis of hydrogen-rich SNe under the supervision of Professor Mario Hamuy. In 2014, I received the award for the Best PhD student in the Department of Astronomy at the University of Chile. From 2014 to 2016, I received a studentship at ESO in Chile. During my career, I have authored or contributed to 143 peer-reviewed publications with more than 8300 citations (H-index= 37; ADS, January 2025). This includes three papers in Nature and two in Nature Astronomy. I have published 10 papers as the first author and 17 as the second/third author (5 of them have been led by students under my supervision).

From January 2017 to September 2020, I worked as a postdoctoral researcher at the University of Southampton (UK). In 2020, I was awarded a FINCA fellowship to conduct my research at the University of Turku (Finland). Since May 2023, I am a Beatriu de Pinós Fellow at the Institut d’Estudis Espacials de Catalunya and the Institute of Space Sciences (Spain), working on extreme SNe and optical transients.

I have gained extensive experience in observing and data reduction. I have successfully secured >200 hours of allocated telescope time as a PI and participated in >100 successful proposals as a co-I. I am a member of several international collaborations, where I play an active role in planning observations, data reduction, data analysis and writing scientific papers. Thanks to my expertise in the SN phenomena, I was invited to coauthor the Nature Astronomy review paper “New Regimes in the Observation of Core-Collapse Supernovae” (Modjaz, Gutiérrez and Arcavi 2019).



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I have been a reviewer for high-impact astronomy journals and a member of the Time Allocation Committee panels for the LT and the HST. I have been part of the SOC of 5 international meetings and have been invited as a speaker in 18 seminars and colloquia. I have participated in >50 conferences/meetings with 40 contributed talks and 3 invited talks. I have supervised >20 students. This includes 4 PhD students, 3 masters students, and one bachelors student. I have also been a tribunal member in 4 master's thesis defences and jury in the selection process of PhD students and postdocs. From 2021 to 2024, I was in the LOC of the mentorship RECA programme for Colombian undergraduate students. I am a member of ICE-CSI's Equity Committee and the Teaching Committee, leading the Mentoring programme. I have been actively involved in outreach activities since my bachelor studies. In recognition of these activities and as part of the Women's Physics Network, I received the Vice-Chancellor's Award 2017 in the Equality, Diversity and Inclusion category.



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Turno General

Área Temática: Ciencias físicas
Nombre: TERZO, STEFANO
Referencia: RYC2024-049441-I
Correo Electrónico: sterzo@ifae.es
Título: Next-Generation Particle Detectors: From ATLAS to Applied Physics

Resumen de la Memoria:

My research focuses on developing innovative particle detectors for current and future High Energy Physics (HEP) experiments, while exploring their potential applications in applied physics and medicine. My work spans the upgrade of the ATLAS detector at CERN for the High Luminosity Large Hadron Collider (HL-LHC), cutting-edge detector R&D, and the transfer of HEP technologies to interdisciplinary applications.

I contribute significantly to two key sub-detector upgrades for the ATLAS experiment: the Inner Tracker (ITk) and the High Granularity Timing Detector (HGTD). For the ITk, I focus on hybrid pixel modules utilising advanced thin planar and 3D silicon sensors paired with the ITkPix chip. At IFAE, I oversee the development of 3D silicon-based linear triplet modules that will instrument the innermost pixel barrel layer. As ITk Sensor Coordinator, I lead sensor production and testing to ensure the successful installation at CERN. For the HGTD, which will enhance pile-up rejection and object reconstruction in ATLAS's forward region, I contribute by leading the development of the Alvin readout system for characterising LGAD modules with ALTIROC chips and coordinate the module characterisation and testbeam data analysis at IFAE.

My research extends to advanced detector technologies, including LGADs, 3D sensors, and Monolithic Active Pixel Sensors (MAPS), which promise precise timing and spatial resolution for applications in HEP and beyond. My involvement within the frameworks of the ATLAS and RD50 Collaborations at CERN has been focused on the development and advancement of all these three technologies. I am now following up these efforts within the new DRD3 Collaboration which is taking shape at CERN. I am presently part of three DRD3 project proposals exploring 3D sensors for timing and the development of novel LGAD technologies with fine segmentation (AC-LGAD and iLGAD) and innovative silicon carbide substrates. Additionally, I closely monitor developments in the recently established DRD5 collaboration on Quantum sensing detectors, exploring the potential continuation of my research on graphene-based detectors initiated in collaboration with ICN2 and IMB-CNM through the BIST Ignite Award.

I actively work on adapting HEP detector technologies for applied physics and medical applications. In particular, the SOFTPIX project explores novel LGAD sensors coupled to the Timepix4 chip for ultra-sensitive soft X-ray detection. This system targets applications such as low-energy photon detection within the "water window."

Over the coming years, I aim to play a central role for the ATLAS upgrade at IFAE, contributing significantly to both the ITk and the HGTD projects. My primary focus is on overseeing the completion of the construction of the 3D triplet and the ALTIROC modules, culminating in their installation into the ATLAS experiment at CERN.

In parallel, I am dedicated to taking the lead on the SOFTPIX project exploiting the synergies with the inverse-LGAD and AC-LGAD developments within the DRD3 Collaboration.

Looking ahead, my long-term vision involves delving into new implementations and innovative applications of LGAD and 3D sensors, as well as exploring novel Depleted Monolithic Active Pixel Sensors (DMAPS) and graphene-based detectors with the aim of developing ideas and collaborations for the design of future HEP trackers.

Resumen del Currículum Vitae:

In 2012, I completed my M.Sc. in Physics at Università degli Studi di Milano-Bicocca, Italy, with top honors, focusing my thesis on developing track reconstruction software for a proton tracking telescope at Fermilab TestBeam Facility, USA.

I pursued a Ph.D. at the Max-Planck-Institute for Physics in Germany, contributing to the ATLAS experiment at CERN. My work centred on advancing particle detector technology for the High Luminosity Large Hadron Collider (HL-LHC), including pioneering studies on thin planar silicon sensors and active edge sensor modules.

Following my Ph.D., I became a postdoctoral fellow at the Institut de Física d'Altes Energies (IFAE) in Spain, where I investigated innovative silicon detector technologies, including Depleted Monolithic Active Pixel Sensors (DMAPS). My efforts culminated in publishing the first radiation-hardness results for a fully monolithic prototype and leading the development of 3D pixel modules designed for extreme radiation environments, later adopted for the ATLAS Inner Tracker (ITk) project.

In September 2019, I took over the role of "Sensor Coordinator" for the ATLAS ITk Pixel project, overseeing both 3D and Planar pixel sensor activities of the different international groups of the Collaboration, including validation and procurement for installation in the final detector at CERN and I am currently supervising the pixel sensor production.

In the latter part of 2021, I expanded my research to include detectors for precise timing, contributing to the ATLAS High Granularity Timing Detector (HGTD) project. This involved developing a data acquisition system for the new ALTIROC chip prototype and coordinating the characterisation of Low Gain Avalanche Detector (LGAD) modules, which allow to distinguish LHC collisions within tens of picoseconds.



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Beyond the ATLAS Collaboration, I engaged in interdisciplinary research at the Barcelona Institute of Science and Technology (BIST). Since 2019, I am involved in a collaboration between IFAE and The Institute of Photonic Sciences (ICFO) to develop Single-Photon Avalanche Diodes (SPADs) for diffuse correlation spectroscopy to be used in non-invasive, micro-vascular cerebral blood flow measurements. In March 2020, I was honoured with the first-phase BIST IGNITE award for outstanding multidisciplinary projects. This award supported my investigation of charged particle tracking with graphene-based detectors in collaboration with the Catalan Institute of Nanoscience and Nanotechnology (ICN2).

In 2022, I became a Tenure Track researcher at IFAE, broadening my focus to medical applications of detector technologies. I became the representative of IFAE in the MEDIPIX Collaboration at CERN and joined the Medical physics group of IFAE and IMB-CNM contributing to the SOFTPIX project. This project aims at building imaging detectors with improved sensitivity to soft X-rays by employing LGAD sensors coupled to the new Timepix4 chip developed by the MEDIPIX Collaboration. Building on the foundation of SOFTPIX, I initiated and now lead a proof-of-concept project called EPixCam. EPixCam takes advantage of the thin entrance window designed for low-energy photon detection to create an ultra-sensitive camera tailored for electron microscopy applications.



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Turno General

Área Temática: Ciencias físicas
Nombre: MUÑOZ IGLESIAS, VICTORIA
Referencia: RYC2024-050522-I
Correo Electrónico: vikina.mi84@gmail.com
Título: Geochemical processes of planetary interest
Resumen de la Memoria:

En la memoria presentada se detallan las 10 principales contribuciones científico-técnicas que la investigadora ha aportado al campo del Ciencias en el Espacio, con especial hincapié en la Astrobiología. De esta manera, se describen artículos publicados aplicados a Marte, Ceres y las principales lunas heladas de Júpiter y Saturno, como son Europa, Titán y Encélado. Los trabajos tienen una principal componente geoquímica experimental, aunque las colaboraciones con diversos investigadores procedentes de distintas áreas científicas y tecnológicas han permitido ampliar el contenido de cada contribución a otros ámbitos, desde aplicaciones biológicas o geofísicas hasta avances instrumentales.

La movilidad e internacionalización de la investigadora se puede dividir fundamentalmente en cuatro periodos: su etapa predoctoral nacional (etapa 1), sus etapas postdoctorales internacionales (etapas 2 y 4), y su etapa postdoctoral nacional (etapa 3). Así, durante la realización de su tesis doctoral en el Centro de Astrobiología (CAB, CSIC-INTA) cabe destacar la colaboración con el departamento de Química-Física de la Universidad Complutense de Madrid (UCM), por la que estuvo también contratada durante 1 año y 4 meses a través de proyectos con participación de ambas entidades CAB y UCM. Tras la lectura de la tesis, la investigadora realizó una estancia postdoctoral de 2 años en el "Jet Propulsion Laboratory-Caltech" (Pasadena, CA, USA), gracias a la obtención de una beca del "National Aeronautics and Space Administration (NASA) Postdoctoral Program" por presentar el proyecto "Experimental investigation of the stability, formation, and exchanges in clathrate hydrates for outer solar system applications". Tras ese periodo, la investigadora regresó al CAB durante 6 años. En el 2022 recibió una nueva beca posdoctoral, en este caso una "Individual European Marie Curie (MSCA) postdoctoral fellowship", para ir 2 años al "Laboratoire de Planétologie et Géosciences" de la Universidad de Nantes/CNRS (Francia). Dentro del proyecto, la investigadora pasará también 2 meses en la "Freie Universität Berlin", en Berlín (Alemania). A lo largo de todo el periodo postdoctoral la investigadora ha participado en la organización de eventos de carácter internacional.

La investigadora ha podido demostrar su independencia y liderazgo hasta el momento a través de la guía como tutora o co-tutora de estudiantes de grado, master, y doctorado en todos los centros en los que ha estado como postdoc (JPL, CAB, y LPG). Por otra parte, ha sido miembro de 7 proyectos de investigación y 2 contratos con la Agencia Espacial Europea (ESA). Además, ha actuado como revisor externo durante el "Preliminary Design Review" (PDR) del espectrómetro Raman que portará la misión japonesa MMX. También ha participado en diversas actividades de divulgación incluyendo conferencias públicas y entrevistas en medios de comunicación.

La trayectoria de la investigadora le permitirá desarrollar la línea de investigación "Caracterización espectroscópica y calorimétrica de minerales de interés planetario y astrobiológico, en apoyo de futuras misiones espaciales", a partir de la cual, por medio de métodos experimentales se elaborarán (a) modelos geoquímicos de evolución planetaria, y (b) bases de datos para misiones.

Resumen del Currículum Vitae:

Tras finalizar mi licenciatura en Química (en la UDC) obtuve una Beca de Formación INTA de 3 años en el Centro de Astrobiología (CAB-CSIC-INTA). Durante este periodo, me integré en los equipos de alta presión de los proyectos "CONSOLIDER-INGENIO 2010" y "QUIMAPRES", y realicé un doctorado en Geología (UCM) con mención "cum laude", con la tesis "Efectos de la presión en la geoquímica de la corteza y el océano del satélite Europa". Los trabajos se plasmaron en 5 publicaciones y 2 capítulos de libro.

Seguidamente, obtuve una beca del Programa Postdoctoral de la NASA (NPP), para realizar un postdoctorado de 2 años en el Jet Propulsion Laboratory (JPL), Caltech (Pasadena, CA), bajo el proyecto "Experimental investigation of the stability, formation, and exchanges in clathrate hydrates for outer solar system applications". 2 publicaciones reflejan el trabajo realizado durante este periodo. También participe 2 años seguidos en la tutoría de estudiantes de verano del "JPL Summer Internship Program".

Tras esta estancia, regresé al CAB, donde formé parte de los equipos de 5 proyectos nacionales; 2 centrados en el estudio de la geoquímica las lunas heladas, otros 2 centrados en el desarrollo de instrumentación para las misiones a Marte, y estudio de sus condiciones de habitabilidad, y un proyecto "María de Maeztu" (mención obtenida por el CAB en 2018). También estuve involucrada en dos contratos con la ESA, uno centrado en la toma de medidas eléctricas con aplicación a la interpretación de los datos de radar que vendrán de JUICE y Europa Clipper, y el otro en el desarrollo de equipos para que los futuros astronautas puedan realizar mediciones espectroscópicas in-situ en la superficie de la Luna. Durante el periodo postdoctoral en el CAB, participé en la publicación de 16 artículos y 2 capítulos de libro. Fui tutora de las prácticas curriculares de una estudiante de la URJC y empecé a co-dirigir a un estudiante de doctorado que leerá la tesis en 2025.

En febrero de 2024 comencé una nueva etapa en Nantes (Francia), gracias a la obtención de una beca postdoctoral Marie Curie (MSCA) de 2 años por el proyecto "SECRECY - SEarChing REcent CrYomatism in Ceres and Europa, astrobiological targets", que se está llevando a cabo en el "Laboratoire de Planétologie et Géosciences (LPG), Nantes University/CNRS". Dentro del proyecto realizaré en el 2025 una estancia de 2 meses en la "Freie Universität Berlin" (Berlín, Alemania). Durante todo este periodo estoy tutorizando estudiantes de la universidad tanto de licenciatura como de master durante sus estancias y actividades en el laboratorio.

He participado como docente en la "Escuela de Altas Presiones 2021" de la "Universitat Politècnica de Valencia" y en la "European Astrobiology Institute (AEI) Academy 2024-2025". Y he realizado en los últimos años diversas actividades de divulgación como la "I Jornada de Invierno 2020", el "Pachakucha 2021", y el "Día Internacional de la Mujer y la Niña en la Ciencia 2022" en el CAB, y en la organización de eventos internacionales como el "American Heritage Event 2016" en el JPL y el "VI Encuentro de Ciencias Planetarias y Exploración del Sistema Solar 2019" en el INTA.



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Turno General

Área Temática: Ciencias físicas
Nombre: MASSANA CID, HELENA
Referencia: RYC2024-050070-I
Correo Electrónico: helenamassanacid@gmail.com
Título: Motion, assembly and dynamics of active matter and magnetic colloids

Resumen de la Memoria:

My research has advanced the understanding of non-equilibrium dynamics of active matter and colloidal systems. During my over four years of postdoctoral work at Sapienza University of Rome, supported by Marie Skłodowska-Curie and SAPIExcellence fellowships, I observed the coexistence of multiple effective temperatures in a novel colloidal crystal activated by photokinetic bacteria. This allowed me to establish a new research line on active crystals, providing a unique platform for observing emergent far-from-equilibrium phenomena and testing theoretical predictions never observed before in real systems. Prior to this, I studied how to use green light to guide photokinetic bacteria, generating confined biological systems with predictable dynamics. Since October 2024, I have been continuing my research on active crystals at the University of Barcelona, now focusing on phoretic systems.

Previously, during my PhD at the Condensed Matter Physics department at the University of Barcelona, I investigated the structure formation and the dynamics of driven and active magnetic colloids. The interactions in our experimental system were tuned in situ by using external fields, with the aim of finding novel approaches to drive and engineer these microparticles into a rich variety of microstructures. The colloids formed chains and clusters able to transport cargos, space-filling gels and self-healing crystals. Moreover, we demonstrated the bidirectional transport of paramagnetic particles on top of a structured magnetic substrate. All these contributions have been recognized through invited and contributed presentations at top international conferences and through numerous publications in peer-reviewed and high-impact journals such as Nature Communications, Science Advances, PNAS and Small.

Moving forward, my research will explore the dynamics of driven colloidal structures within bacterial baths. I aim to understand how external magnetic forces and active fluctuations from bacteria influence the motion and self-organization of colloids. This includes analyzing the interactions and the transport of colloids and their collective assemblies inside bacterial suspensions. By bridging the gap between active and driven colloidal systems, my future work seeks to offer new perspectives on many-body effects in non-equilibrium systems. The practical applications of this research are extensive, potentially informing processes in a variety of condensed matter systems at different scales.

Resumen del Currículum Vitae:

I am a physics researcher specializing in the study out-of-equilibrium phenomena in active and soft matter systems by manipulating bacteria and magnetic colloids. In my postdoctoral experience abroad at Sapienza University of Rome, I demonstrated independence by securing significant grants like the Marie Curie and the Add SAPIExcellence fellowships. These grants allowed me to establish a new research line in the physics department, on active colloidal crystals, providing a unique platform for observing emergent phenomena and testing theoretical predictions never observed before in real systems. Prior to this, I studied how to manipulate and guide photokinetic bacteria using green light, creating confined systems with predictable dynamics. During my Ph.D. at the University of Barcelona, my thesis received notable awards and led to twelve journal publications, reflecting significant contributions to the field. My work explored the dynamics of magnetic colloids, yielding microstructures capable of cargo transport, forming space-filling gels and self-healing crystals and demonstrating bidirectional transport of microparticles on magnetic substrates. All these contributions have been recognized through numerous publications in peer-reviewed and high-impact journals such as Nature Communications, Science Advances, PNAS and Small. Throughout my career, I have actively mentored students and been invited to present at international conferences and give seminars in Universities. I have also organized conferences, served as a referee for peer-reviewed journals, and engaged in science dissemination activities. Since October 2024, I have been continuing my research on active crystals, now focusing on phoretic systems, at the University of Barcelona.



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Turno General

Área Temática: Ciencias físicas
Nombre: MAÑAS VALERO, SAMUEL
Referencia: RYC2024-048264-I
Correo Electrónico: S.ManasValero@tudelft.nl
Título: Tailoring magnon spintronics in van der Waals magnets for information technologies
Resumen de la Memoria:

My scientific career is centered around magnetism.

As undergraduate (Physics, Univ. of Valencia, Spain), I participated in the imaging of magnetic nanoparticles by low-temperature magnetic force microscopy.

During my master, I learnt the crystal growth of layered van der Waals materials by solid-state chemistry techniques, focusing in the growth of strongly-correlated materials (superconductors, magnets, charge-density waves).

As a PhD (Univ. of Valencia, Spain, under the supervision of prof. E. Coronado), I consolidated a novel research line focused on the physics of 2D quantum materials, van der Waals heterostructures and electronic nanodevices. In particular, I first set up a new synthesis lab for growing crystals of inorganic layered materials (from 6 systems before he started his PhD to more than 60 systems nowadays). Second, I was the main driving force for setting a new laboratory for the manipulation of 2D materials under inert atmosphere conditions, their assembly forming van der Waals heterostructures, as well as the fabrication of nanodevices based on 2D materials. Importantly, for the physical characterization of such nanodevices, I set up a new characterization lab for performing magneto-transport measurements at low temperatures and under magnetic fields (0.5 K $\square$ 400 K, $\pm$ 9 T), with the corresponding design of suitable insets and codes for communicating with different equipment. At the beginning of my PhD, it was not possible to perform this kind of assembly of 2D materials/devices/measurements in the Coronado's group. Thanks to all these technical advancements I have been able to report on the magneto-transport properties at low temperatures of a large variety of low-dimensional systems, ranging from quantum spin liquids and superconductors to twisted 2D magnets and hybrid molecular/inorganic heterostructures.

Later, I moved as postdoctoral researcher to the group of prof. H. van der Zant (Delft University of Technology, The Netherlands), characterizing van der Waals magnets by low-temperature nanomechanical resonators (funded by the Generalitat Valenciana through the APOSTD program).

Then, I was awarded with a Marie-Curie postdoctoral grant for realizing diamond magnetometry at low-temperatures in the group of prof. T. van der Zant (Delft University of Technology, The Netherlands). In particular, I have assembled a scanning microscope for performing magnetometry based on a single-spin (single nitrogen-vacancy center in diamond), being able to image successfully spin-waves. Currently, I am characterizing with this technique van der Waals magnets at low-temperatures, aiming to detect spin-waves in the 2D limit.

Building on my expertise, I propose to expand my know-how in van der Waals magnets, 2D materials and magnon sensing with diamond magnetometry for developing a new research line in magnon spintronics with van der Waals magnets. In particular, I will assess the magnon-transport characteristics of these materials -which is unknown so far- and tailor their properties in a controlled manner (through twisting, stacking and molecular engineering), with potential impact towards more-efficient information technologies.

Resumen del Currículum Vitae:

I am an early-career researcher with experience in the fields of physics, materials science and chemistry. In particular, I am interested in quantum materials and in the delicate symbiosis between crystal growth and strongly correlated phases as magnetism or superconductivity, ranging from bulk to the low-dimensional limit (2D materials).

My KEY SCIENTIFIC ACHIEVEMENTS are:

- ▣ Molecule-based two-dimensional magnets: First isolation and characterization of molecule-based 2D magnets via mechanical exfoliation (equally contributed first author in Nat. Chem. 10, 1001, 2018; J. Am. Chem. Soc. 143, 18502, 2021).
- ▣ Molecular straintronics: Fabrication of smart strain-switchable van der Waals heterostructures by incorporating the spin-crossover phenomena with 2D inorganic materials, opening avenues for molecular straintronics (corresponding author in Adv. Mat. 34, 11, 2110027, 2022).
- ▣ Twisted 2D magnets: first demonstration of artificial magnets with hysteresis through 90° twisting of two ferromagnetic monolayers, contributing to CrSBr-based 2D spintronics and magnonics (corresponding author in Nature Mat. 23, 212, 2024; Adv. Mat. 2025, doi:10.1002/adma.202415774; Adv. Mat. 34, 13, 2204940, 2022; Adv. Mat. 35, 2307195, 2023; Small Science 4, 2400244, 2024).

A strong aspect in my research is BUILDING NOVEL LABS as:

- ▣ Crystal growth: setting a new synthesis lab for growing crystals of inorganic layered materials in the group of prof. E. Coronado (Univ. of Valencia, Spain).
- ▣ 2D materials: setting a new laboratory for the manipulation of 2D materials under inert atmosphere conditions, their deterministic assembly forming van der Waals heterostructures and ulterior fabrication of nanodevices for their magneto-transport characterization in the group of prof. E. Coronado (University of Valencia, Spain).
- ▣ Diamond magnetometry: construction of a single-spin scanning microscope based on diamond magnetometry and successfully imaging of spin waves in the group of prof. T. van der Sar (TUDelft, Netherlands).



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Turno General

I have DELIVERED TALKS at 55 conferences/workshops, including 1 plenary talk, 13 invited talks, 35 oral communications and 6 posters. I have TEACHING EXPERIENCE (6 ECTS credits/year; period: 2016-2021) and I have SUPERVISED UNDERGRADUATE (4), MASTER (3) AND GRADUATE STUDENTS (1).

I have received AWARDS AND HONORS as the 2023 Young Scientist Award by the European Magnetism Association or attending the 73rd Lindau Nobel Laureate Meeting, Physics, 2024, among others. As well, I have participated in SERVICE & ACTIVITIES like the governing board member of the Condensed Matter Division and the Valencian Local Section of the RSEF (2018 - 2022), organization of workshops (Young Minds Symposium in the CMD2020GEFES meeting or the 2025 Young Research Leaders Group Workshop within the SPICE-Spin+X Seminars) or being a journal reviewer for 25 journals as Advanced Materials, Physical Review Letters, Physical Review X, Physical Review B or npj 2D Materials and Applications, among others (115 verified reviews, source: ORCID).

Overall, my PUBLICATION TRACK RECORD is:

☑ Co-author of 61 peer-reviewed publications (+7 under consideration), including journals as Nature Materials, Advanced Materials or Nature Chemistry.

☑ First/co-first author: 5; Corresponding author: 10.

☑ H-index: 26 (Google Scholar)/ 24 (Scopus).

☑ Citations: 2203 (Google Scholar)/ 1678 (Scopus).



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Turno General

Área Temática: Ciencias físicas
Nombre: DE LA TORRE LUQUE, PEDRO JOSE
Referencia: RYC2024-048445-I
Correo Electrónico: pedroj.luque@hotmail.com
Título: The quest for new physics through astrophysical observations

Resumen de la Memoria:

My work primarily focuses on theoretical astroparticle physics, with a special emphasis on modelling particle production and their propagation in various astrophysical media, as well as the search for signatures of particles Beyond the Standard Model using astrophysical observations. My research interests aim to address unanswered questions in astrophysics, particle physics, and cosmology, utilizing a diverse range of observables, from astrochemical tracers (e.g., ionization lines) to the direct detection of astroparticles.

My work has been mainly dedicated to

1) The study and modeling of astroparticle diffuse emissions

I am expert in the physics and phenomenology of the propagation of cosmic rays. This allows me to produce accurate models for the diffuse neutrino and gamma-ray background. I have worked on the modelling of these emissions under different scenarios, from sub-GeV energies to the PeV. In addition, I am specialized on the modelling of inhomogeneous diffusion, which made me able to work directly on novel phenomena, such as TeV halos.

In addition, given the relevance of the potential measurements of cosmic-ray antinuclei by the AMS-02 collaboration, I have been working on estimations of the predicted rate of antinuclei production from astrophysical and "exotic" mechanisms, leading to 3 papers in the topic.

2) Search for exotic physics

Given my expertise on the modeling of diffuse emissions, I am in a very good position to conduct searches for anomalies in the fluxes of different astroparticles. Therefore, I have worked on a number of WIMP dark matter searches using antiprotons, positrons and antinuclei, as well as gamma rays.

More recently, I got interested on one of the most long-standing anomalies in astrophysics: the 511 keV line. I am actively working on explanations of this anomaly, and especially related to sub-GeV dark matter. In the last 2 years I have published 4 papers about their connection.

On top of this, In the last years I have demonstrated the potential of the hard X-ray to the soft gamma-ray band to constrain the existence of exotic positron sources (such as MeV dark matter or primordial black holes). However, I showed that these observations are also able to strongly probe the existence of a broad family of Feebly Interactive Particles which are produced in supernovae, FIPs (such as axion-like particles, dark photons, sterile neutrinos, etc.). In fact, for the first time in the context of FIPs, we used X-ray measurements to obtain the strongest bounds on MeV FIPs produced by Galactic supernovae. This demonstrates that astrophysical observations are able to directly probe particle physics models even not depending on the assumption that they are related to dark matter.

Resumen del Currículum Vitae:

At present I enjoy a Juan de la Cierva fellowship at the Institute of Theoretical physics and my resumé features around 49 scientific articles (25 as first or corresponding author), with about 62 citations per year and an h-index of 19. I have participated in more than 40 conferences in the last for years and visited more than 10 institutions all around the world to give seminars on my work. Out of my last 10 oral contributions, 7 were invited seminars or talks. For 2025, I have already accepted my participation in 4 conferences as an invited speaker, and I have been invited to be instructor in the prestigious GGI school in 2025. Furthermore, I am a coordinator of the "indirect detection: gammas and cosmic rays" group in the Multidark network. In addition, I have been referee in journals like PRL, PRD, ApJ or Qeios. I am an active member of the FLUKA and Fermi-LAT collaboration and cooperate with the ANTARES and Km3Net collaborations as an external collaborator.

During my PhD in Bari (2018-2021), my work focused on the physics of Galactic CRs and gamma rays; their propagation and production. My thesis, titled Cosmic-ray propagation and production of secondary particles in the Galaxy, acquired the Cum Laude title with highest distinction (less than 1/3 of the applicants did) in addition to the of Doctor Europaeus title. During my early career, I specialized in numerical calculations to solve CR transport equations to such an extent that today I am one of the main developers of the DRAGON code, one of the main codes used in the CR community. Furthermore, my public software contributions and models have become the reference in collaborations such as CTAO, HAWC or ANTARES. Then, I obtained a postdoc position at the Oskar Klein Centre (Stockholm University 2021-2023), where I have mostly worked in dark matter searches, including antinuclei, line searches, gamma-rays at the Galactic centre, etc. In the last couple of years, I have specialized on the modelling of gamma-ray signals in the MeV range too.

On top of that, at the outreach level, I am co-founder of an association for the dissemination of science (AMDIC) since 2020, organizing and promoting scientific culture at national level (see amdicmontilla.com) such as a workshop of scientific drawing, astronomical routes or competitions of scientific photography. I have also participated and help in the organization of several of the editions of the European Night of the Researchers, Pint of Science and the Cosmic Ray Day, held in Bari from 2018 to 2020.



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Turno General

Área Temática: Ciencias matemáticas
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Título: Submanifolds and curvature from a symmetry viewpoint
Resumen de la Memoria:

My research revolves around the study of Riemannian geometry in the presence of symmetry. In particular, I have derived results concerning isometric actions, submanifolds in Riemannian homogeneous spaces with a special focus on symmetric spaces, and positively curved spaces. In my investigation, I usually consider homogeneous spaces meaning that, roughly speaking, they look the same at every point, and also symmetric spaces, which are homogeneous spaces whose group of isometries contains an inversion symmetry at each point. The latter were studied and classified by Cartan in the 1930s and they include some of the most standard spaces in Riemannian geometry.

A cohomogeneity one action on a Riemannian manifold is an isometric action with codimension one orbits. One of my results was the conclusion of the classification problem of cohomogeneity one actions on rank one symmetric spaces (roughly speaking those that look the same in all directions), a problem that traces back to the thirties, when Cartan classified cohomogeneity one actions of real hyperbolic spaces. An isometric action is polar if it admits a submanifold meeting all orbits orthogonally. These are classified in symmetric spaces, but their classification has not been explored in the homogeneous (non-symmetric) setting. In this realm, I obtained a classification of polar actions on real Stiefel manifolds of 2-frames, and of cohomogeneity one actions on arbitrary Stiefel manifolds.

A hypersurface of a Riemannian manifold is isoparametric if it has constant mean curvature and its nearby parallel hypersurfaces too. Some of my results in this topic were the construction of the first example of a non-isoparametric hypersurface with constant principal curvatures, and an uncountable number of new inhomogeneous isoparametric families of hypersurfaces with constant principal curvatures.

A submanifold of a Riemannian manifold is totally geodesic if every geodesic in it is also a geodesic of the ambient space. The problem of classifying totally geodesic submanifolds in symmetric spaces has been an outstanding topic of research in submanifold geometry over the last decades. In the sixties Wolf obtained the classification in rank one. The rank two case was addressed by Chen and Nagano in the late seventies, and revisited later by Klein. My research has yielded results on a topic that did not see progress over the last decades by obtaining the classification of totally geodesic submanifolds in exceptional symmetric spaces, and in products of rank one symmetric spaces. I have also obtained the classification of totally geodesic submanifolds in homogeneous (non-symmetric) spaces including: Hopf-Berger spheres, homogeneous nearly Kähler 6-manifolds, and real Stiefel manifolds of 2-frames.

A key topic in Riemannian geometry is the interaction between curvature and topology. Two of the most important classical curvature notions are sectional curvature and Ricci curvature. Examples of spaces with positive sectional curvature are scarce, which motivates the study of weaker notions. Positive k -th intermediate Ricci curvature ($\text{Ric}_k > 0$) on a Riemannian n -manifold is a condition that interpolates between positive sectional curvature ($k=1$) and positive Ricci curvature ($k=n-1$). In this context, I have produced the first examples of spaces admitting (strict) $\text{Ric}_2 > 0$ metrics in dimensions 10 to 14.

Resumen del Currículum Vitae:

I completed a B.Sc. (2017) and a M.Sc. (2018) in Mathematics at the University of Santiago de Compostela, obtaining my Ph.D. in Differential Geometry in 2022 under the advisorship of José Carlos Díaz-Ramos and Miguel Domínguez-Vázquez. My thesis "Homogeneous hypersurfaces and totally geodesic submanifolds" received the RSME-BBVA Vicent Caselles Prize and the university's Extraordinary Ph.D. Award.

I have held a postdoctoral position at KU Leuven (KUL), first as a Methusalem postdoctoral fellow and later as an FWO postdoctoral fellow. In 2024, I was awarded an Oberwolfach Leibniz Fellowship to visit the Mathematisches Forschungsinstitut Oberwolfach for four weeks.

Since August 2024, I have suspended my FWO postdoctoral fellowship to take a 2-year Marie Skłodowska-Curie Postdoctoral Fellowship at Université Libre de Bruxelles (ULB), with a good bench fee. Recently, Prof. Kollross and I were granted a Research in Pairs stay at CIRM, Trento (Italy) for March 2025.

Some of the results of my research have been published or accepted for publication in journals such as: J. Eur. Math. Soc., J. Reine Angew. Math., Adv. in Math., or Ann. Scuola Norm. Sup. Pisa Cl. Sci.

I stayed for several months visiting some of the most renowned experts in my field: Prof. Berndt at King's College London (United Kingdom), Prof. Kollross at University of Stuttgart (Germany), Prof. Olmos at Universidad Nacional de Córdoba (Argentina), and Prof. Lotay at University of Oxford (United Kingdom).

I have presented my research at around 40 conferences, seminars, or lecture series, consistently as invited speaker, in countries such as Argentina, Belgium, Brazil, Czech Republic, Germany, Poland, Spain, Turkey, United Kingdom, and United States.

I have supervised/co-supervised 8 B.Sc. theses, 2 M.Sc. theses, and currently co-supervise 1 M.Sc. and 2 Ph.D. students. I have taught 270 hours across all university levels, including a M.Sc. course in Differential Topology and a Ph.D. course on compact Lie groups at KU Leuven, as well as an advanced course on one of my research topics at a summer school in Turkey.



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I have served as a referee for various journals including Bull. London Math. Soc., J. Geom. Anal., and Diff. Geom. App. (3x). I have reviewed 7 articles for Mathematical Reviews and Zentralblatt MATH. I participated in 3 M.Sc. thesis committees at KU Leuven, and co-organized the Ph.D. seminar at the University of Santiago de Compostela (2020-2022).

Additionally, I organized a reading group (King's College London and Universidade de Santiago de Compostela) about semisimple Lie algebras, a graduate course on mean curvature flow at KU Leuven, and co-organized several sessions and conferences. Moreover, I am member of the Committee on International Relations of the Royal Spanish Mathematical Society (RSME).

Concerning outreach activities, in 2021, I appeared on La Aventura del Saber (La 2, Spanish public TV) with the short video "¿Por qué las pompas de jabón son redondas?". I have also contributed to scientific outreach at the high school Terra do Xallas (Galicia), creating videos like "Os sólidos platónicos" (2022) and "A desigualdade isoperimétrica" (2024). From 2020 to 2021, I co-organized the 1-day conference "Matemáticas: habelas hainas" at Universidade de Santiago de Compostela, promoting the dissemination of mathematics.



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Turno General

Área Temática: Ciencias matemáticas
Nombre: QUINLAN GALLEGO, EAMON
Referencia: RYC2024-049057-I
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Título: B-functions in positive characteristic

Resumen de la Memoria:

My work is in commutative algebra and algebraic geometry. More precisely, I aim to understand singularities of algebraic varieties by using methods from the theory of D-modules and the Frobenius endomorphism in positive characteristic, with a particular interest in problems for which these two techniques intersect. In particular, a long term goal of mine has been the development of a theory of the b-function in positive characteristic. I am also involved in other projects; for example, with a group of coauthors we are trying to understand derived differential operators. Both of these projects are described in detail in my "memoria de la trayectoria investigadora".

Resumen del Currículum Vitae:

My career has been fairly international: I was an undergraduate student at the University of Glasgow, in Scotland, where I also did a one year exchange at the National University of Singapore. I then did most of my graduate studies at the University of Michigan (US), but I also spent three of those semesters as a visiting student at the University of Tokyo (Japan). Since 2021, I have been a postdoc at the University of Utah, in the US.

I have often led and obtained funding for various research projects. The most significant would be the Mathematical Sciences Postdoctoral Research Fellowship, which I obtained in 2022 and for which I am the sole Principal Investigator, and which provides funding for three years of work at half the teaching load.

With my coauthors on the project on derived differential operators, we have obtained funding in two different rounds of applications: during the summer of 2024, we were awarded the Summer Collaborators Program from the Institute for Advanced Study, which paid for our flights and a two week stay in Princeton. In January of 2025, we obtained the Collaborate@ICERM program from ICERM, which likewise will pay for our flights to Providence and a one week stay. As a graduate student I also obtained a scholarship from the Ito Foundation for International Education Exchange, which paid for my flights to Japan and 14 months of salary while there.

I have also been given the opportunity to supervise the senior theses of two undergraduate students from Universitat Politècnica de Catalunya, which came to Utah to work with me for two semesters. One of them (Abel Doñate Muñoz) is currently in progress; the one that finished (Pedro López Sancha) graduated in 2023, and his thesis was awarded the Emmy Noether prize from the Societat Catalana de Matemàtiques.

Throughout my career, I have presented my results at various seminars and institutions; to date I have given about 20 research talks in five countries (Germany, Japan, Mexico, Spain, and USA). Similarly, I have been involved in three research schools for graduate students: Methods in Mixed Characteristic Geometry in Mainz, Germany, as a teaching assistant; the RGAS School on Singularities in Seville, Spain, as a lecturer; and PRAGMATIC in Catania, Italy, as a teaching assistant. I have also been involved in outreach activities for high school students: I have been director of the Summer High School Program at the University of Utah, and a teaching assistant at the Michigan Math and Science Scholars program.



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Turno General

Área Temática: Ciencias matemáticas
Nombre: OLIVIERI, MARCO
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Título: Derivation of effective Macroscopic Theories from the Microscopic Models of Quantum Mechanics and QFT
Resumen de la Memoria:

Many Body Quantum Problems [MB]: In condensed matter physics, it is of key importance the study of energetic properties of the many body Hamiltonian generating the dynamics of N bosons interacting through a pairwise potential v . The energy density in the thermodynamic limit allows the extraction of information about the macroscopic features of the system. I calculated this quantity for a Bose gas in 2D and aim at calculating it for other configurations of the system. For repulsive v , I will calculate the third-order expansion of the energy density in the dilute regime (small density of the gas). The analysis will also be carried out for the calculation of the energy in the case of two different types of bosons. For potentials with non-zero negative part, I will give first rigorous contributions for the challenging problem of the crystallization, i.e., the mathematical justification to the formation of molecules. I will try to identify conditions for the absence of bound states and obtain a similar expansion of the energy density taking into account the terms coming from the energy of bound states.

Semiclassical limits [SCL]: Quantum systems composed by particles interacting with a radiation have been widely studied by the scientific community by extracting effective models of Schroedinger operators from models of Quantum Field Theory (QFT). This approximation, where the quantum fluctuations

of the field are neglected, is rigorously justified by the use of Semi-Classical limits. During my PhD, I calculated the Quasi-Classical limit of the energy and dynamics of QFT models, deriving effective Schroedinger operators as effective models. In this part of the project I aim at using Semi-Classical analysis to study with a novel approach the famous singularities in QFT models: the infrared singularities (generated by too many low energy excitations of the field) and ultraviolet singularities (generated by too highly energetic excitations).

Quantum Electrodynamics [QED]: Conductor interfaces interact through van der Waals forces due to the formation of instantaneous dipoles created by misplacement of charge densities. The van der Waals forces have universal decaying behaviors with respect to the distances between the interacting interfaces. Casimir and Polder, in 1947, discovered however that, considering the quantum fluctuations of the radiation the interaction is weakened and the decay faster. The rigorous proof of the Casimir-Polder effect (CP) is still lacking. I contributed to this line of research with one of the few rigorous results existing in literature, proving the CP effect for a simplified Pauli-Fierz model, with zero and one photons interactions. Aim of this part of the project is to investigate the CP effect for paradigmatic examples of interfaces, like two atoms or an atom interacting with a conductor wall, and derive the retarded potentials decays with rigorous perturbation theory and renormalization techniques. Long term goal is the generalization of these calculations to non-trivial geometry interfaces.

Resumen del Currículum Vitae:

My name is Marco Olivieri, and I am presently a MSCA Postdoc researcher (Marie Curie fellowship) working with prof. J. P. Solovej and prof. S. Fournais in the QMATH group at the University of Copenhagen.

My previous academic experience consists of one year as a Postdoc researcher at Aarhus University working in the group of prof. S. Fournais, two years as a Postdoc researcher in Karlsruhe Institute of Technology (KIT) in the working group of prof. D. Hundertmark and three years of PhD in Rome.

I obtained my PhD in January 2020 at Sapienza, University of Rome with a thesis with the title "Quasi-Classical Dynamics of Quantum Particles interacting with Radiation", under the supervision of M. Correggi and M. Falconi. I obtained both my Master and Bachelor degrees in Mathematics with maximum grades cum laude at Sapienza, University of Rome, in July 2016 and July 2014, respectively. Since then, I have been working in Mathematical Physics and participated in several workshops and conferences.

During my PhD, I have investigated both dynamical and stationary features of microscopic systems of quantum particles interacting with radiation fields and studied the derivation of effective models in the quasi-classical limit, namely a classical limit only on the field subsystem. The most important results have been collected in the paper "Quasi-Classical Dynamics" in collaboration with M. Correggi and M. Falconi, published in the Journal of European Mathematical Society.

During my first Postdoc period in Karlsruhe, I worked on the proof of the Casimir-Polder effect in the quantum fields interacting with matter and the results were collected in one paper giving the first rigorous proof of the effect for an approximate Pauli-Fierz model. Furthermore, I continued the collaborations with M. Falconi and Z. Ammari in a project about the Semiclassical analysis of quantum asymptotic fields in the Yukawa theory.

During my Postdoc period in Aarhus, I have been part of the working group composed by T. Girardot, L. Morin and L. Junge. I worked for the DFF Research Project "Mathematics of the Bose gas" granted to S. Fournais and, as the most relevant result, we derived the second order expansion for the energy of the dilute Bose gases in thermodynamical regime in 2D.

In the ongoing project "Universal Description of the Bose Gases" (UniBoGas) for the Marie Curie fellowship in Copenhagen, together with my collaborators, I derived an expansion for the free energy and the expression of the low energy spectrum of the Bose gases in thermodynamical regime in 3D at positive temperature.

I disseminated the results of my work in more than 25 seminars in international conferences and by informal discussions with colleagues.

Over the years, my research has positioned me as an experienced scientist with a broad international network build by collaborations and participation in conferences.



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Turno General

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Título: Bayesian modelling of complex data structures via random partitions

Resumen de la Memoria:

Modelling complex data structures can be efficiently addressed using flexible Bayesian semi- and non-parametric approaches. These methodologies aim to jointly model diverse data types, handle data heterogeneity, and provide interpretable results through partition structures. This research will develop two main lines of investigation: (a) Bayesian modelling of multiple categorical variables using staged trees and (b) Bayesian methods for modelling grouped data. Both areas use random partition models, borrowing from the Bayesian nonparametrics literature, though they tackle distinct problems.

(a) Bayesian Modelling of Multiple Categorical Variables via Staged Trees

Probabilistic graphical models, particularly directed acyclic graphs (DAGs), are commonly used to represent causal dependencies among categorical variables. However, DAGs struggle to capture asymmetry and context-specific dependencies, which are essential for understanding complex systems. Staged trees offer a more flexible alternative by modelling these dependencies. Recent advancements include efficient algorithms for constructing staged trees and accessible software.

This research proposes a fully Bayesian approach to estimate causal effects alongside staged tree models, integrating structure learning and causal inference. By accounting for uncertainty in both the staged tree structure and model parameters, this approach avoids the post-selection inference issues common in traditional methods. The model incorporates a prior distribution over staged tree structures, where the node colouring follows a Product Partition Model with covariates. This prior is designed to favour parsimonious models with interpretable dependence patterns.

Three key aspects of this Bayesian approach will be explored: (a.1) dependent colouring of the nodes; (a.2) staged trees with random variable ordering; (a.3) joint modelling of staged trees with continuous responses

This line of research represents a new area for Dr Cremaschi, who has recently begun exploring it through collaborations. The use of staged tree models has the potential to address the challenges of modelling multivariate categorical covariates, offering flexible, model-based solutions to enhance understanding in this domain.

(b) Bayesian Analysis of Grouped Data in Complex Settings

This research stream focuses on the analysis of data with an inherent group structure, such as experimental conditions, sub-populations, or risk groups. Ignoring this grouping structure can lead to biased results and incorrect conclusions. Many existing methods for analysing grouped data have their advantages and limitations. The aim of this research is to develop novel Bayesian tools to improve upon popular approaches.

Key areas of research within this stream include: (b.1) Bayesian nonparametric hierarchical mixtures; (b.2) physics-driven model-based clustering; (b.3) Gaussian graphical models for grouped data.

This line of research is expected to benefit from interdisciplinary collaborations and offer high-level research output across multiple fields. Although distinct from Dr Cremaschi's previous work, which focused on specific applications, these methodologies have broad applicability to complex study settings and are driven by a strong methodological focus.

Resumen del Currículum Vitae:

Dr Cremaschi's academic career is marked by interdisciplinarity and international mobility, producing high-quality research in both methodological and applied aspects of Statistics, with a particular focus on Bayesian Statistics. His diverse work experiences have shaped a multi-faceted researcher profile, enabling him to tackle modern statistical problems across various domains.

Dr Cremaschi completed his BSc and MSc in Mathematical Engineering at Politecnico di Milano, where he developed a strong interest in Statistical research, supported by a solid foundation in applied Mathematics. In 2012, he defended his thesis on model-based clustering using Bayesian mixture models, resulting in his first peer-reviewed publication.

In 2017, he earned a PhD in Statistics from the University of Kent, UK. His dissertation focused on modelling discrete-valued high-frequency trading data, which involved expertise in Bayesian Statistics, MCMC algorithms, and programming in C/C++, R, and Matlab. During his PhD, Dr Cremaschi initiated interdisciplinary collaborations, taught the foundation-year Statistics module, and played a key role in organizing scientific activities, including seminars and speaker invitations.

From 2016 to 2019, Dr Cremaschi held a postdoctoral position at the Oslo Centre for Biostatistics and Epidemiology and the Institute for Cancer Research (Norway), working on modelling drug combination therapies for haematological cancers. Collaborating with Immunology, Molecular Biology, and Biochemistry teams, he addressed interdisciplinary challenges and communicated complex research. This period deepened his interest in Biostatistics and resulted in high-quality publications in journals such as JASA and Bayesian Analysis.

Between 2019 and 2024, Dr Cremaschi worked in Singapore as a postdoc at YaleNUS and A*STAR, later becoming a Research Scientist at A*STAR. His work focused on child and maternal health, using advanced Bayesian models to analyse large longitudinal cohorts. His research aimed to identify modifiable risk factors for early intervention in translational Neuroscience, metabolomics, and child development. In 2021, he received the Emerging PI Award, recognising his aptitude for independent clinical/translational research. In 2024, he was awarded the Human Potential Programme FY23



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Prenatal/Early Childhood Grant, focusing on the relationship between maternal mental health and child behaviour. He also received the Ayuda Beatriz Galindo 2023, though these two grants could not be transferred to his current role as Assistant Professor at IE University, Madrid.

Dr Cremaschi has authored 23 journal papers, with 19 in the first quartile and 7 as first author. He regularly presents at congresses of the International Society for Bayesian Analysis (ISBA) and ERCIM, with 15 talks since 2014, including 5 invited ones. He has organized multiple sessions on Bayesian semi- and non-parametrics at CMStatistics and EcoSta. From 2024/2025, he serves as Associate Editor for Statistics and Computing and as Secretary of the Bayesian Nonparametric Section of ISBA.

Dr Cremaschi has also mentored several students, co-supervising two undergraduate theses at YaleNUS, one master's thesis at the University of Oslo, and a PhD thesis for a visiting student from the University of Klagenfurt.



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Turno General

Área Temática: Ciencias matemáticas
Nombre: ETAYO RODRÍGUEZ, MARÍA DE UJUÉ
Referencia: RYC2024-049105-I
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Título: Discretizar espacios mediante minimización de energías

Resumen de la Memoria:

Mi línea de investigación se centra en el problema de cómo colocar cierta cantidad de puntos de forma equidistribuida en un espacio dado. Cuatro ingredientes aquí son importantes:

1. ¿Qué cantidad de puntos? Normalmente estudio sucesiones de conjuntos de puntos donde el número de puntos tiende a infinito, así que me centro en el estudio asintótico del problema, con sus técnicas correspondientes.
2. ¿A qué nos referimos con equidistribución? Trabajo con distintas definiciones que pertenecen a distintas ramas de las matemáticas. Por un lado, busco configuraciones de puntos que minimicen un cierto potencial (teoría del potencial); por otro, puntos que minimicen una discrepancia dada (geométrica combinatoria); y por otro, puntos que actúen como buenos nodos de interpolación (análisis numérico).
3. ¿En qué espacios trabajo? Trabajo en espacios que tienen una rica estructura que permita operar con ellos: Variedades riemannianas, variedades algebraicas, espacios homogéneos o 2-homonogéneos.
4. ¿Cuál es la naturaleza de los puntos? He trabajado tanto con sucesiones de conjuntos de puntos deterministas como aleatorios, en particular, con procesos de puntos determinantes.

Para los hitos concretos de mi trayectoria, remito al apartado de CV. Son buenos medidores de la calidad de mi investigación mi publicación en el Journal of the AMS (primer decil del ranking JCR), o los premios Vicent Caselles, Rubio de Francia y Juan María París que he recibido. Mi trabajo se caracteriza por su originalidad, ya que constantemente utilizo herramientas de ciertas áreas de las matemáticas para resolver problemas en otras áreas distintas. Cabe destacar cómo (junto con los profesores C. Beltrán, J. Marzo y J. Ortega-Cerdà) resolví un problema de condicionamiento de polinomios (cálculo numérico) utilizando herramientas de teoría del potencial o cómo en solitario he utilizado estas dos herramientas para demostrar de una nueva desigualdad en teoría de números (desigualdad de tipo Bombieri).

He colaborado con diferentes matemáticos en las distintas universidades donde ha trabajado (CUNEF, U. Cantabria, U. Barcelona, U. Brown y T. U. Graz) y en las 11 estancias de investigación que he realizado en universidades de reconocido prestigio (Barcelona, Cantabria, Navarra, KTH de Stockholm, KU Leuven, Vienna, Graz, Michigan e Icmr de Brown). Testimonio de mi independencia científica son mis dos trabajos en solitario "Spherical cap discrepancy of the Diamond ensemble" y "A sharp Bombieri inequality, logarithmic energy and well conditioned polynomials". He participado en 6 proyectos competitivos con fondos europeos y nacionales y actualmente dirijo como I.P. mi propio proyecto de la FBBVA.

Mis resultados tienen aplicaciones prácticas en la investigación con células cancerígenas, como ha publicado un grupo de investigación de la U. de Cantabria y el I. C. de Londres. Muchos autores estudian mis métodos. Por ejemplo, el artículo "Spherical cap discrepancy of the Diamond ensemble" ha sido el precursor de una serie de artículos que intentan dar una mejor constante para la cota de la discrepancia esférica. De igual forma, el artículo "Asymptotically optimal designs on compact algebraic manifolds" ha sido el precedente para que otros matemáticos pudieran ampliar las cotas obtenidas para fórmulas de cuadratura a variedades no algebraicas.

Resumen del Currículum Vitae:

Me doctoré en la U. de Cantabria en el año 2019 con una tesis titulada "El problema de la distribución de puntos en la esfera" realizada bajo la dirección del profesor C. Beltrán. Los resultados presentados en dicha tesis dieron lugar a 4 publicaciones en revistas de reconocido prestigio internacional. Durante la realización de mi tesis realicé dos estancias de larga duración; una de ellas en la U. de Barcelona, invitada por los profesores J. Ortega-Cerdà y J. Marzo y otra en el instituto ICERM de la U. de Brown (USA) invitada por el profesor E. Saff. Ambas estancias dieron lugar a publicaciones y a relaciones matemáticas que se extienden hasta el día de hoy. Además, he sido galardonada por dicha tesis con el premio Vicent Caselles de la RSME y la FBBVA y con el premio Juan María Parés del Consejo Social de la U. de Cantabria. Fui la ganadora en la categoría de ciencias, convirtiéndome en la segunda matemática en ganar este premio que tiene en cuenta las aplicaciones de los resultados de la tesis así como el alto nivel de la misma.

Tras doctorarme, firmé un contrato postdoctoral en la TU Graz, bajo el marco de un proyecto de la FWF incorporándome así al instituto de teoría de números. Dicho contrato, de un año de duración fue luego prolongado otro año más y lo dejé para incorporarme a una plaza de profesora ayudante doctora en la U. de Cantabria. Durante mi periodo en Graz trabajé con diversos equipos internacionales, participé en muchas conferencias y congresos como ponente invitada y publiqué tres artículos que, a día de hoy, considero mis mayores logros académicos. Por un lado, junto con los profesores C. Beltrán, J. Marzo y J. Ortega-Cerdà resolví un problema planteado por Shub y Smale en 1993 sobre el número de condición de polinomios. Por otro lado, elaboré dos artículos en solitario, uno de ellos proponiendo una nueva desigualdad en teoría de números. Por mis logros en investigación, mencionando especialmente estos dos artículos, recibí el premio Rubio de Francia otorgado por la RSME junto con la FBBVA en su edición de 2021. Además de mis labores de investigación, impartí docencia, en particular un curso de doctorado de 6 créditos ECTS.

En el año 2020 gané una plaza de profesora ayudante doctora en la U. de Cantabria y me incorporé a dicha institución en febrero de 2021. En cuanto me incorporé, comencé a dirigir una tesis doctoral a P. R. López-Gómez. He impartido muchas horas de docencia y he publicado dos artículos de investigación. La elevada cantidad de docencia junto con el hecho de que he debido guardar 9 meses de baja durante el periodo 2022-2024 por causas médicas han hecho que mi participación en congresos haya sido menor durante este periodo. Sin embargo, sí que he participado como conferenciante plenaria en 4 congresos; todos ellos de reconocido prestigio.



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Turno General

En septiembre de 2024 me incorporé a CUNEF universidad con un puesto de Tenure Track. Desde mi incorporación he finalizado un artículo que está en proceso de publicación pero ya puede encontrarse en la plataforma arXiv.

Como resultado de mi trabajo de investigación, he publicado 11 artículos en revistas de gran prestigio matemático, indexadas mayoritariamente en el primer y segundo cuartil del JCR y tengo otro artículo esperando a ser publicado. He impartido 56 conferencias y seminarios en más de 10 países distintos, en todas las ocasiones ha sido invitada.



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Turno General

Área Temática: Ciencias matemáticas
Nombre: EGGL, MAXIMILIAN
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Título: FAST DW-MRI: Fitting Advanced Simulation Techniques for diffusion-weighted MRI
Resumen de la Memoria:

My background provides the perfect base to establish new research lines that apply advanced mathematical techniques from optimal control and dynamical systems theory to analyze neuroimaging data, expertise that are currently lacking at the primarily experimental institute of neuroscience, Alicante.

More concretely, my main project (FAST DW-MRI) aims to revolutionize the analysis and processing of diffusion-weighted MRI (dw-MRI) data, a crucial non-invasive tool for obtaining detailed information about brain anatomy and function. By analyzing the random diffusion of water molecules in brain tissue, dw-MRI offers quantitative maps of relevant brain features, such as microstructural integrity. However, often when using dw-MRI in the clinical or research setting, noisy measurements can lead to accuracy problems, meaning that often long or repeated scans are required to boost signal-to-noise ratios. This oversampling prolongs acquisition times, making many models impractical in clinical settings, and prevents multi-modal imaging, since additional MRI sequences become too time-consuming to acquire. Consequently, even relatively simpler protocols are underutilized in routine practice, and more advanced methods struggle to leave the laboratory.

To overcome these challenges, the FAST DW-MRI proposes developing a novel deep-learning-based fitting routine that drastically reduces the need for extensive sampling. The key strategy involves implementing a Simulation-Based Inference approach, specifically using Neural Posterior Estimation (NPE). This method leverages deep neural networks to robustly estimate diffusion parameters from reduced or noisy measurements while maintaining accuracy and significantly shortening scan times.

The research will focus on optimizing dw-MRI model fitting through two main innovations. First, a recurrent neural network-based preprocessing layer will be developed to compress arbitrarily ordered acquisition signals for efficient analysis with NPE. This innovation will allow the technique to generalize across different scanning protocols and conditions without extensive retraining, making the approach highly adaptable. Second, a generative adversarial network-based upsampling technique will be explored to enhance undersampled signals. By increasing the dimensionality of suboptimal or legacy data, this method enables the recovery and reanalysis of previously unusable scans.

Building on my preliminary work that successfully applied machine learning to reduce dw-MRI acquisition times, the project will extend these methods to further improve the robustness and efficiency of dw-MRI analysis. By translating theoretical knowledge from signal processing and fluid mechanics into practical computational tools, FAST DW-MRI seeks to enable rapid application of both simple models like DTI and more advanced models that can provide significantly more informative biomarkers.

The anticipated impact of this work is substantial. By drastically reducing scan times and improving parameter estimation under low-noise conditions, the project will make advanced dw-MRI techniques more accessible in clinical settings. This will facilitate early diagnosis and better monitoring of neurological conditions, expanding the reach of these technologies to a broader patient population and enhancing capabilities of both research and clinical neuroimaging.

Resumen del Currículum Vitae:

I am an applied mathematician with a passion for interdisciplinary projects, the application of mathematical rigor to industrial, engineering and biological processes as well as the teaching of mathematical research.

My academic journey began with a BSc (1st Class) and MSc (with distinction) in applied mathematics at Imperial College, London. Awarded the Roth Scholarship, I next completed a PhD under Prof. Schmid, focusing on optimizing fluid mixing using gradient-based methods. My work led to multiple Q1 journal publications, international conference presentations, and recognition such as a Lighthill-Thwaites Prize nomination. I also started my mentoring path by being awarded the Faculty of Natural Sciences Prize for Excellence in Teaching and Learning.

After defending my PhD in 2019, I joined Princeton University under Prof. Rowley and Fields Medalist Prof. Fefferman in the department of mechanical engineering. Here I leveraged my optimal control knowledge and computational techniques to study "on-the-fly control", i.e., controlling a system without any a-priori knowledge of its dynamics. Thus, we introduced a novel set of control strategies which we called "agnostic control". This resulted in three Q1 publications and an invitation to present at an international conference. Additionally, I expanded my leadership in mentoring students by securing a lectureship at Princeton, teaching a postgraduate course on Optimal Control and Estimation.

Next, I moved to Germany to take a position as a PostDoc with Prof. Tchumatchenko at the Max Planck Institute/University of Bonn. My previous academic experience had been focused on optimal control theory/its application, and I wanted to expand my horizon by applying my math skillset to real-world problems. To this end, I was moved to work with Prof. Tchumatchenko in the field of computational neuroscience. By combining theoretical knowledge with the experimental and biological results, I was able to initiate a set of impactful and interdisciplinary projects. Firstly, I studied the mechanistic basis of synaptic plasticity (linked to learning and memory), leading to a set of first-author publications, e.g., Nature Comms., conference presentations, and the Joachim Herz Foundation Add-on Fellowship. Secondly, I initiated a set of projects such as supervising a master's thesis on language formation, resulting in a Nature Comms. paper, and developing the open-source tool SpyDen, now used internationally. I also founded a yearly workshop on Bio-inspired Deep Learning, which attracts international speakers and participants.



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Turno General

Now in my current role as a La Caixa Junior Leader, I am an emerging PI at the Institute of Neuroscience of Alicante. Here, my research has once more moved into a more application-driven direction as I aim to enhance usability and efficacy of magnetic resonance imaging (MRI). Collaborating with my host lab, I have already published a pre-print on reducing MRI acquisition times and presented this result at an international conference.

In summary, I am an interdisciplinary leader with significant publications (5 as first author, 1 as senior author, 6 as corresponding author) from each position I've held, have mentored one PhD and two master's students earned multiple awards/fellowships in the UK, Germany, and Spain, and created a workshop that continues to make a notable impact.



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Turno General

Área Temática:

Ciencias matemáticas

Nombre:

FERNÁNDEZ SÁNCHEZ, ANTONIO J.

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RYC2024-049142-I

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Título:

Nonlinear PDEs arising from physics, geometry and fluids

Resumen de la Memoria:

My research interests lie at the intersection between Partial Differential Equations (PDEs), Fluid Mechanics and Mathematical Physics. With special emphasis on the analysis of elliptic PDEs, during the last years, I have studied the existence and multiplicity of solutions for some semilinear and quasilinear PDEs arising from physics and fluid mechanics.

The main topic of my Ph. D. was the analysis of existence and multiplicity of solutions for classical elliptic problems with critical growth in the gradient. During this period, I learned how to use and combine variational and topological methods to deal with nonlinear elliptic PDEs (see contributions 1 & 2).

One of my main concerns at the end of my Ph. D. was to understand the shape and behavior of the solutions to some PDEs arising from physics and biology. Combining variational methods with several tools from harmonic analysis, I studied some elliptic PDEs arising from physics and biology, such as the nonlinear Schrödinger equation and the biharmonic Schrödinger equation (see contributions 3 & 4).

Beyond the PDE, a crucial fact in this research line is the essence of the phenomenon under study. In the last years, the central line of my career concerns the construction of solutions which satisfy relevant properties from a modeling point of view (see contributions 5 to 9). In particular, the construction of solutions in problems such that limiting values of a parameter lead to concentration phenomena. These, fundamental in the analysis of equations arising from geometry, physics and fluid mechanics, are aimed to analyze the behavior of solutions whose, for instance, mass or velocity, is concentrated at certain points, curves, or particular geometrical structures. Techniques like bifurcation or singular perturbation conform a family of powerful methods which, suited to every particular problem, may allow us to obtain important information on the shape of the solution.

In the next years, I will use bifurcation methods and singular perturbation techniques to construct solutions for several problems arising from fluid mechanics. In particular, I will work on:

- Vortex desingularization problems for incompressible fluids;
- The construction of stationary concentrating 3d-Euler flows;
- The construction of non-radial smooth compactly supported stationary 2d-Euler flows;
- The construction of non-radial smooth solutions for the SQG equations, both uniformly rotating and stationary.

Resumen del Currículum Vitae:

I received my Ph. D. in Sept. 2019 at the Université Polytechnique Hauts-de-France (Valenciennes, France) and the Université de Franche-Comté (Besançon, France), supervised by C. De Coster and L. Jeanjean respectively. From Oct. 2019 to Sept. 2021, I enjoyed a postdoctoral position at the University of Bath (Bath, United Kingdom) supervised by M. del Pino. Finally, from Sept. 2021 to Jan. 2023, I worked at ICMAT (Madrid) as a postdoctoral researcher, under the supervision of A. Enciso. Currently, I am Profesor Ayudante Doctor at the Universidad Autónoma de Madrid (Madrid).

So far, I have co-authored 14 articles, 12 of which are already published or accepted in top journals such as Duke Math. J., J. Math. Pures Appl., J. Funct. Anal., Math. Ann., Ann. Sc. Norm. Super. Pisa Cl. Sci., Calc. Var. Partial Differential Equations, SIAM J. Math. Anal. and J. Differential Equations. Also, I have several works in progress with leading experts on my field and I serve as referee for several top journals such as Calc. Var. Partial Differential Equations, Math. Ann. and Proc. London Math. Soc.

My publications have attracted some attention from the international PDEs community, and I have been invited to give more than 50 talks in different countries. I have been invited speaker at 22 international conferences. Among those, it is worth highlighting that I am invited to the workshop New Synergies in Partial Differential Equations, Banff (Canada), Oct. 19-24, 2025. Also, I have given more than 25 seminars in different universities, some of them of world-class renown such as Cambridge (Cambridge, UK), Sorbonne Paris-Nord (Paris, France) and Sapienza (Rome, Italy). In June 2018, one of my talks was chosen as best talk in mathematics in the XIX Ph. D. School meeting Carnot-Pasteur (Besançon, France).

I have also made several research visits to different universities in Europe and America. Some of these visits led to scientific publications in top journals as the ones referred above.

Since Sept. 2024 I am co-principal investigator (together with M. Medina) of the Proyecto de Generación de conocimiento PID2023-149451NA-I00, funded with 45.000€ by the Ministry of Science, Innovation and Universities.

Concerning the organization of scientific activities, in addition to organizing the visits of several researchers to my university, in Oct. 2023, I co-organized an international two weeks meeting for Young researchers in PDEs at UAM and ICMAT with F. del Teso and M. Medina. Also, together with I. Erneta, S. López-Martínez and C. Torres-Latorre, I organized the special session Elliptic and parabolic PDEs at the Workshop of Young Researchers RSME, Jan. 2025 (Bilbao). Finally, together with M. del Pino and Y. Yao, in May 2025, I will organize the workshop Singularities and asymptotic patterns



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Turno General

in Fluid and evolutionary PDEs at BIRS-IMAG (Granada). On the other hand, I am currently co-organizing, with M. García-Ferrero, the Seminario EDP UAM-ICMAT.

About my teaching experience, I have more than 200 hours of teaching distributed in three different countries (Spain, France, and UK). Also, I have supervised a master thesis (Trabajo fin de máster) and I am currently supervising a bachelor thesis (Trabajo fin de grado).



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Turno General

Área Temática: Ciencias matemáticas
Nombre: HÄNNINEN, TIMO
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Título: Functional analytic perspectives on harmonic analysis

Resumen de la Memoria:

The applicant's leads independent, original research on the fruitful interplay between abstract principles and concrete problems at the interface of harmonic analysis, functional analysis, and operator theory.

The applicant's Ramon y Cajal research program is centred around the following two themes:

(1) Theory and applications of multilinear duality.

The aim is to refine the duality theory for strong-type inequalities, and to develop a parallel theory for weak-type inequalities.

This research line builds upon the applicant's and his collaborators' recent breakthroughs in developing a duality theory for non-oscillatory and oscillatory multilinear inequalities, published in a series of three recent papers (Journal of European Mathematical Society, Analysis & PDE, and Journal of Functional Analysis).

Multilinear perspective together with the method of polynomial partitioning has proved a most fruitful line of attack on fundamental problems in harmonic analysis, such as on the Kakeya problem, on the restriction problem, and on their applications in number theory and PDEs. The duality theory initiated by the applicant and his collaborators is a fundamental advance in multilinear analysis. According to the theory, each inequality within the vast scope of the theory is equivalent to the existence of a corresponding factorization. This equivalence reveals novel approaches to various open problems in harmonic analysis, such as the endpoint multilinear restriction inequality and the linear two-weight inequality for positive integral operators in the difficult range of integrability exponents.

(2) Compactness in harmonic analysis.

The aims include to characterize for which operators compactness and boundedness are equivalent in upper triangular range of exponents (concrete examples hint at a general phenomenon), to understand the testing conditions for compactness in lower triangular range of exponents, and, most important, to establish the principle of compactness via sparse domination.

Sparse domination has proved the most fruitful perspective on the (weighted) boundedness of operators in harmonic analysis. Various (complicated and essential) operators in harmonic analysis can be dominated by (simple) sparse operators by means of bilinear forms. The class of such operators includes Calderón-Zygmund operators, singular Radon transforms, pseudo-differential operators, and variational operators.

Via domination the uniform boundedness of dominating operators immediately implies the boundedness of the dominated operator. In stark contrast, the inheritance of compactness via sparse domination is delicate and a long-standing open problem. Developing the principle of compactness via domination would be a fundamental breakthrough in harmonic analysis: the utility of sparse domination would now be finally extended from boundedness to compactness, with many consequences.

Resumen del Currículum Vitae:

My deepest mathematical contribution thus far is the recent breakthrough in developing a duality theory for non-oscillatory and oscillatory multilinear inequalities in collaboration with Carbery and Valdimarsson. This breakthrough is published in a series of three papers: Journal of European Mathematical Society (2023), Analysis & PDE (2023), and Journal of Functional Analysis (2024).

In addition to the development of the duality theory, I have made substantial contributions to diverse areas in harmonic analysis, functional analysis, and operator theory, such as (1) the dyadic presentation approach to the operator-valued T(1) theorem for singular integral operators with operator-valued kernels (the study of such singular integrals is motivated by the problem of the solvability of quasi-linear parabolic PDEs), jointly with Hytönen, (2) the dual formulation for the Carleson embedding inequality for general sets (assuming the boundedness of the corresponding maximal operator), and (3) the domination of lattice-valued maximal operators by certain simple model operators that depend on the geometry of the lattice (p-convexity), jointly with Loris.

I am leading a research team at the University of Helsinki: the former and the current members of the team are Tuomas Oikari (Postdoc for Aug 2024-Aug 2025), Emiel Loris (Postdoc for Apr 2021-July 2022, currently Assistant Professor at the Delft University of Technology), and Jaakko Sinko (PhD student/Postdoc Sep 2020-Feb 2025), who defended his PhD thesis under my co-supervision in 2 December 2024.

I have worked more than 15 months in international English-speaking research environments outside Finland (at the University of Missouri, USA, and at the University of Edinburgh, UK) and more than 7 years in the international community of analysts in Finland.



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Turno General

Since the completion of my PhD in 2015, I have been carrying out my own research program independently. I have acquired in total more than €1,000,000 of highly competitive external research funding as principal investigator.

I have actively contributed to the community of analysts in Finland, for example, by organizing seminars (organizer of the Harmonic analysis seminar, University of Helsinki, Autumn 2021-Spring 2023) and conferences (e.g. co-organizer of the Special Session in Harmonic Analysis in IWOTA 2023). I am looking forward to contributing to the community of analysts in Spain.

Teaching and supervision are critical for training the next generations of mathematicians. I have actively developed my teaching and supervision expertise and experience (e.g. 23 credits of university-pedagogy staff training in teaching and supervision, and development of teaching methods in the six one-semester courses that I have taught). In addition, I have co-supervised one PhD Student (Jaakko Sinko) and supervised two postdoctoral researchers (Emiel Lorist and Tuomas Oikari).

My 14 accepted or submitted papers demonstrate my strong expertise and versatility. My research would complement and further strengthen the research profile in mathematical analysis in Spain. Having lived in Spain for one year, I speak Spanish fluently and hence my integration to the research community will be fast. As a Ramón y Cajal Fellow, I would be a strong addition to the research, teaching, and supervision in mathematical analysis in the Spanish mathematical community.



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Turno General

Área Temática: Ciencias matemáticas
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Título: Harmonic Analysis, Sampling Theory, and related topics
Resumen de la Memoria:

During my PhD I specialized in Harmonic Analysis, with particular emphasis on weighted Fourier inequalities, a topic that I still consider one of my main areas of research to this day, and in which I made considerable contributions. In my thesis I studied several such problems in the setting of generalized Fourier transforms. In parallel, I also educated myself in the topic of Approximation Theory.

After my PhD, I began a postdoc at Bar-Ilan University (Israel) in 2018, where I worked with E. Liflyand and N. Lev. Together with N. Lev, in the area of Sampling Theory, we solved a long-standing open problem regarding the existence of Riesz bases of exponential functions in centrally symmetric polytopes. This work established myself in the area of Sampling Theory, where I could make another contribution with N. Lev, in the topic of Gabor orthonormal bases, where we, among obtaining other results, solved a conjecture that was open for 20 years.

In parallel, I also developed a project in Approximation Theory together with Elijah Liflyand in Bar-Ilan University. In particular, we developed new methods of approximation through Hausdorff (averaging) operators, which replace the classical convolution operators, and improved the classical rates of approximation in some cases. This experience allowed me to gain more expertise in the topic and incorporate it to my main (parallel) lines of research.

In 2020-21, I briefly held a position as a Teaching Assistant at Universitat Autònoma de Barcelona, where I expanded my expertise into artificial intelligence, supervising two undergraduate theses on statistical methods.

In September 2021, I joined the University of Aveiro (Portugal) as a researcher for my second postdoc. There, I was introduced to the area of Noncommutative Analysis, collaborating with Paula Cerejeiras and Uwe Kähler, as well as other international researchers from Politecnico di Milano close to Aveiro's group, with whom I later established strong collaborative ties. There I also supervised a master thesis on quaternionic Functional Analysis, which increasing my expertise in the topic.

In April 2023, when I joined Universitat Autònoma de Barcelona with a Beatriu de Pinós postdoctoral grant, I carried out a research project that united my previous work in Harmonic Analysis and Sampling and Approximation Theory. An important part of the goals settled for the project were achieved during the grant period.

In September 2023, João Costa, whom I already supervised at the University of Aveiro, began his doctoral studies at Universitat Autònoma de Barcelona under my co-supervision. The investigated topic is, until now, Noncommutative Linear Algebra. In particular, we are studying the eigenvalue problem in Clifford Algebras, which, although being the basis of the more popular Analysis over Clifford Algebras, remained unexplored until now.

It is also worth mentioning that while I developed all the aforementioned research, I also co-authored a book, Single and Multiple Number Series, with E. Liflyand, S. Tikhonov, and M. Zeltser. With almost 500 pages, the book comprehensively develops the theory of number series in one and multiple dimensions (the latter being a topic overlooked in classical books in number series). It has been accepted for publication in the series Encyclopedia of Mathematics and its Applications, and will appear in mid-2025.

Resumen del Currículum Vitae:

I began my career in 2015 when I joined Professor Sergey Tikhonov's research group at the Centre de Recerca Matemàtica (Barcelona). I earned my PhD in March 2018 from the Universitat Autònoma de Barcelona, with a thesis titled "Convergence and Integrability of Fourier Transforms," achieving the highest distinction (Cum Laude). Additionally, the university awarded me the Extraordinary Doctorate Prize for the quality of my thesis. The work of my PhD thesis and its continuation resulted in several articles published between 2016 and 2020, most of them appearing in prestigious, first-quartile journals in the field.

In December 2018 I started my first postdoc at Bar-Ilan University, Israel. There I had the opportunity to broaden my lines of research, including topics of Sampling and Approximation Theory, and I collaborated with Profs. Nir Lev and Elijah Liflyand.

My first postdoc ended in September 2020. Later on, in November of that same year, I joined Universitat Autònoma de Barcelona as a Teaching Assistant for the academic year 2020/21, where I had the opportunity to supervise two bachelor theses for the Statistics degree, in the topic of machine learning applied to real-life problems, an area that I had studied independently in parallel to my research.

In September 2021 I started my second postdoctoral stay. I joined the University of Aveiro as a researcher, where I was introduced to the topic of Noncommutative Analysis. There I had the opportunity to co-supervise a Master thesis in that topic. The student of such a thesis, named João Costa, became my PhD student in September 2023 (in co-supervision with Uwe Kähler, University of Aveiro, and Fabrizio Colombo, Politecnico di Milano).



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In 2023, I joined the Universitat Autònoma de Barcelona with a Beatriu de Pinós postdoctoral grant (including an associated research project for travel expenses of €12,000 over three years). In 2024 I accepted a position as a Lecturer (equivalent to Assistant Professor). Since then, I have been teaching with full responsibility, great motivation, and notable success.

I have published 13 scientific articles (one of them is a book chapter formatted as an article), of which 8 are single-authored by me. Almost all of those publications appeared in journals of the first quartile, and even in very prestigious generalist journals such as the Journal of the European Mathematical Society, Mathematische Annalen, and Advances in Mathematics. Such achievements and the fact that I developed a high degree of independence during my PhD (where I published 5 single-authored articles), brought me the distinction "CIDMA's Young Doctor Award", by the University of Aveiro (2022).

I am also an active member of the mathematical community, performing tasks such as reviewing scientific articles for various journals, acting as assistant editor to the journal Demonstratio Mathematica for one year, and participating in the organization of activities when the opportunity comes. For example, I organized a parallel session at the RSME young researchers' conference (in 2020) that allowed me to get in contact with several young researchers across the world. I also co-organized an online seminar (from 2020 to 2022) entitled "Corona Seminar: Inequalities on Function Spaces of Smooth Functions", motivated by the situation caused by COVID-19 (see <https://coronaseminar.wordpress.com/>).



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Turno General

Área Temática: Ciencias matemáticas
Nombre: TRUJILLO AMEZQUITA, FRANK
Referencia: RYC2024-051282-I
Correo Electrónico: fatrujilloa@gmail.com
Título: Ergodic, dimensional, and rigidity properties in Hamiltonian and Low-dimensional dynamics
Resumen de la Memoria:

I have had good mobility among complementary research centers on dynamical systems, such as IMPA in Brazil and IMJ-PRG in France, where I effectuated my Master's and PhD studies, and the University of Zurich and the Centre de Recerca Matemàtica (CRM), where I have worked as a postdoctoral researcher. My publication record shows my ability to quickly learn and acquire tools from neighboring fields and my interest in collaborating with other researchers.

My research is centered on two distinct yet interconnected areas within dynamical systems: Hamiltonian systems, with a specific focus on Hamiltonians on lattices and convex billiards, and low-dimensional dynamics, encompassing systems related to circle maps and generalized interval exchange transformations.

Hamiltonians serve as a foundational framework for understanding physical phenomena and are a cornerstone of classical mechanics. Circle maps and generalized interval exchange transformations are archetypal examples that illustrate fundamental concepts, behaviors, and phenomena within dynamical systems. Moreover, the latter two offer simplified models that capture essential features of more complex dynamical systems; for example, they appear naturally as Poincaré maps (i.e., first return maps) of locally Hamiltonian flows on compact surfaces and thus are closely related to Hamiltonians in this context.

Resumen del Currículum Vitae:

I have written a total of 14 scientific articles. Out of these, 9 have been already published or accepted in major peer-reviewed journals, such as the Journal of the European Mathematical Society and Advances in Mathematics. The remaining articles have been submitted to major peer-reviewed journals and are being refereed. I have also published a Conference paper in Oberwolfach Reports.

These works cover a wide range of topics, such as KAM theory, circle maps, ergodic theory, and interval exchange transformations, and include two significant breakthroughs:

The first existence result of lower-dimensional invariant tori, with any codimension and associated with a resonant torus, for arbitrary sufficiently small perturbations of near-integrable Hamiltonians and the first result of ergodicity for typical skew products over interval exchange transformations (IETs) with a piecewise constant cocycle. This latter result greatly generalizes the previous ones and provides new versatile methods that could be applied to similar contexts.

Many of my scientific works stem from international collaborations with researchers in Switzerland and Poland. I have effectuated several research visits to institutions in Austria (ISTA, 1 week), France (Université Paris Dauphine, 1 month), Poland (University of Toruń, 2 months) and Switzerland (University of Zurich, 2 weeks), in relation to several ongoing research projects. I have also effectuated a long-term research visit to Sweden (Mittag-Leffler Institute, 3 weeks), in the context of an international research program.

COMMUNICATION OF RESULTS. I have been invited as a speaker to more than 10 international conferences where I have had the opportunity to communicate, share, and discuss my results with researchers from different countries working on dynamical systems and related subjects. I have also shared my results in more than 15 seminar talks.

FUNDING. I have secured funding in competitive research calls, both at a local level (in Switzerland, UZH Postdoc Research Grant) and at the European level (Marie Skłodowska-Curie Actions fellowship).

Scientific responsibilities. I was co-organizer of a weekly research seminar on dynamical systems, joint between the University of Zurich and the ETHZ, in Switzerland, as well as co-organizer of the working groups on dynamical systems at the University of Zurich. I am currently the co-organizer of the School on Interactions between Dynamical Systems and Partial Differential Equations (JISD 2026), at the CRM, Spain.

CONTRIBUTIONS TO SOCIETY. I have participated in several activities of public engagement and outreach including mathematics popularization talks, both at school (Collège Jean Jaurès, Saint Ouen, in France) and university level (Universidad Manuela Beltrán, in Colombia), as well as information and advice panels (ETHZ, in Switzerland). I have also been a tutor in a directed reading program (Pares Ordenados, online) for mathematics undergraduate students in Latin America.

TRAINING AND MENTORING. During my postdoc at the University of Zurich, I co-supervised two master's thesis and co-organized working groups for PhD students and postdocs. A collaboration with one PhD student (Fernando Argentieri) at the University of Zurich, which stemmed from discussions in the working group, led to the scientific work on skew products mentioned above.



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Turno General

Área Temática: Ciencias matemáticas
Nombre: DABROWSKI , DAMIAN
Referencia: RYC2024-049002-I
Correo Electrónico: damian.m.dabrowski@proton.me
Título: Quantitative rectifiability and projections

Resumen de la Memoria:

My research is in geometric measure theory (GMT), a subfield of analysis studying geometric problems using tools of measure theory. The tools and techniques of GMT are widely used in the calculus of variations, boundary value problems, harmonic analysis, and dynamical systems.

I am an author of 12 journal articles and 4 preprints. Out of these, I wrote 8 by myself, and 8 were results of collaborations with 7 coauthors. An up-to-date list of all my preprints and articles can be found at www.damiandabrowski.eu. Below I briefly discuss my research trajectory.

At the beginning of my doctoral studies I focused on proving characterizations of rectifiability, one of the key concepts of GMT. Later on I started to pivot towards the applications of GMT in harmonic analysis, in particular regarding singular integral operators and quantitative rectifiability. My biggest research achievement in that period was the solution to the Painlevé problem for Lipschitz harmonic functions by Tolsa and myself in the preprint "The measures with L2-bounded Riesz transform and the Painlevé problem" (arXiv:2402.08615). The research from my PhD was awarded the Vicent Caselles 2022 award (an annual prize of Real Sociedad Matemática Española awarded to 6 mathematicians under 30) and Premi Extraordinari de Doctorat (a distinction awarded to the best PhD theses at Universitat Autònoma de Barcelona).

After defending my PhD in 2021 I started working as a postdoc at the University of Jyväskylä. Since moving to Finland my research topics have changed in two major ways.

Firstly, I shifted my focus within the field of quantitative rectifiability. I started working on problems related to orthogonal projections and analytic capacity. My recent preprint "Favard length and quantitative rectifiability" (arXiv:2408.03919) is the biggest accomplishment of my career so far: it quantified the Besicovitch projection theorem in a strong sense, solving a conjecture of David and Semmes from 1993, and making progress on Vitushkin's conjecture from 1967. Solving this problem was my main research objective since 2021.

The second major way in which my research has changed is that I started working on fractal geometry, an area of GMT with strong presence in Finland that was completely new to me. The specific topics I work on are the projections, slices, and visibility of fractal sets.

Resumen del Currículum Vitae:

In years 2012-2017 I studied mathematics at the University of Warsaw. In 2015 I obtained the BSc in Mathematics (summa cum laude) for the thesis "Hausdorff dimension of Besicovitch sets".

The same year I began my master studies. In 2017 I obtained MSc in Mathematics for the thesis "Characterization of Sobolev-Slobodeckij spaces using geometric curvature energies". The thesis was subsequently published as a research article.

After completing my masters I moved to Barcelona to begin PhD studies in mathematics at Universitat Autònoma de Barcelona. I obtained a PhD scholarship from Barcelona Graduate School of Mathematics, and my advisor was Xavier Tolsa, a world-leading expert on harmonic analysis, geometric measure theory, and PDEs.

In 2020 I spent 3 months at the University of Edinburgh visiting Jonas Azzam. The visit resulted in a joint paper.

In February 2021 I defended my PhD thesis "Rectifiability of Radon measures". My diploma was granted an honorable mention "cum laude".

Over the course of my PhD I wrote 6 articles, out of which 2 were results of collaborations, and 4 were written on my own.

Right after obtaining my PhD (Feb 2021) I began working as a postdoc at the University of Jyväskylä. I was hired by Tuomas Orponen, a world-leading expert on geometric measure theory and harmonic analysis. The group led by Tuomas Orponen and Katrin Fassler is one of the largest and most active research groups on geometric measure theory in the world.

My initial contract was due to end in Aug 2023, but in 2022 I obtained a highly competitive (success rate ~15%) Academy of Finland postdoctoral grant, which allowed me to stay at the University of Jyväskylä until Aug 2025.

I am an author of 12 journal articles and 4 preprints. Out of these, I wrote 8 by myself, and 8 were results of collaborations with 7 coauthors. An up-to-date list of all my preprints and articles can be found at www.damiandabrowski.eu.

Every year I attend 2-3 conferences or workshops. I have given 8 invited conference talks (e.g. at the University of Washington, Hausdorff Institute in Bonn, Oberwolfach Research Institute for Mathematics), 10 contributed conference talks, and 15 seminar talks (e.g. in Barcelona, Madrid, Bilbao, Edinburgh, Warwick, Minnesota).

My long research visits include 6 weeks at Universitat Autònoma de Barcelona in 2024, 6 weeks at the Hausdorff Institute in Bonn in 2022, 3 months at the University of Edinburgh in 2020, 4 weeks at IMPAN in 2019.

I am well integrated into the geometric measure theory research community, as evidenced by the conference and research programs invitations (Banff International Research Station in 2024, Oberwolfach Research Institute 2023, Hausdorff Institute in Bonn in 2022, Simons semester in Warsaw in 2022). In May 2024 I co-organized a conference AGENT Forum 2024, which was aimed at young mathematicians in Finland.

I was a teaching assistant for 2 courses in Barcelona, and 2 courses in Jyväskylä. In 2023 I lectured an advanced course on Singular Integral Operators at the University of Jyväskylä.



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Turno General

Área Temática: Ciencias matemáticas
Nombre: BAYINDIR, HALDUN OZGUR
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Correo Electrónico: ozgurbayindir@gmail.com
Título: K-theoretic methods for higher vector bundles
Resumen de la Memoria:

My research areas are algebraic topology/homotopy theory, algebraic K-theory and homological algebra.

From the early days of the subject, algebraic topology has provided an influx of tools relating a priori different theories in mathematics. For example spectra, the stabilization of the topological spaces with respect to the suspension functor, generalize chain complexes. This generalization carries out to monoid objects; ring spectra provide a generalization of differential graded algebras (chain complexes with an associative and unital multiplication). Due to such generalizations, extensive work has been carried out in algebraic topology that studies homological algebra at the level of spectra, i.e. at the level of stable homotopy theory. My early research follows this philosophy by studying problems in homological algebra using methods of algebraic topology. Through this, I obtain various classification results for differential graded algebras and in applications to derived algebraic geometry, I obtain the first examples of tensor triangulated categories with non-unique DG-enhancements. For instance, I obtain results on the classification of DGAs with polynomial homology which was a question posed by Dwyer, Greenlees and Iyengar.

Furthermore, algebraic topology provides an important framework to define and compare various homology theories. Maybe the most important of these homology theories is the algebraic K-theory. Although it is often defined as an object in algebraic topology, algebraic K-theory has important connections to number theory, manifold topology and algebraic geometry. For instance, after the results of Whitehead and Bass, Waldhausen showed that the algebraic K-theory of a manifold provides its stable pseudo-isotopy space. Due to the difficulty of computing these K-theory groups, Waldhausen proposed a program, later carried forward by Ausoni and Rognes, that aims at computing the algebraic K-theory of manifolds by studying the algebraic K-theory of familiar ring spectra.

In my research, I contribute to this program by developing tools for algebraic K-theory computations and by concrete algebraic K-theory computations for various ring spectra. These include the first computation of the K-theory of a DGA that is not a ring which provides a counter-example to a natural generalization of Quillen's fundamental theorem of algebraic K-theory to DGAs.

Furthermore, these computations have consequences in differential topology regarding pseudo-isotopy spaces of spheres. Moreover, I obtain significantly simplified computation of the algebraic K-theory of the complex K-theory spectrum by developing a root adjunction formalism for ring spectra. This significantly simplifies one of the most sophisticated and important K-theory computations in the literature. Through this, I obtain a classification result for virtual real two-vector bundles (a categorical generalization of real vector bundles).

In my future work, I aim to carry this program forward by obtaining a full understanding of the K-theory of ring spectra obtained through root adjunction. This provides a critical contribution to the aforementioned program of Waldhausen and Ausoni-Rognes.

Another part of my research is on model categories. With Boris Chorny, we prove that nice symmetric monoidal model categories are classified by commutative ring spectra.

Resumen del Currículum Vitae:

I earned my undergraduate degree from Bilkent University, Department of Electrical and Electronics Engineering in 2007 and earned a master's degree from the same department in 2009. During my carrier as an engineer, I worked in the development of commercial products including a vehicle speed measurement system patented in Turkey. In my master's thesis in engineering, I developed an algorithm for faster magnetic resonance imaging (MRI) that I presented at the ISMRM congress.

I earned a master's degree from the Mathematics Department of the Middle East Technical University (METU) in 2014 and earned my PhD in mathematics from the University of Illinois at Chicago (UIC) in 2018 under Prof. Brooke Shipley. My PhD thesis is in algebraic topology and homological algebra. In my dissertation project, I study the classification of E-infinity differential algebras (DGAs) using methods in algebraic topology (Algebr. Geom. Topol.).

I presented my dissertation in important conferences including:

- Homotopy theory: tools and applications, University of Illinois, U. S.
- Lloyd Roeling UL Lafayette Mathematics Conference, U. S., plenary talk
- Workshop on Derivators, Regensburg-Germany, plenary invited talk.

Between 2018 and 2020, I worked as a postdoc at the University of Haifa (Israel) under Boris Chorny. In our project with Chorny (Algebr. Geom. Topol.), we prove that nice symmetric monoidal model categories are classified by commutative ring spectra. In Haifa, I also completed my paper "DGAs with polynomial homology", published in Advances in Mathematics, where I obtain algebraic classification results for DGAs with polynomial homology using topological methods; this classification problem was left open in work of Dwyer, Greenlees and Iyengar. This work is presented at:

- "Program on Toric Topology and Polyhedral Products", Fields Institute-Canada, plenary Invited Talk

I published another paper on the same theme in Algebr. Geom. Topol.



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Between 2020-2021, I worked as a postdoctoral researcher at the Sorbonne Paris North University under Christian Ausoni. where I produced three preprints from our research two of which are published in Trans. Am. Math. Soc. This work is presented in:

- $\square$ Cobordisms, Strings, and Thom Spectra workshop in Oaxaca $\square$, Mexico plenary invited talk
- $\square$ Chromatic Homotopy, K-theory and Functors $\square$ at the Centre International de Rencontres Mathématiques (CIRM), plenary invited talk.

Between 2021 and 2024, I worked as a postdoc at the City, University of London and since September 2024, I have been working as a postdoc at LMU Munich under Markus Land. During this time, I developed projects that contribute further to algebraic K-theory of ring spectra and provide a near complete solution to the open question of Dwyer, Greenlees and Iyengar that I studied before.

I carried out several research projects on my own throughout my carrier. Two of my papers published in Algebr. Geom. Topol., one of my papers published in Trans. Am. Math. Soc. and my paper in Advances in Mathematics are published as single-authored papers.

In August 2024, I was awarded the postdoc grant BP 2023 (for between 04/2025 and 03/2028).

As a PhD candidate and as a postdoc, I organized semester long reading groups aimed at providing young graduate students with the background they need to start their research.



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Turno General

Área Temática: Ciencias matemáticas
Nombre: LÓPEZ SORIANO, RAFAEL
Referencia: RYC2024-051212-I
Correo Electrónico: Rafael.Isoriano@gmail.com
Título: Ecuaciones y Sistemas en Derivadas Parciales de la Geometría y Física
Resumen de la Memoria:

Mi trabajo puede enmarcarse en el campo de las Ecuaciones en Derivadas Parciales (EDPs). Dentro de esta área, mis contribuciones se basan en el estudio de algunas ecuaciones y sistemas elípticos motivados principalmente por la Geometría diferencial y la Física. Los logros científicos más destacables en mi carrera se detallan a continuación (con la misma referencia que en el CVA):

1. Prescripción de curvaturas en geometría conforme: existencia, multiplicidad e inexistencia de soluciones para el campo medio singular de Liouville con soluciones que cambian de signo, [DMLS], existencia y análisis de explosión para el problema de prescripción de curvaturas gaussiano-geodésicas, [JLSMR, LSMR, BLS2] y una nueva formulación variacional del campo medio [BLS].
2. Sistemas no lineales de Schrödinger y modelos relacionados: existencia de estados base y frontera por métodos variacionales para sistemas doblemente críticos [CLSO1, CLSO2], clasificación de soluciones por técnicas de ODEs [ELSS] y propiedades cualitativas para operadores vectoriales [LSMS].

Mi conocimiento en el análisis de ecuaciones en derivadas parciales (PDEs) y la amplia experiencia que he adquirido en este campo me permiten plantear, en el marco del programa Ramón y Cajal, una línea de investigación centrada en el estudio de diversos aspectos de ecuaciones y sistemas derivados de la Geometría y la Física.

En primer lugar, abordaremos el problema de doble prescripción de curvatura para el disco, un caso especialmente complejo debido al efecto no compacto del grupo de transformaciones de Möbius. Aprovecharemos la formulación de campo medio introducida en [BLS], lo que garantizaría la existencia de una secuencia de mínimos. Posteriormente, analizaremos si las soluciones aproximadas convergen a soluciones reales o si presentan un fenómeno de blow-up. En caso de convergencia, se obtendría la existencia de soluciones sin restricciones en el signo de la curvatura geodésica prescrita. Para prescribir curvatura de Gauss negativa, estudiaríamos la formulación clásica. En ambos casos, será crucial determinar las condiciones bajo las cuales las soluciones de problemas aproximados convergen a soluciones reales, requiriendo una caracterización precisa de las sucesiones de blow-up y la localización de los puntos críticos.

Paralelamente, en sistemas tipo Schrödinger con doble criticidad, nos planteamos varias cuestiones fundamentales. El objetivo inicial es clasificar soluciones positivas generales en sistemas de Hardy-Sobolev con doble criticidad en el régimen cooperativo. Estudiaremos sistemas generales de tipo (p,q) -Laplaciano definidos en todo el espacio, tratando de ampliar los resultados de [ELSS].

Pretendemos también abordar el caso competitivo. Analizaremos la existencia de soluciones sincronizadas para pequeños parámetros negativos y su unicidad. Después, usaremos la invariancia conforme para explorar soluciones en todo el rango negativo y su posible fenómeno de separación de fases, aplicando técnicas variacionales para estudiar simetría y existencia. Dicho estudio debería permitir caracterizar nuevas soluciones de cambio de signo para el problema desacoplado.

Resumen del Currículum Vitae:

Formación:

Licenciado en Matemáticas por la UA en 2012.

Máster por la UGR en 2013. Doctorado internacional por la UGR en 2017.

Trayectoria profesional:

1. Becario FPI en la UGR 2013-2017.
2. Investigador Plan Propio en la UGR 2017-2018.
3. Leibniz Fellow en MFO Oberwolfach 2018.
4. Investigador Juan de la Cierva Formación en la UV 2019-2020.
5. Profesor Ayudante Doctor en la UC3M 2020-2022.
6. Investigador Juan de la Cierva Incorporación en la UGR 2022-Presente.

Investigación

Mi trabajo se enmarca en el campo de las Ecuaciones en Derivadas Parciales. Mis contribuciones se basan en el estudio de algunas ecuaciones motivadas por la Geometría diferencial y la Física.

Autor de 16 artículos, publicados en revistas de prestigio como J. Math. Pures Appl. x2 (2018, 2024), Ann. Scientifiques de l'ENS (2022), Analysis & PDEs (2022), Calc. Var. PDEs (2016, to appear) o Trans. Amer. Math. Soc. (2023)

He participado en cinco proyectos nacionales. He sido invitado como ponente en conferencias internacional (BIRS, Mittag-Leffler, Libre de Bruxelles, Banach Center) He impartido seminarios en SNS Pisa, ETH Zurich, KIT Karlsruhe o Sapienza Università y cursos de doctorado (Roma, Namibia)



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En 2014 y 2015 realicé estancias en Università di Roma II. En 2019 obtuve una beca José Castillejo para realizar una estancia de 5 meses en Università della Calabria. Desde 2022 codirijo una tesis doctoral (Francisco J. Reyes Sánchez), he supervisado un TFG en Matemáticas y superviso otro. Otros méritos: organizador de seminarios, congresos y sesiones en congresos nacionales e internacionales. Acreditación a PTU ANECA (2024). Evaluador de aplicaciones Erasmus+. Co-organizador del festival de divulgación científica "Pint of Science". Selección de publicaciones científicas:

1. A. Arroyo, LS; A. Ortega, Existence of solutions for a system with general Hardy--Sobolev singular criticalities, to appear in Calc. Var. Partial Differential Equations.
2. L. Battaglia; LS A mean field problem approach for the double curvature prescription problem, Commun. Contemp. Math, DOI: 10.1142/S0219199725500087.
3. F. Esposito; LS; B. Sciunzi, Classification of solutions to Hardy-Sobolev Doubly Critical Systems, J. Math. Pures Appl. 189, (2024) 103595.
4. LS; L. Montoro; B. Sciunzi, Symmetry and monotonicity results for solutions of vectorial p-Stokes systems, Trans. Amer. Math. Soc. 376 (2023), no.5, 3493-3514.
5. E. Colorado, LS; A. Ortega, Bound and ground states of coupled "NLS-KDV" equations with Hardy potential and critical power, J. Diff. Eq. 365 (2023), 560-590.
6. E. Colorado, LS; A. Ortega, Existence of bound and ground states for an elliptic system with double criticality, Nonlinear Anal. 216 (2022), Paper No. 112730, 26 pp.
7. A. Jevnikar; LS; M. Medina; D. Ruiz, Blow-up analysis of conformal metrics of the disk with prescribed Gaussian and geodesic curvatures, Anal. PDE 15 (2022), no. 8, 1897-1931.
8. LS; A. Malchiodi; D. Ruiz, Conformal metrics with prescribed gaussian and geodesic curvatures, Ann. Sci. Éc. Norm. Supér. (4) 55 (2022), no. 5, 1289-1328.
9. L. Battaglia; LS, A double mean field equation related to a curvature prescription problem, J. Diff. Eq. 269 (2020), no. 4, 2705-2740.
10. F. De Marchis; LS, Existence and Non Existence Results for the singular Nirenberg problem, Calc. Var. PDEs 55



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Turno General

Área Temática: Ciencias matemáticas
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Título: High Dimensional Statistical Inference Under Privacy Constraints
Resumen de la Memoria:

My research centers on developing statistical inference methods for complex stochastic systems, which are crucial for addressing challenges in data privacy, epidemiology, and mathematical finance. Many probabilistic models excel at fitting data but lack statistical guarantees to explain why they capture natural phenomena effectively. My work bridges this gap by providing rigorous theoretical insights, with contributions spanning three key areas: interacting particle systems (IPS), local differential privacy (LDP) constraints, and stochastic differential equations (SDEs) with jumps.

Key Contributions

1. My contributions to statistical inference for IPS include joint estimation of drift and diffusion parameters under discrete observations, as demonstrated in Amorino et al. (2023), and extending this work to two-dimensional IPS with degenerate SDEs, as in Amorino-Pilipauskaite (2024), where I developed estimators with asymptotic Gaussianity. Additionally, I advanced semiparametric estimation for interaction drift functions in IPS, employing Fourier analysis to solve a deconvolution problem and achieve polynomial convergence rates, as seen in Amorino et al. (2024).
2. My contributions to statistical inference under local differential privacy constraints include studying the "price of correlation" in componentwise LDP, as detailed in Amorino-Gloter (2024), where we study a trade-off between statistical utility and privacy. Additionally, I introduced local differential privacy for SDEs in Amorino et al. (2024), marking the first application of LDP to time-evolving data.
3. Regarding statistical inference for SDEs with jumps, in Amorino-Gloter (2020), we proposed corrected contrast functions to remove constraints on discretization and jump summability, enabling robust drift estimation. We further extended this approach to joint drift-diffusion parameter estimation (Amorino-Gloter, 2021) and studied invariant density estimation for jump processes, achieving optimal rates and super-optimal convergence in 1D.

Research Plan as a Ramón y Cajal Fellow

Building on this foundation, my research agenda will address both theoretical advancements and practical applications in IPS and LDP.

- 1.A) Extend IPS models to incorporate jumps for systems with sudden shifts, such as opinion dynamics or financial asset interactions.
- 1.B) Replace standard Brownian motion with fractional Brownian motion to account for memory effects in systems like precipitation patterns or economic forecasting.
- 1.C) Develop statistical methods for IPS on manifolds, targeting applications in astrostatistics, such as modeling sunspot interactions on spherical surfaces.
- 2.A) Create frameworks allowing for mixed privacy levels across data components, addressing real-world needs for both privacy and utility.
- 2.B) Focus on low-frequency observations to ensure effective privacy in correlated stochastic processes, with applications in pharmacology and medical research. I aim to integrate privacy-preserving methodologies into mixed-effects models, critical for sensitive data like tumor growth studies.

Conclusion: This plan addresses emerging challenges in statistical inference for high-dimensional, privacy-constrained, and stochastic systems, advancing both theoretical methods and practical applications, bridging gaps in understanding complex systems.

Resumen del Currículum Vitae:

My research focuses on developing stochastic models for complex systems, inspired by real-world applications in biology, finance, and data privacy. I contribute innovative ideas and computationally efficient methods to scientific problems, including tools for analyzing interacting particle systems, statistical inference techniques, and novel estimators for emerging models. My work bridges statistics, probability, and machine learning, advancing understanding in these domains.

I completed my PhD at Université Paris-Saclay in 2020 under the supervision of Prof. Arnaud Gloter, where I developed methods for statistical inference in SDEs with jumps. These models are increasingly applied to study real-world phenomena in fields like physics, biology, medical sciences, economics, and finance. Specifically, they are used in modeling exchange rates, asset prices, and neural activity. My doctoral research resulted in four manuscripts published in renowned journals, including Stochastic Processes and Applications and the Scandinavian Journal of Statistics.

After my PhD, I joined the Probability and Statistics group at Université du Luxembourg as a postdoctoral researcher under Prof. Mark Podolskij. Over three and a half years, I expanded my research in several directions: continuing my work on statistical inference for SDEs, including those without jumps, and exploring Hawkes processes/self-exciting jump processes with applications in finance, insurance, and neuroscience. This research, which involved threshold estimators and Malliavin calculus, led to six publications in journals such as Annales de l'Institut Henri Poincaré and Scandinavian Journal of Statistics. Additionally, I contributed to Stein's method, producing two papers (one published, one under review), as well as statistical analysis of interacting particle systems, resulting in two publications in Probability Theory and Related Fields and Stochastic Processes and Applications.

During my postdoctoral work, I also focused on statistical problems under local differential privacy (LDP) constraints. This is crucial in today's data-driven world, where institutions must balance data access and privacy protection. I addressed this challenge in two manuscripts accepted for publication in Annals of Statistics and Stochastic Processes and Applications.



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Turno General

In April 2024, I joined the Department of Economics and Business at Universitat Pompeu Fabra (UPF) as a member of the Statistics and Probability group and as an affiliated member of the Barcelona School of Economics. At UPF, my research continues on local differential privacy, Hawkes processes, and high-dimensional statistics, with a focus on interacting particle systems, Lasso estimators, and fractional Brownian motion. The latter is particularly suited for modeling systems with memory effects, such as earthquake occurrences, precipitation patterns, and health-related phenomena. My work at UPF has led to four papers under review in journals like *Annals of Statistics* and *Bernoulli*. I am also part of a research group at Sorbonne Université and Paris Nanterre, focusing on high-dimensional statistical inference.

In addition to my research, I serve as a referee for leading journals and I am committed to mentoring emerging statisticians. During my postdoc, I co-mentored three PhD students.



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Turno General

Área Temática: Ciencias matemáticas
Nombre: GÁRRIZ MOLINA, ALEJANDRO
Referencia: RYC2024-050952-I
Correo Electrónico: alejandro.garrizmolina@gmail.com
Título: Doctor en Matemáticas

Resumen de la Memoria:

Trabajo en ecuaciones diferenciales parciales (EDPs) y sus aplicaciones. Mis áreas de interés cubren, principalmente, ecuaciones difusivas lineales y no lineales de diversas naturalezas, presentando diferentes operadores locales y no locales. En los últimos años he ampliado mi línea de trabajo a modelos de ecuaciones aplicados a la biología, ecuaciones cinéticas y transporte óptimo.

En mi tesis realizada en la Universidad Autónoma de Madrid bajo la supervisión del profesor Fernando Quirós discutí las propiedades de las soluciones de varias ecuaciones de evolución diferentes, prestando especial atención a su comportamiento en tiempos grandes. Podríamos destacar de entre ellas la Ecuación de los Medios Porosos o la Ecuación con Difusión p-Laplaciana en el ámbito de la difusión local, o ecuaciones parabólicas con términos de difusión dados por el Laplaciano Fraccionario o la convolución con núcleos de probabilidad en el ámbito de la difusión no local. Parte de los trabajos en los que consiste la tesis fueron realizados durante estancias de varios meses en la Universidad de Buenos Aires (Argentina), con el profesor J. Rossi, y en la Universidad de Bucarest (Rumania) con el profesor L. Ignat.

Durante mi post-doctorado en el CNRS francés bajo la supervisión de la profesora Sepideh Mirrahi estudié modelos de EDPs de Selección-Mutación centrándome en sus aplicaciones en biología. Durante mi estancia logré probar la existencia de complejos e inesperados estados de equilibrio para soluciones de estos problemas cuando se les añade un término de reacción no-local que pretende simular el proceso de conjugación de plásmidos, uno de los más importantes procesos evolutivos a nivel bacterial. Una vez probada la existencia de esos equilibrios complejos, comenzamos un estudio del comportamiento de las soluciones a lo largo del tiempo, durante el cual hemos ampliado la teoría existente sobre ecuaciones de Hamilton-Jacobi aplicable a este tipo de modelos.

A lo largo de ese periodo también enseñé en la Université Paul Sabatier (Toulouse III) en Toulouse. Participé en cursos de grado y máster cuyas materias iban desde matemática teórica pura hasta matemática aplicada y simulaciones numéricas. En total, a día de hoy, he impartido cuatro cursos, todos ellos en francés.

A día de hoy disfruto de un contrato Juan de la Cierva en el Instituto de Matemáticas de Granada, trabajando junto al profesor José Alfredo Cañizo. Hemos podido completar un exhaustivo estudio sobre el comportamiento para tiempos grandes de las soluciones y de los núcleos de la ecuación del calor en dominios con agujeros que aparecerá en breves en ArXiv. También hemos comenzado a estudiar el empleo de este tipo de técnicas en la Ecuación de los Medios Porosos y en la Ecuación de Difusión Rápida, logrando obtener resultados nuevos e interesantes. Durante este contrato imparto además clases en la facultad de manera voluntaria.

Finalmente querría comentar que recientemente he añadido una nueva línea de investigación en colaboración con el profesor A. González Sanz, centrada en el estudio de la relación entre la Ecuación de los Medios Porosos y el Transporte Óptimo Regularizado, uno de los temas más actuales en matemáticas por su relación con el Machine Learning. Junto al estudiante de tesis G. Mordant ya hemos realizado un artículo al respecto, disponible en ArXiv.

Resumen del Currículum Vitae:

Completé mis estudios de doctorado en la U. Autónoma de Madrid en enero de 2021 bajo la dirección del profesor F. Quirós con la tesis [Comportamiento para tiempos grandes en difusión local y no local](#). Durante ese periodo realicé estancias de investigación de varios meses en la Universidad de Buenos Aires (Argentina), con el profesor J. Rossi, y en la Universidad de Bucarest (Rumania) con el profesor L. Ignat.

Posteriormente (abril 2021 - agosto 2021) disfruté de un contrato FEDER de la Junta de Andalucía de cuatro meses como investigador en la Universidad de Granada junto con el profesor J.A. Cañizo, estudiando la adaptación de nuevos métodos de entropía al estudio de ecuaciones de difusión en dominios con agujeros.

A continuación (sept. 2021 - oct. 2023) conseguí una plaza de investigador post-doctoral durante dos años en el Centre National pour la Recherche Scientifique (CNRS-Francia) radicada en el Institut Montpellierain Alexander Grothendieck (Montpellier) con el proyecto ANR-DEEV, trabajando junto a la profesora S. Mirrahi y sus colaboradores.

Finalizado ese post-doctorado, fui contratado brevemente por la profesora M. Medina a cargo de su beca Ramón y Cajal durante un mes (diciembre 2023), pero al poco de comenzar renuncié al contrato ya que conseguí una beca Juan de la Cierva de dos años en el Instituto de Matemáticas de Granada (IMAG) para poder seguir trabajando con el profesor J. A. Cañizo en ecuaciones cinéticas y modelos de entropía. En este momento me encuentro al comienzo de mi segundo año de contrato, impartiendo además clases en la facultad de manera voluntaria.



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Turno General

Área Temática: Ciencias matemáticas
Nombre: REY LEY, GUILLERMO
Referencia: RYC2024-051323-I
Correo Electrónico: guillermo.reyley@gmail.com
Título: Harmonic analysis: singular integrals, maximal functions, sparse domination
Resumen de la Memoria:

My career in mathematics has been marked by a strong focus on Harmonic Analysis, starting with my Ph.D. research on singular integrals and maximal operators. This period led to significant publications and laid the groundwork for my later work on sparse domination of singular integrals, a key part of my doctoral thesis that received considerable recognition.

My transition to industry, with roles at Google, Wing, and Citadel, allowed me to apply my mathematical expertise to practical problems, enhancing technologies and optimizing financial strategies. This phase of my career provided valuable insights that I brought back to academia.

Returning to academic research, I continued my work in Harmonic Analysis at the University of Minnesota and currently at Universidad Autónoma de Madrid. Here, my focus has been on expanding the field, particularly through my leadership as the principal investigator of a "Proyecto de generación de conocimiento" grant. This role highlights my ongoing commitment to advancing mathematical research and my ability to lead significant scientific inquiries.

My research line is focused on the study of multiparameter operators, from the point of view of Harmonic Analysis.

Resumen del Currículum Vitae:

My curriculum vitae reflects a balanced blend of academic and practical experience in mathematics, particularly in Harmonic Analysis. My academic contributions are evident through several respected publications, born from my research during my Ph.D. and postdoctoral work. A significant highlight of my career is being the principal investigator of a "Proyecto de generación de conocimiento" grant, which underscores my leadership and expertise in driving forward-thinking research projects. My industry experience, including roles at Google, Wing, and Citadel, has allowed me to apply mathematical theories to practical challenges, enriching my academic perspective and contributing to advancements in technology and finance. This combination of academic rigor and practical application defines my professional journey.

Summary of Key Strengths in Relation to the Call Specifications:

- Scientific Contributions: I am an established researcher in the field, with a strong track record of publications in leading journals, including *Advances in Mathematics* (two articles), *Journal of Functional Analysis* (one article), and *Mathematische Annalen* (one article), among others.
- International Collaboration: Since beginning my scientific career, I have spent only 3.5 years in Spain, demonstrating my clear internationalization. The majority of my work is co-authored with researchers from other countries, totaling seven international collaborators.
- Independence and Leadership: I am the principal investigator of a national grant, showcasing my ability to lead research initiatives independently. Furthermore, none of my articles have been co-authored with my PhD advisors, underscoring my academic independence.



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Turno General

Área Temática: Ciencias matemáticas
Nombre: GAJOVIC, STEVAN
Referencia: RYC2024-050075-I
Correo Electrónico: stevangajovic@gmail.com
Título: Number theory with focus on rational points, Diophantine equations and arithmetic statistics with applications

Resumen de la Memoria:

I defended my PhD in 2022, supervised by Steffen Müller and Jaap Top, at the University of Groningen with my PhD thesis, "Variations on the method of Chabauty and Coleman". I finished my bachelor's and master's studies at the University of Belgrade, with grades 9.77/10, and 10/10, respectively.

I am a postdoctoral researcher at the Max-Planck Institute for Mathematics in Bonn (January - December 2025), where I was before (March 2022 - February 2023). From March 2023 - December 2024, I was a postdoctoral researcher at Charles University Prague. I was awarded a Junior Fund grant for postdoctoral researchers by Charles University for 2024.

My research interests lie in number theory, computational arithmetic geometry and their interactions with other areas. My main research areas are rational and integral points on curves, Diophantine equations and arithmetic statistics. I have eight scientific papers, six already published and two accepted for publication.

I have researched different variations on the method of Chabauty and Coleman: I published a single-authored paper, "Curves with sharp Chabauty-Coleman bound", in the proceedings volume for the Simons Collaboration "Arithmetic Geometry, Number Theory, and Computation", a joint paper with Box and Goodman, "Cubic and quartic points on modular curves using generalised symmetric Chabauty", in the International Mathematics Research Notices, and, from my PhD thesis, with Müller, I have a paper "Linear quadratic Chabauty" which is accepted for publication in the Israel Journal of Mathematics. This variant of the quadratic Chabauty method relies on p -adic heights, for which, during my PhD, I created a very fast and efficient algorithm to compute them on hyperelliptic curves, published in Mathematics of Computation in the paper "Computing p -adic heights on hyperelliptic curves" with Müller.

I have one joint paper with Bhargava, Cremona, and Fisher in arithmetic statistics, "The density of polynomials of degree n over $\mathbb{Z}_p$ having exactly r roots in $\mathbb{Q}_p$ ", published in the Proceedings of the London Mathematical Society, which was awarded as one of the six best papers published in this journal in 2019-2022.

As my interest in number theory is broad, I have papers on certain Diophantine equations, on the application of number theory to TQFT algebras, and on the arithmetic-geometric mean sequences over finite fields.

I was an invited speaker on five conferences and I gave ten contributed talks at conferences and many seminar talks about my research, including the seminars at Boston, Cambridge, EPFL, ICMAT, ISTA, Oxford, Warwick.

I was a lecturer of elliptic curves in one AESIM/CIMPA school, a teaching assistant for four master courses and several bachelor courses, and once at a research school, a teacher in Mathematical Grammar School. I cosupervised three bachelor theses and three high-school graduation projects at Mathematical Grammar School.

I am organising a conference this year at the MPIM Bonn, and I organised the conference "Young Number Theorists in Bonn" there in 2023. I organised one AESIM/CIMPA school and several local seminars and study groups. I contributed to creating a worldwide online Visual Mathematical Dictionary by translating mathematical notions into the Serbian language.

I refereed articles for 13 journals, including Annals of Mathematics (quick opinion).

Resumen del Currículum Vitae:

My research topics are number theory and computational algebraic geometry. I studied pure mathematics at the University of Belgrade, where I finished my bachelor's studies with a 9.77/10 grade and my master's studies, where I scored 10/10. For my master's thesis, I learned about the method of Chabauty and Coleman, which I continued for my PhD, and it is one of my main research areas with arithmetic statistics.

I have three papers on the method of Chabauty and Coleman, one single-authored and two with collaborators, but I had a contribution to the main results. Also, I have one related paper with my PhD supervisor, Steffen Müller, on computing p -adic heights on hyperelliptic curves. As this was my PhD project, it is natural that I contributed to all of the key points in this paper.

I have one paper on p -adic arithmetic statistics with Bhargava, Cremona, and Fisher, where I simplified their previous arguments, which resulted in a joint work.



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Since my interest in number theory is much broader, I have three more papers on number theory and its applications to some other mathematical areas.

My research attracted a considerable amount of attention, and I was invited to present it as an invited speaker at five conferences and many seminars, including those in Barcelona and ICMAT Madrid.

I completed my PhD in at the University of Groningen in the Netherlands. I worked a lot with my PhD supervisor, Steffen Müller, and this collaboration was so fruitful that it has continued after finishing my PhD. I also benefited a lot from the whole number theory group and also contributed to their research. I was a very engaged member of the Dutch mathematical community. I attended several courses at different universities in the Netherlands, where I learned a lot of mathematics. Furthermore, I initiated one seminar on the topic of Diophantine equations with PhD students from other Dutch universities.

On my initiative, I spent one semester in Boston, where I visited the research group of Jennifer Balakrishnan at Boston University at the time when I worked on the algorithms for computing p -adic heights on hyperelliptic curves, which was quite useful for that project.

My first postdoctoral position was at the Max Planck Institute for Mathematics in Bonn. There, I initiated a local study group on the proof of Last Fermat's Theorem, where I participated and gave a talk. Also, I started several collaborations with other postdoctoral researchers, which are still active nowadays. I initiated the idea to organise a conference called "Young Number Theorists in Bonn", which was so popular that we received more than 200 applications and, in the end, was very successful. . I am also organising another conference at this institute this year.

I am dedicated to improving the state of number theory and arithmetic geometry in Belgrade, so I organised a CIMPA/AESIM school in Belgrade.

Independence in my research can be visible in my current publications, especially as I am working in different research directions. I have two single-authored papers and except from my PhD supervisor, with whom I have two joint papers, I have no other collaborators with more than one published paper.

I initiated several conferences, school, and seminars, and I showed my leadership skills on these occasions, also when supervising students and being the head of a mathematical seminar.



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Turno General

Área Temática: Ciencias matemáticas
Nombre: KUZNETSOV, MAXIM
Referencia: RYC2024-049809-I
Correo Electrónico: kouznetsovmb@gmail.com
Título: Towards personalized precision radiopharmaceutical therapy

Resumen de la Memoria:

I have suggested an innovative approach for treatment of blood cancers via radiopharmaceutical therapy (RPT), which is intriguing for clinical translation and the set of verifying experiments is now pending funding. However, potential scope of application of these results is limited since blood cancers represent less than 7% of cancer cases. Most cancers grow as solid tumors, with relatively low permeability of associated capillaries resulting in slow penetration of antibodies to them. On the other hand, dense arrangement of cells facilitates their cross-fire irradiation, contributing to the increase of solid tumors cure probability, as implied by experimental cases of complete tumor remission.

The main line of my research builds on my previous research, setting the ambitious goal of discovering general principles for robust optimization of RPT of solid tumors.

Aim 1. Develop the mathematical model of RPT of solid tumors. The crucial requirement is balance between complexity and practicality – the model should be complicated enough to reasonably reproduce heterogeneity of drug distribution, but numerous optimal control problems should be solved in efficient way.

Aim 2. Investigate the developed model and propose general principles for robust optimization of RPT of solid tumors. Plenty of optimization techniques can be considered. Coadministration of unlabeled antibodies should allow for saturation of receptors near capillaries to redistribute radionuclides deeper into tumor, while gradual increase of nuclide to antibody ratio during subsequent injections may increase the chance of eliminating the remaining viable cells. The use of beta-emitters can be advantageous for initial doses, but alpha-emitters can be more effective for later doses. Pre-estimation of capillary permeability (e.g., via FDG PET/CT scan) can guide treatment strategy. This is not an exhaustive list of high-level descriptions of potential optimizations approaches, with the crucial question to be answered being: which innovative techniques can be used in robust manner and under which conditions?

Aim 3. Validate a specific optimization approach in a virtual trial constrained by prior experimental data. Using data from existing experimental study, I will suggest a preclinical study in which the model-based optimized protocol should yield a measurable increase of treatment efficacy. As my experience suggests, the proposed approach will most probably go beyond current clinical paradigms, which focus on maximum tolerated dose and tend to divide the total dose in equal fractions.

Active discussions with experimentalists, clinicians, and fellow mathematicians are essential to ensure that used methodology and model assumptions are sound and up-to-date, as well as for paving the way for dissemination and practical application of results. To successfully implement this project and foster my growth as an independent researcher, the University of Castilla-La Mancha is the ideal venue due to the expert guidance of Prof. Víctor Manuel Pérez-García, rich experience of members of the Mathematical Oncology Laboratory, and their broad network of experimental and clinical collaborators. The clinical collaboration will also be supported by my current connection to a group of interventional oncologists at City of Hope, who are eager to initiate a clinical trial based on my findings.

Resumen del Currículum Vitae:

From theoretical biophysics at Moscow's prestigious institutions to pioneering mathematical oncology at one of the best cancer hospitals in the USA, my scientific journey reflects a profound integration of mathematics, biology, and clinical application, driving forward innovative approaches and groundbreaking clinical trials. My list of mentoring colleagues includes leading scientists in their fields: mathematicians Vitaly Volpert (Russia/France), Jean Clairambault (France), and Russell Rockne (USA), as well as clinical researchers John Shively, Edward Boas, and Peter Lee (USA). Early in my career, I gained industry experience as an analyst at two companies, including Tinkoff, the world's largest digital bank, where I obtained machine learning skills.

During my training, I demonstrated independent thinking capacity and leadership potential across diverse fields. I am the author of 23 publications in WoS-indexed journals, with 8 of them belonging to first quartile (Q1) journals, and 4 to first decile (D1) journals. I am the first author of 20 articles on mathematical oncology, biological morphogenesis, and combustion, and the sole author of 2 articles. The impact of my research is on the rise with 39 citations in WoS-indexed journals in 2024, and 143 citations in total, yielding an h-index of 8. During my career, I delivered 20 talks at national and international conferences and participated in 19 projects funded by National Institutes of Health, USA (2), Russian Ministry of Science and Higher Education (1), Peoples' Friendship University of Russia (1), Russian Science Foundation (3), and Russian Foundation for Basic Research (12).

I obtained two personal grants, leading to discovery of systems in which Turing patterns formation can be controlled regardless of parameter values, which may be applied in regenerative medicine. I proposed a set of optimization strategies for fractionated external beam radiotherapy of solid tumors, which led to initiation of a clinical trial with radiation oncologist Dr. Peter Wu. I suggested general principles for optimization of radiopharmaceutical therapy for blood cancers and designed a set of validating in vivo experiments (now pending funding), which gained support from clinician Dr. Scott Goldsmith and a group of interventional oncologists led by Dr. Edward Boas, who are determined to set up a clinical trial using the relevant approach in solid tumors, using catheters and needles to deliver therapeutical payload directly into tumors. I am now engaged in an immunological project, where I revealed non-additive phenomena in immune cell signaling under application of different cytokines, proposed and managed a set of additional



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experiments, and put forward an explanation of underlying mechanisms and their evolutionary reasons, which can lead to a new type of therapeutical interventions for patients with autoimmune diseases and for overcoming cytokine release syndrome (work in progress).



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Turno General

Área Temática: Ciencias matemáticas
Nombre: ROS CAMACHO, ANA
Referencia: RYC2024-048991-I
Correo Electrónico: anaroscamacho@gmail.com
Título: El álgebra cuántica y sus conexiones con la física matemática

Resumen de la Memoria:

Mi área de especialización se encuentra en la intersección entre teoría de representaciones, teoría de categorías, álgebra cuántica y física matemática. Mi investigación se ha centrado en los siguientes dos temas.

Durante el doctorado y posteriormente, he utilizado herramientas algebraicas para proveer de esqueleto matemático a diversas conjeturas de la literatura de física teórica y estudio y desarrollo dichas estructuras algebraicas para ver más allá de lo que indican las predicciones de la física. Más concretamente, me he centrado en la llamada correspondencia de Landau-Ginzburg/teoría conforme de campos (LG/CFT), que en particular predice conexiones matemáticamente muy inesperadas entre categorías de representaciones de las álgebras de operadores vértice (que controlan las simetrías de las teorías conformes de campo) y categorías de las llamadas factorizaciones matriciales (que describen las condiciones de contorno y defectos de los modelos de Landau-Ginzburg). Mi trabajo demostró que lo sugerido por la física era cierto, y formalicé los primeros ejemplos de esta correspondencia, así como evidencia de muchos otros, en diversos trabajos conjuntos con N. Carqueville (Viena), A. Davydov (Ohio), I. Runkel (Hamburgo), y T. Wasserman (Oxford). Parte de la belleza de LG/CFT reside en su versatilidad, y así he explorado sus conexiones con la geometría algebraica, la teoría de números y los problemas computacionales que presenta, junto con mis colaboradores T. Kluck (Jane Street) y R. Newton (King's College).

Por otro lado, durante este trabajo una estructura algebraica en particular llamó mi atención: las álgebras objeto (o simplemente álgebras) en categorías tensoriales. Estas álgebras, que son una abstracción de la noción de álgebra sobre un cuerpo en una categoría, aparecen en muchos ámbitos de la física matemática: aparte de en álgebra cuántica donde tienen un rol por derecho, también aparecen en extensiones de álgebras de operadores vértice, teorías topológicas y conformes de campo, etc. Sin embargo, estudiarlas y clasificarlas no es tarea sencilla. Junto con mis colaboradores S. Hannah (Cardiff), R. Laugwitz (Nottingham), Y. Morales (Tecnológico de Monterrey, México), M. Mueller (Sao Joao del Rei, Brasil), J. Plavnik (Indiana), C. Walton (Rice University, USA), A. Tabiri (AIMS Ghana), he clasificado diversas familias de álgebras en diferentes tipos de categorías (grupo-teóricas, Dijkgraaf-Witten) mediante métodos directos, y desarrollado herramientas indirectas para simplificar esta búsqueda a través de las llamadas representaciones NIM de los anillos de fusión de las categorías en juego.

Finalmente, como complemento a toda esta actividad, recientemente he desviado mi atención hacia la teoría de representaciones de las álgebras de operadores vértice y obtenido junto con H. Nakano (Osaka), F. Orosz Hunziker (Boulder), S. Wood (Cardiff) los anillos de fusión para algunas de estas categorías y demostrando rigidez en algunas de ellas.

La línea de investigación propuesta a desarrollar es un paso adelante en el estudio de las álgebras objeto, con el objetivo de generalizar los métodos directos, extender los métodos indirectos, combinar todo lo previo e introducir métodos de modificación de las categorías, y finalmente aplicar los resultados a LG/CFT y representaciones de álgebras de operadores vértice.

Resumen del Currículum Vitae:

Lecturer en matemáticas en la Escuela de Matemáticas de la Universidad de Cardiff (País de Gales) desde enero de 2020. Doctorada por la Universidad de Hamburgo (Alemania), con experiencia postdoctoral en centros punteros de toda Europa (Instituto Max Planck para las Matemáticas de Bonn, Instituto de Matemáticas de Jussieu y École Polytechnique, Instituto Matemático de la Universidad de Utrecht).

Investigadora especializada en álgebra cuántica y física matemática, miembro altamente respetada de la comunidad investigadora con publicaciones en revistas de alto rango y una red activa de colaboradores en Norte y Sudamérica, Japón, y Europa. Ganadora de becas durante toda la carrera investigadora que incluyen la Marie Skłodowska Curie Individual Fellowship y la NWO Veni Fellowship o más recientemente una LMS Emmy Noether Fellowship. Experiencia extensa en la organización de eventos y congresos locales, nacionales e internacionales, y en la impartición de más de 80 charlas en congresos y seminarios por todo el mundo. Su servicio a la comunidad matemática también incluye la evaluación de proyectos para la Comisión Europea, la Comisión de Ciencias Físicas, Matemáticas y Astronómicas del Ministerio de Ciencia y Tecnología de la República Argentina y la London Mathematical Society, así como el arbitraje de artículos de investigación para revistas prestigiosas como Communications in Mathematical Physics o Advances in Mathematics. Sirve actualmente como miembro electa del Forum de Investigadores Jóvenes para las Ciencias Matemáticas del Consejo de Investigación de Ingeniería y Ciencias Físicas (EPSRC) del Reino Unido, y ha sido nominada a elección como Miembro del Consejo de Gobierno de la London Mathematical Society.

Amplia experiencia de docencia y supervisión de tesis de grado, máster y doctorado, en varios países (Alemania, Países Bajos y Gales) e idiomas. Su calidad docente viene acreditada por la Calificación Básica de Docencia neerlandesa y la Fellowship Senior de la Higher Education Academy del Reino Unido (Número de Referencia PR255917).

Actual directora de Igualdad, Diversidad e Integración de la Escuela de Matemáticas en Cardiff, bajo su liderazgo la Escuela consiguió la acreditación Athena SWAN Silver con elogio explícito a las iniciativas lanzadas y desarrolladas por ella. Activista por la igualdad, diversidad e inclusión de las minorías en las matemáticas reconocida internacionalmente, premiada con el LMS Anne Bennett Prize 2024 (que también avala la excelencia de su investigación), y el Westerdijk Award 2019, entre otros. Líder de la organización de la serie de talleres 'Women in Mathematical Physics' y miembro



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

de la junta directiva y vicepresidenta de la Association of Women in Mathematical Physics. Ha participado en paneles como experta abogando por la igualdad, impartido charlas en su experiencia personal, y aconsejado, ayudado, apoyado, y entrenado a infinidad de mujeres matemáticas y físicas matemáticas en sus carreras académicas.

Finalmente, tiene experiencia sólida en divulgación habiendo impartido charlas en España, Canadá, Colombia y Panamá. Madre de dos niños nacidos en 2020 y 2023.



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Turno General

Área Temática: Ciencias sociales
Nombre: VENTURA GARCIA, LAIA
Referencia: RYC2024-048389-I
Correo Electrónico: lventur2@ed.ac.uk
Título: Toxicity in Post-Industrial Societies: Social Dynamics, Health Effects and Knowledge

Resumen de la Memoria:

Bodies and landscapes are deeply intertwined, particularly in "sacrifice zones" (Lerner, 2010) – areas exploited for profit at the expense of the environment and local populations. These zones often exemplify "slow violence" (Nixon, 2011), harm that unfolds gradually and persistently, remaining largely unnoticed. Toxicity, far from being solely biological, is culturally and relationally constructed (Dawson & Dennis, 2020), shaping social relations, identities, and human experiences, and influencing how we live and die (Brocca et al., 2023).

My proposed research, grounded in chemo-ethnographies (Shapiro & Kirsey, 2017), investigates the multifaceted effects of toxicity on health and social dynamics. It emphasizes "embodied ecologies" (Ford, 2019), examining the dynamic connections between bodies and their physical and social environments, and how these interactions influence lived experiences.

The study pursues four objectives:

Toxicity and Social Dynamics: Investigate how toxic chemicals reshape relationships, identities, and cultural landscapes, with attention to the historical and daily contexts of ambivalence toward industries that intertwine economic dependency with health and environmental risks.

Politics of Knowledge: Examine how political, economic, and social power structures shape knowledge about toxicity and risk, influencing public understanding and experiences. This builds on my work on professional care cultures and diseases like Chagas and cervical cancer.

Gendered Health Impacts: Drawing from research on NTDs, sexual and reproductive health, and gendered effects of toxicity (Chiang et al., 2017), this line integrates community-based perspectives and critical epidemiology to analyze health inequities shaped by pollution.

Participative and Artistic Methodologies: Building on my work with chemical risks and cervical cancer, I aim to explore participatory methods and creative practices as tools to advocate for social justice, emphasizing "situated knowledge" (Haraway, 1988).

This interdisciplinary research combines medical anthropology, STS, and social sciences to address sociocultural and environmental determinants of health, contributing to public health, global health, and environmental epidemiology. It aligns with EU research missions on health, well-being, equity, and gender, while engaging communities to co-develop tools for addressing toxicity and advancing sociocultural epidemiology.

The ethical dimension will underpin all stages of the research, ensuring participant protection, community collaboration, and respect for vulnerable groups. A Ramon y Cajal fellowship would enable me to further develop a research group focused on Toxicity in Post-Industrial Societies and advance innovative, participatory methodologies.

Resumen del Currículum Vitae:

I am a UKRI Guarantee Postdoctoral Fellow with the Horizon Europe MSCA Individual Award (2023/25) and Principal Investigator of the EthnoCC project (£236,748.48) at the University of Edinburgh, while also serving as an adjunct lecturer at URV. My career encompasses global projects funded by prestigious institutions, including the European Commission, UKRI, AECID, and Santander-CRUE, with leadership roles in projects C.3.1 and C.3.5.

I have authored 24 publications, including 3 Q1 (one as sole author), 5 Q2, and 1 Q3, with 137 citations (WoS/H-index3), 149 (Scopus/H-index3), and 401 (Google Scholar/H-index7). My research addresses health-seeking processes in marginalized communities, particularly in Guatemala and among Latin American migrants in Europe, focusing on sexual and reproductive health and neglected diseases and "stratified pharmaceuticalisation", including the examination of biomedical frameworks and processes of resistance to "othering". This work has contributed to the development of policy recommendations to reduce health inequalities and build inclusive health systems. I have also explored COVID-19's impact on caregivers, advocating for gender equality in caregiving during crises. And, in the field of toxicity, I have contextualized chemical emergency responses within "slow violence" (Nixon, 2011) frameworks, developing a stakeholder analysis tool for chemical risk communication. Theoretically, I introduced the concepts of "latent risk" and "lived efficacies", bridging phenomenology and political economy. My ongoing EthnoCC project focuses on intimacy in the UK, exploring early-stage cervical cancer through (auto)ethnographic and arts-based methodologies, employing concepts like "acoustic justice" (Labelle, 2024).

I actively collaborate with international researchers across Latin America, Europe, and the US, participate in networks such as EASA, AIBR, MARC, and IIEDG, and have evaluated World Health Organization proposals and reviewed for leading journals. I am the PI of EthnoCC and previously participated in the FP7 European COHEMI project. Starting in 2025, I will join the Catalan Institute of Oncology for a European project on cervical cancer screening and vaccination.

International research stays at institutions like the Institute of Tropical Medicine (Belgium), MRC Unit-The Gambia (LSHTM), and CBSS (University of Edinburgh) have advanced my expertise, complemented by upcoming visiting positions at the Health Equity Institute (San Francisco) and the University of Warsaw. I have presented at 30 scientific conferences, coordinated panels on health and risk, and organized workshops on migrant health and chemical risks.

I also collaborate with filmmakers and cultural institutions for public engagement, producing workshops, reports, films, and contracts with the Government of Catalonia. Accredited as a Tenure-Track Lecturer by AQU Catalunya (2019), I bring over a decade of teaching experience, supervising theses, coordinating seminars, and mentoring students within my research group.

My career reflects strong leadership, independence in research direction, success in securing funding, and expertise in managing multidisciplinary projects and building networks across career stages and disciplines.



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Turno General

Área Temática: Ciencias sociales
Nombre: OLLER ALONSO, MARTIN
Referencia: RYC2024-049449-I
Correo Electrónico: martin.olleralonso@gmail.com
Título: The proposed line of research: Detection, analysis and mitigation of religious hate speech among young people.

Resumen de la Memoria:

Throughout my scientific career, I have contributed to the field of communication, focusing on journalistic cultures and studies that address intolerance in the media against especially vulnerable groups. I have been actively involved in several activities aimed at disseminating the results of my research in projects such as COIN, PHARM and MEDIADELCOM. I have also been actively involved in all three waves of the international Worlds of Journalism Study (WJS), a collaborative research project conducted across more than 100 countries. During the second phase (2012-2016), I became a Regional Coordinator for Latin America and the Caribbean and became a member of the WJS Executive Committee. My responsibilities included managing national research teams, ensuring methodological alignment across participating countries, and overseeing data collection and analysis.

My international research experience spans Switzerland, England, France, Spain, Italy, Ecuador, Cuba and the United States. In particular, my work at the Università degli Studi di Milano (Italy) has been crucial in developing my skills and knowledge in comparative journalism in global contexts. My international experience also includes stays in other regions around the world as a visiting researcher at the Miami Institute for the Americas, University of Miami (USA) (15/10/2016-31/05/2017) and at the Faculty of Communication of the University of Havana (Cuba) in 2015 and 2017, where I developed the Graduate Course "Latin America, political and media confrontation", presented the lecture "Journalistic Culture in Latin America", and conducted workshops such as "Tools and Strategies for Content Analysis".

My time at the Miami Institute for the Americas and the School of Communication at the University of Havana has significantly enriched my career, especially in exploring journalism in diverse contexts. I also would like to highlight my stay in Ecuador, where I engaged in impactful research and teaching activities. I was awarded as a postdoctoral researcher within the "Prometeo" Project, a program financed by the Presidency of the Republic of Ecuador.

The proposed line of research aims to address the existing gap in the study of hate speech towards religions aimed at young audiences, with a comprehensive and integrated approach justified by the increasing exposure of young people to religious hate speech online, which can have detrimental effects on their psychological well-being and social attitudes. My scientific background is particularly relevant to this project, as my previous experience includes the analysis of hate speech, communication with vulnerable groups and designing audiovisual counter-narratives. Meanwhile, on this occasion, I delve into a novel area within my career: studying hate speech in the context of youth as an audience.

Resumen del Currículum Vitae:

Currently, I am a Principal Investigator in the framework of the Marie Skłodowska-Curie Actions program (H2020-MSCA-COFUND-2020-USAL4EXCELLENCE-PROOPI-663) at the University of Salamanca, within the Department of Sociology and Communication. In this project, I lead the design and execution of research on hate speech and counter narratives, using advanced technologies such as artificial intelligence to study biases and the relationship with hate crimes.

I have a PhD in Journalism from the Universidad Rey Juan Carlos (Spain), with an extensive background in the field of communication, especially in the study of journalistic cultures, political communication and media intolerance towards vulnerable groups. My career has been driven by my dedication to research and leadership in international projects, in which I have developed innovative approaches to media research and its social impact.

Throughout my career, I have coordinated and contributed to important research projects, such as PHARM, with funding of 362,131.85 euros, which focused on the effects of hate speech on journalists in Spain, Italy and Greece. I was also part of the MEDIADELCOM project, with a budget of 2,999,533.75, which analyzed media governance in the EU. Since November 2023, I am the PI of the COIN project, with a budget of 150,575.63, which addresses hate speech and its relation to real crimes using artificial intelligence.

My work has been published in more than 20 books and almost 60 articles in indexed scientific journals, including publications in high impact journals (Q1 JCR). I have also organized and participated in more than 90 conferences, impacting the development of new lines of research and international collaborations. I have received 1,239 citations in these works and have an H index of 19 on Google Scholar. In addition, I have presented my work at about 90 congresses, including reference forums such as ICA, IAMCR, and ECREA. Below, I present a selection of the 10 most relevant contributions, which I consider key to reflecting the impact and relevance of my scientific work.



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Turno General

Área Temática: Ciencias sociales
Nombre: SEKULOVA, FILKA
Referencia: RYC2024-049709-I
Correo Electrónico: fisekulova@gmail.com
Título: Just sustainability transitions

Resumen de la Memoria:

I am an established social environmental scientist conducting research in the fields of urban nature governance and postgrowth. My work aims at conceptualizing and advancing social justice and well-being for all within Earth's limits.

As a psychology graduate of Sofia University, I started my career as a chief researcher at the Amsterdam-based think-tank ASEED. In parallel, I did a second bachelor (on economics) at Universiteit van Amsterdam, and a Masters (in environmental economics) at Vrije Universiteit, Amsterdam. My academic trajectory continued with the pursuit of a PhD (2009-13) at the prestigious Institute of Environmental Science & Technology (ICTA)/Universitat Autònoma de Barcelona (UAB). My dissertation theorized climate change and sustainability transition from the perspective of subjective well-being. As of 2010, I laid the foundation for the emergent scholarly field of degrowth by writing academic articles, organizing academic conferences, directing postgraduate summer schools, and establishing Research & Degrowth as a path-breaking research think-tank. Upon my doctoral degree, I won a contract as an independent researcher at Greenpeace Eastern Europe in the field of energy transition and human health. Consequentially, I won a post-doctoral position at ICTA/UAB (2014-21). During 2020/21 I had a fellowship position at the Institute of Social Studies (Erasmus University, Rotterdam). Upon my return to Spain, I won a senior postdoctoral position at the Universitat Oberta de Catalunya (UOC), and sequentially - a senior researcher position at the Faculty of Economics at the University of Barcelona, where I am currently based (2024-onwards).

My academic leadership, research excellence and outstanding fundraising capacity is evidenced by the 7 competitive international research projects that I worked on and led/lead: TESS FP7 (2013-16) in the field of low-carbon community-led transition, where I coordinated a work-package on the qualitative evaluation of community-based initiatives (ICTA/UAB); B-MINCOME UIA (2017-19) on the provision of a Basic Income in Barcelona, where I was a Principal Investigator for ICTA/UAB leading the analysis on subjective well-being; NATURVATION Horizon 2020 (2016-2021) in the field of nature-based urban innovation, where I was a Principal Investigator for ICTA/UAB and led the work package on the equity implications of nature-based solutions; URBANA Horizon 2020 (2019-21) on the urban sustainability-social justice nexus, where I led the work package on environmental justice (ICTA/UAB); COOLSCHOOLS Horizon 2020 (2022-25) focusing on the benefits of climate-adaptive schoolyards in Europe, where I lead the work-package on the governance of greening schoolgrounds (IN3/UOC); MERGE Horizon Europe (2024-26), exploring pathways towards inclusive and sustainable well-being, where I lead the modelling and stakeholder engagement work package (UB); and MAPS Horizon Europe (2024-2028), dedicated to evaluating postgrowth policies through simulation models, where I lead the stakeholders' needs assessment work package (UB).

Through my research at the UAB, Greenpeace, the Institute of Social Studies, UOC, UB, and the supervision of 2 doctoral theses and 22 master's dissertations, I have established myself as a recognized scholar in the fields of the urban nature governance, post/degrowth, and subjective well-being.

Resumen del Currículum Vitae:

I am an established social and environmental scientist conducting research in the fields of urban nature governance and postgrowth. Currently I am a senior researcher at the Department of Economic History at the University of Barcelona. I am trained in psychology (Sofia University), economics (Universiteit van Amsterdam), and environmental economics (Vrije Universiteit van Amsterdam). During my PhD (on the economics of happiness and climate change) and postdoctoral studies at the Institute of Environmental Science & Technology (ICTA)/Universitat Autònoma de Barcelona (UAB), I developed a strong interdisciplinary focus, cutting across ecological economics, climate change, sustainability transition, and degrowth. The high quality of my scientific contribution (H-index 19; 3162 citations/Google Scholar) are evidenced by the 23 peer-reviewed papers in Q1 journals, (9 as a first author), > 10 book-chapters (Routledge, Edward Elgar), and 20 other conference proceeding papers/scientific reports I published and disseminated. I led two special issues (in Q1 journals) I as a first editor, wrote 2 books (Routledge, Diputació de Barcelona) and disseminated my work through > 70 public talks for academic and non-academic audiences, 29 of which at established international scientific conferences. I had/have postdoctoral positions at the UAB, UOC and UB and research stays/ contracts at Greenpeace and the Institute of Social Studies.

The relevance of my contribution to research and policy in the fields of post/degrowth, urban nature governance, socio-environmental movements and subjective well-being has been recognized through invitations to give open and plenary talks for academic centres like: the Pufendorf Institute (Sweden), the STEPS centre (UK), governmental bodies like the Municipality of Madrid, the Scottish Government & Biodiversity Convention, and NGOs like the European Green Foundation, the Stay Grounded and the Basic Income Network.

I hold the outstanding R3 Certificate and the Tenure-Assistant Professor Certification AQU.

I participate(d) in 7 large-scale European research projects as a PI, or a work-package leader: TESS FP7 (€ 3.6); B-Mincome UIA, (€ 4.8), NATURVATION Horizon 2020 (€ 7.8 million), URBANA Horizon 2020 (€ 1.5) COOLSCHOOLS Horizon 2020 (€ 1.5 million), MERGE Horizon Europe (€ 3.6 million) and MAPS Horizon Europe (€ 3.8 million). In all of these I have guided/guide substantial part of the project-coordination, leading key work-packages and undertaking scientific coordination and research delivery. I participate/d in 4 research projects funded by the Spanish ministry of Science and Innovation as a member of the scientific team.



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I worked as a Chief Researcher at ASEED (Netherlands), and a research fellow at Greenpeace Eastern Europe. Over 2020-2021 I was a Visiting Fellow at the Institute of Social Studies (The Hague, Netherlands). I am a member of the Barcelona Lab for Urban Environmental Justice (ICTA/UAB), and founder of the academic think-tank Research & Degrowth, which I led as a president between 2016-2018.

I am a founder of, and course-coordinator/lecturer at, the "Masters on Political Ecology", and "Masters on Degrowth" at UAB). I initiated and directed the post-graduate summer schools on degrowth (ICTA/UAB), supervised 22 Master's theses and two PhD dissertations.



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Turno General

Área Temática: Ciencias sociales
Nombre: MENÉNDEZ GONZÁLEZ, IRENE
Referencia: RYC2024-049316-I
Correo Electrónico: irenemenendez@gmail.com
Título: The political economy of globalization and social protection

Resumen de la Memoria:

My research studies issues of international and comparative political economy, with a focus on the intersection between the global economy and domestic politics. In particular, it revolves around the links between globalization, interests and institutions, and their effects on policy and political representation. Underpinning much of my research is the question of “who gets what policy, and why?” in response to deepening globalization and the shocks that ripple through interconnected economies. In contrast to much work in political economy, I focus on neglected micro-foundations to understand the structure of demand for policy, which I combine with work on the responsiveness of politicians. This matters because it can shed light more directly on who the winners and losers are from a given policy and the political coalitions that can be crafted. It is also a core topic in political science, economics and sociology.

More particularly, my research agenda to date revolves around three main themes. First, on the intersection between the global economy and domestic politics, with a focus on the political consequences of globalization. A second focus is on the politics of welfare state and informality. Third, my work also explores the effects of institutions on political representation. Methodologically, I rely on surveys, experiments (field, natural and survey) and administrative data. Most of my work is on Latin America and Western Europe.

Over the next 5 years, I aim to further our understanding of the politics of and the policies governing the global political economy and social protection, across geography and institutional settings, in order to shape academic debates and public policy. I will rely on observational data, including fine-grained administrative data, and natural and survey experiments as sources of causal identification. Empirically, I aim to expand the scope to other countries in Latin America and Europe.

A first line of research will explore the changing nature of the global economy and its political consequences in middle-income economies. Focusing on a diverse set of Latin American countries, as well as Spain and US, it asks to what extent the changing nature of international trade shapes electoral outcomes in middle-income countries, and whether this is driven by attitudes on economic nationalism. A second line of research examines the uneven enforcement of the law, its political rationale and how it shapes political support, particularly in crisis-hit economies. Going beyond enforcement or forbearance as political responses to non-compliance, I aim to conduct a cross-country, multi-disciplinary study of uneven enforcement in diverse Latin American countries that asks, first, what is the menu of choice that governments have to induce compliance with regulations, particularly during (recurrent) crises? And second, how politically sustainable are they? A third line of research focuses on the political responses to the rise of protectionism. It asks to what extent political institutions shape legislative responses to the trade wars started abroad. Focusing on a diverse set of national and supra-national parliaments in Europe and Latin America, I will analyze how electoral institutions, which define fundamental rules of the game in representative democracies, shape legislators’ votes on trade policy.

Resumen del Currículum Vitae:

I am an Assistant Professor of International Political Economy at IE University. I am also an associate researcher at the Cluster of Excellence on the “Politics of Inequality” at the University of Konstanz. I am a researcher in international and comparative political economy, with a focus on globalization, welfare states and political representation.

I grew up in different parts of Europe and the Middle East, and attended the University of St Andrews (Scotland). I developed an international career in research in the 20 years that followed. I completed a first Masters degree in Sciences Po (Paris) and then spent 2 years working as a junior researcher at a think tank on international affairs (FRIDE, Madrid). Seeking to ground policy in sound research, I completed a second fully-funded research-oriented Masters degree at the Juan March Institute (Madrid). I then obtained a PhD at the University of Oxford, ranked among the top 3 universities worldwide on social science research, with full funding from Caja Madrid and La Caixa Fellowships. During my PhD, on the political consequences of globalization and how economic geography shapes them, I spent 1 year doing fieldwork in Argentina and Spain and held a visiting fellowship at the Universidad Torcuato di Tella in Buenos Aires. Before joining IE University, I was an Assistant Professor at the University of Mannheim, a research fellow at the Institute for Advanced Study in Toulouse, and a post-doctoral fellow at the University of Zurich.

My research has been published in some of the top journals of the discipline, including the American Political Science Review, the British Journal of Political Science and Comparative Political Studies. I have published 8 peer-reviewed articles (of which 4 in top Q1 journals), 2 chapters in edited (peer-reviewed) volumes and 3 policy reports.

My research has also obtained recognition from the discipline through grants, awards, invited talks and award committees. It has been supported by public and private funders, jointly amounting to about 220,000 EUR. Some of my work has received awards from the discipline. In 2021, I was awarded a competitive 3-month senior research fellowship at the University of Konstanz’s Cluster of Excellence on the “Politics of inequality”. A single-authored paper published in Comparative Political Studies won the best post-graduate prize at the Annual Meeting of the Red de Economía Política de América Latina in 2018. A paper on trade and the politics of electoral reform received the McGillivray Award for Best Paper in Political Economy presented at the 2022 American Political Science Association (APSA) meeting. I have delivered 43 presentations and invited talks in Europe and Latin America, and regularly peer-review for top journals.



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I have served in 2 international award committees, including the 2024 William Riker Best Book Award Committee for APSA's political economy section, and the 2023 Premio Nacional en Ciencia Política for Best Article for Uruguay's Political Science Association. I am serving as the organizer of the political economy section of the European Political Science Association in June 2025. Finally, I engage actively with policymakers and the policy community as well as journalists, presenting my research in national and international (European and Latin American) fora.



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Turno General

Área Temática: Ciencias sociales
Nombre: ALMENARA NIEBLA, SILVIA
Referencia: RYC2024-049312-I
Correo Electrónico: silvia.an89@gmail.com
Título: Navigating Borders: Migration and Gendered Media Practices

Resumen de la Memoria:

I have established myself as a media anthropologist focused on the intersection of emotions and borders, particularly through the analysis of everyday gendered media practices among refugees, borderlanders, and activists. My main contributions include an innovative framework for the study of migration through digital media practices in the Sahrawi case in Algeria, Spain, and Mauritania, as well as the bordering experiences through visual methods related to film in different European and non-European borders. The results of my research have been published in 18 academic journals, 6 book chapters, 1 encyclopedia entry, and they have been presented at leading academic conferences. My career has greatly benefited from different research stays and training in institutions in Europe and the MENA region, including a postdoctoral and project manager position at the ERC Starting Grant Reel Borders at VUB (Belgium), where I have led two work packages and developed a new methodological line based on film elicitation and participatory methods. As project manager, I have consolidated my previous management skills through the coordination of several research tasks such as the ethical plan, internships, research stays, student assistants, report management, etc. During my PhD, I was awarded the Best Paper Award at the Fortress Europe conference and the Extraordinary Doctoral Prize from ULL. I also received two scholarships to conduct research stays at prestigious institutions, including the University of Oxford (UK) and Utrecht University (NL). I have accumulated significant fieldwork experience in countries such as Algeria, Mauritania, Northern Ireland, Spain, and Turkey, where I have also conducted research stays at Nouakchott Al Aasriya University (MAUR), Queen's University Belfast (UK), Granada University (ES), and Çukurova University (TR).

I have also participated in national competitive research projects, including CrisisNewEUmob funded by the Ministerio de Ciencia e Innovación, and CIMPI of the regional competitive call of the Canary Islands Research Agency. I act as Vice Chair of the Diaspora, Migration, and Media section of the European Communication Research & Education Association (ECREA), for which I have been organizing several conferences. I am part of the scientific committee of the Western Sahara International Academic Observatory (OUIISO) led by Université Paris Descartes where I have organized various workshops and coordinated a special issue. I have also participated in the successful writing of the ERC Starting Grant proposal "Reel Borders", and an ERC Consolidator Grant proposal. I have also written successful research projects for the FCT (Portugal). I am also a member of the editorial board of the Journal of Global Diasporas and Media, and I was director of the journal Clepsydra. I have also contributed to dissemination activities as migration expert in the United States Institute of Peace, European Parliament and TV shows in Euronews. I have accumulated several hours of teaching (ULL and VUB) and supervision (VUB) of students. I have been invited as guest lecture in Granada University, UAM, ISCTE Portugal, Erasmus University Rotterdam, etc. I have also been member of 1 PhD committee, as well as other ongoing, and two research awards and 1 PhD scholarship.

Resumen del Currículum Vitae:

I'm currently a postdoctoral researcher and project manager (80%) at the Department of Communication Studies of Vrije Universiteit Brussel (VUB) on the ERC Starting Grant project Reel Borders led by Prof. Kevin Smets (2021-2025). I'm also a Guest Lecture (20%) at the same department, where I am titular of two courses at the BA of Social Sciences and the MA New Media and Society in Europe. I have significantly contributed to academic research through 18 peer reviewed articles (with 7 JCR, 7 Q1/Q2) with 3 solo author in JCR Q1 and 2 as first author in JCR Q1/Q2. I have also contributed with different book chapters and encyclopedia entries. I am currently leading publication projects in my main lines of research. I have presented in 26 international conferences and invited guest lectures and talks in different universities of The Netherlands, Canada, Portugal, Spain and Belgium. I have complemented my training with international research stays in the UK, the Netherlands, Mauritania, Turkey, and other universities in Spain (Universidad de Granada). I have also conducted fieldwork research stays in several locations in Algeria and Ireland. I have secured funding at PhD and Postdoc levels in different international and national calls. I have coordinated one working package and co-coordinated another at Reel Borders, where I have been responsible of supervision of students, data collection, analysis and dissemination of results.

My involvement in international projects reflects my dedicated effort to build a noteworthy international academic profile. I'm vice-chair of the Diaspora, Migration and the Media section of European Communication Research & Education Association (ECREA), where I have been responsible for the organization of international conferences (Rotterdam 2023; Tallin 2025) and PhD workshops (Aarhus 2022). I'm part of the scientific committee of OUIISO (Western Sahara International Academic Observatory) where I have coordinated a Research Seminar (2022). I'm also part of the board committee of BIRMM (Brussels Interdisciplinary Research Centre on Migration and Minorities, where I have been involved collaboratively organizing research days and other activities. Furthermore, I have editorial experience in the Journal of Global Diasporas and Media (SCOPUS), as currently associate editor. I was co-director of the Journal Clepsydra. During my PhD, I received two research awards Best Paper Award at the Conference Fortress Europe (2019) and Extraordinary Doctoral Prize (ULL), and we were finalist of the ERC Public Engagement Award (2024). Regarding teaching and supervision of students, I have supervised 5 thesis in the MA New Media and Europe (VUB), 1 Bachelor thesis in the International BA of Social Science (VUB). I have also supervised visiting scholars (1), student internships (2) and student assistants (10). I have accumulated more than 300 teaching hours both in ULL and VUB. I have participated as vocal on 1 PhD committee (Dec 2024) and I have been invited as PhD committee member (Jan 2025). I have participated as jury member of 2 scientific awards and 1 international PhD Proposal (2021). I was invited to give advice to policy makers in the United States Institute of Peace and the European Parliament (2). I have contributed to several dissemination activities and as an expert on migration for the television channel Euronews.



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Turno General

Área Temática: Ciencias sociales
Nombre: DÍAZ FERNÁNDEZ, SILVIA
Referencia: RYC2024-048296-I
Correo Electrónico: silviadiaz93@gmail.com
Título: Contemporary anti-feminism in media, digital culture and politics

Resumen de la Memoria:

I am a Postdoctoral Researcher hired in the Horizon Europe funded research project CCINDLE (CO-CREATING INCLUSIVE INTERSECTIONAL DEMOCRATIC SPACES ACROSS EUROPE, GA: 101061256, 2022-2026) at the Department of Political Science and Administration at UCM, where I develop novel work exploring campaigns opposing gender equality and feminism in Europe. I obtained my PhD in Media Studies at Coventry University in July 2020. My thesis combined Digital Media Studies and Feminist Sociology Studies to analyse anti-feminism in UK Higher Education. I have produced 10 indexed publications, including 1 solo authored article (Q2) and book chapter in a high impact editorial, and 7 first author articles (Q1-Q3). Additionally, I have been the Principal Investigator of 1 European highly competitive project: a Marie Skłodowska-Curie Actions Individual Fellowship with the project TELAIGEN (The Spanish Telecommunication Sector and the Development of AI Products from a Gender Perspective). Through my work, I have made pioneering contributions to the fields of Media and Culture, Gender Studies, and Sociology, and advanced a unique research line that focuses on the entanglement between gender, new digital technologies and anti-feminist socio-political discourses, integrating literatures that rarely interact, and using innovative qualitative methods to develop novel empirical analyses that expand the frontiers of research. I have disseminated my research in over 25 of the main international and national conferences in my fields, and given various invited talks at both academic and knowledge transfer events.

My academic career spans three countries and encompasses a PhD in the UK, research visits, participation in European projects, and collaboration with both international and national research groups. Chronologically, my involvement includes: (i) The Gender and Politics Research Group at UCM, where I am currently a postdoctoral researcher working on the Horizon 2020 CCINDLE project; (ii) A three-month research visit to the Department of Sociology at Trento University to advance the CCINDLE line of investigation; (iii) Collaboration in the Spanish Research Agency-funded project DIVISAR at UCM, where I have been deeply involved from its inception and design to its implementation, including organising the first national conference on Anti-Feminism, the Manosphere, and Masculinities; (iv) Serving as Principal Investigator (PI) of the MSCA-funded TELAIGEN project at the Department of Communication, Carlos III University; (v) A postdoctoral position at UCM for the JovMan project, where I co-designed an innovative methodology, conducted analysis, and co-authored the final report; (vi) A postdoctoral role in the H2020 RAISD project at UCM, where I led the Spanish case study, implementing the methodological design and coordinating qualitative data collection and analysis across consortium teams; and (vii) Completion of my PhD in Media Studies at the School of Media and Performing Arts & Centre for Postdigital Cultures, Coventry University.

I have also contributed to knowledge transfer, especially to academic and feminist organisations, as an expert in anti-feminism and digital media culture. I have 4 years of teaching and supervision experience in both Spain and United Kingdom, having taught at BA and MA level courses relating to media culture, gender and sociology.

Resumen del Currículum Vitae:

I am a postdoctoral researcher for the European project Co-Creating Inclusive Intersectional Democratic Spaces Across Europe (CCINDLE, GA No. 101061256) in the Department of Political Science and Administration since 2023. Previously, I was the principal investigator of the Marie Skłodowska-Curie Actions project The Spanish Telecommunication Sector and the Development of AI Products from a Gender Perspective (TELAIGEN, No. 101028792), which I carried out in the Department of Communication at Carlos III University. I earned my PhD in Media Studies in 2020 from Coventry University, United Kingdom. In 2022, I received accreditation as an Associate Professor (ANECA, 2022/02032).

I have produced 10 indexed publications, including 1 solo authored article (Q2) and book chapter in a high impact editorial, and 7 first author articles (Q1-Q3), in high impact journal articles such as New Media & Society (Q1 JCR), or European Journal of Cultural Studies (Q1 JCR). These publications have all made ground-breaking contributions to fields of Media and Culture, Gender Studies and Sociology, by advancing a unique line of interdisciplinary research to study and address the urgent social problem of anti-feminism, misogyny and violence.

As a postdoctoral researcher I have participated in 5 international and national research projects: (i) as a PI of the TELAIGEN project at UCM; (ii) as a team member in the Horizon Europe CCINDLE project at UCM, to which I meaningfully contribute through my interdisciplinary expertise in digital culture, gender and sociology, conducting the case study in Spain; (iii) as a team member in the DIVISAR project at UCM, where I played a significant role from its inception and design to its implementation, including organising the first national conference on Anti-Feminism, the Manosphere, and Masculinities; (iv) in the JovMan project at UCM, to which I contributed by co-designing the innovative methodology, carrying out the analysis and co-authoring the final report; and (v) in the H2020 RAISD project at UCM, where I conducted the Spanish case study, being responsible for the implementation of the methodology and coordination of qualitative data collection and analysis across teams in the consortium.

In 2024, I further advanced my internationalisation profile as a visiting researcher at Trento University, under the supervision of renowned social movement scholar Elena Pavan. I have presented my research at over 25 national and international conferences and delivered multiple invited talks, sharing my expertise on digital media and anti-feminism at both academic events and public knowledge transfer initiatives. Finally, I have 4 years of teaching and mentoring experience, I have six taught 7.5 ECTS modules in the MA in Communication, Culture, and Media at Coventry University (2018-2020) and one 10 ECTS module in the BA in Contemporary Media Cultures at the University of the Arts, London (2019). Additionally, I have been invited to deliver full seminars on digital misogyny, politics, and anti-feminism at the Cátedra Extraordinaria of Democratic Values and Gender at UCM and in the Gender and Politics course for the BA in Political Science and European Studies at UCM. My supervisory experience includes co-supervising two Ministry of Education-funded collaborative scholarships, supervising 29 Master's theses at Coventry University, and directing the PhD of Luisa Fernanda Espinal in Humanities at Universidad EAFIT, Colombia.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias sociales
Nombre: GONZÁLEZ HIDALGO, MARIEN
Referencia: RYC2024-049831-I
Correo Electrónico: marien.gonzalezhidalgo@gmail.com
Título: The role of emotions in environmental disasters and conflicts

Resumen de la Memoria:

My research is situated within the interdisciplinary field of political ecology, which combines human geography with a range of critical social sciences to analyse environmental impacts and challenges. One of my most significant contributions to this field has been the proposal to consider the role of emotions in socio-environmental processes, including conflicts and disasters. In this regard, the development of my research line on "emotional political ecologies" has facilitated a more profound comprehension of political role that emotions play in environmental conflicts and disasters. This critical, committed and, simultaneously, affective perspective in political ecology studies established the foundations for the project that I am currently leading as a researcher at the Swedish University of Agricultural Sciences (Uppsala, Sweden), "Learning from forest fires: Analysing unequal impacts, well-being and local knowledge and action". The project includes funds for fieldwork in Spain, Sweden and Chile, and the assistance of temporary research assistants, like master students or postdocs.

In addition to my experience publishing in high-impact journals, I have disseminated the results of my research to activists, civil society organisations, foundations, policymakers, and the broader public. My main dissemination activities/outputs include pedagogic materials for undergraduate, basic and master education; academic-activist political ecology editorial projects; reports and briefs for foundations, civil society organisations and policymakers and conferences and seminars directed at civil society organisations.

From the beginning of my research career until now, it has had a strong international focus: in recent years, I have visited and participated in research programmes in several European countries, such as Spain, Portugal, Austria, Norway, Sweden, as well as in Latin America, in Argentina, Chile and Colombia. This high level of mobility has allowed me to develop a very international profile, which has been strengthened by my participation in, collaboration with and leadership of international research groups; research stays at renowned institutions; participation in international research networks and my international fieldwork and training experience in the last ten years.

Throughout my career, I have demonstrated independence and leadership as a scholar, by: obtaining highly competitive grants and executing research projects as PI; initiating and leading collaborative writing projects; contributing to the organisation of international scientific meetings, supporting the development of my field through editorial and review work; mentoring and supervising students at PhD, master's and undergraduate level; and designing and delivering courses at PhD, master's and undergraduate level.

In the coming years my plan is to analyse the unequal impacts and psycho-social coping strategies in both rural and urban contexts affected by a diversity of climate disasters, like floods, heat waves, etc. A Ramón y Cajal fellowship would help me to undertake a comparative examination of psychosocial recovery efforts of multiple climate disasters, cutting across the specificities of different resources and geographies, and addressing the question of how such interventions contribute to emancipatory socio-environmental transformations.

Resumen del Currículum Vitae:

Currently, I am a researcher at the Department of Rural and Urban Development at the Swedish University of Agricultural Sciences, in Uppsala, Sweden. I am an interdisciplinary social scientist trained in human geography and political ecology. My work focuses in the role that emotions play on environmental transformations, focusing primarily on environmental conflicts and disasters. Throughout my research career, I have made significant contributions to my research line, by publishing engaged, empirically-grounded and theoretically innovative work in highly regarded outlets. I have built an excellent publication record relative to my career stage and the scholarly standards of my field. I have published 18 articles in leading international refereed journals, 10 of which are in JCR Q1 journals. I have presented my work and organised sessions in 16 international conferences across four continents, including in annual meetings of the most prestigious scholarly networks in my discipline. I have furthered the dissemination of scientific results and ideas beyond specialized audiences, by publishing policy and disseminating policy briefs and organising outreach events for/with civil society organisations. I also have ample, international teaching experience in diverse bachelor, master and PhD programs on my topic.

My career profile is highly international. I have held academic positions and conducted research stays in prestigious international institutions in Sweden, Spain, Portugal and Chile. I have been involved in and contributed to national and international research projects, including the Marie Curie ITN "ENTITLE" European Network of Political Ecology. I have conducted fieldwork and research secondments in European and Latin American countries, and I am inserted in ample academic networks. I have published and organised events through international collaborations with colleagues from some of the most important political ecology research institutes globally.

I have demonstrated research independence by executing a major international research project as Principal Investigator (PI), funded by the Swedish Research Council for Sustainable Development FORMAS and financed with circa €430.000. My leadership position in collaborative endeavours is additionally demonstrated by my role as co-PI and collaborator of several research projects from international funding bodies, including the European Commission, the Spanish Minister of Science and Innovation (Spain) and Chile's National Research and Development Agency. I have experience as a journal editor in one of the key publications in political ecology in Spain and Latin America (Ecología Política), and have reviewed extensively for 13 of the most important outlets in my field. I am also a core editor and contributor to the widely read on-line political ecology project Undisciplined Environments. Finally, I have participated so far in the supervision of three doctoral dissertations and 8 master's theses in international programs hosted by Swedish and European universities. In this regard, I have received specific pedagogical training for the supervision of PhD students, and I am currently awaiting accreditation as Associate Professor at the Department of Urban and Rural Development at the Swedish University of Agricultural Sciences.



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Turno General

Área Temática: Ciencias sociales
Nombre: ROY, ARPAN
Referencia: RYC2024-048582-I
Correo Electrónico: arpanroy2@gmail.com
Título: Connected Christianities

Resumen de la Memoria:

This project explores the movement of Christian theology within the Arab world—a “Connected Christianities”—using the concept of “connected history” (histoire croisée) as elaborated by contemporary historians like Sanjay Subrahmanyam (2003, 1997) and Bernard Heyberger (2023, 2013), but anthropologically, and in the ethnographic present. By applying this “connected” framework, the project will highlight the intricate networks and interactions that have shaped Arab Christian intellectual life beyond “transnational” models of analysis that take modern state formations as a starting point (e.g., Al-Rasheed 2005). Instead, this project draws from earlier forms of globalization that “connected” ideas and traditions irrespective of neatly organized polities—such as Catholic and Orthodox institutions, missionary networks, Christian publishing houses, and theological seminaries—and their continuities into present-day state regimes.

The main objective of this project is to put forward original case studies illustrating how Christian thought within the Arab world intermingles, exchanges, and evolves across its centers, helping give shape to a cohesive regional intellectual identity. Key questions denoting this objective include: (1) Movement of Religious Ideas: What are the ways in which Christian ideas move across states, regions, and languages within the contemporary Arab world? “Movement” here refers to both the dissemination of ideas through materialist mediums like publishing houses, theological seminaries, religious conferences, television stations, and digital platforms (Anderson 1991, Messick 1996), and also to affective and deeply individual responses to political calamity, circumstance, and opportunity. As such, this project takes interest both in the institutional movement of ideas and in individuals as agents of change. (2) Regional Integrity: In a post-Ottoman and (mostly) postcolonial Arab world in which individual nation-states have replaced imperial centralized governance, to what extent does the movement of Christian theology and ideas contribute to the integrity of the region itself? How does the spread and consolidation of theology constitute interconnected constellations that stitch together a viable regional identity and ethos? Where do these connections loosen and deteriorate? What do these connections tell us about economic and cultural capital in the region today? (3) Interplay of Historical and Modern Empires: How do religious legacies of historical empires like the Byzantine and Ottoman interact with religious agendas of more recent empires and powers, such as British, French, Soviet, American, Gulf, and Israeli influences? What is the continuing legacy, for instance, of the supplanting of long-established religious institutions like the Orthodox Church by Evangelical movements (Makdisi 2008), or in another case, the shaping of Arab Christian theological frameworks in response to European colonial ideologies and postcolonial realities? This project conceptually reimagines the study of Arab Christianity by taking a holistic regional perspective. While recognizing the really-existing-fact of political borders and bounded religious traditions, it nonetheless focuses on continuities and connections, and on the intertwining of historical legacies and contemporary movements.

Resumen del Currículum Vitae:

I am a sociocultural anthropologist researching in the Middle East. I am presently a Marie Skłodowska-Curie Postdoctoral Fellow at Leibniz-Zentrum Moderner Orient in Berlin, as well as an Affiliated Researcher at the Orient-Institut Beirut. Previously, I was a Research Associate in the Program in Islamic Studies at Johns Hopkins University. I earned my PhD in Anthropology from Johns Hopkins in 2021. I am the author of 24 publications: 3 books (1 in press), 7 journal articles (1 under review), 3 book chapters (1 in press), 2 book reviews (1 in press), and 9 articles in major magazines and newspapers. My books have been published by some of the leading publishers like University of Toronto Press and Pluto Press, and my articles have appeared in the highest ranked journals in anthropology and related fields. My work revolves around themes of difference and plurality in the Middle East, investigating creative forms of life and pluralism within a wider Arab/Islamic ethos, with a particular focus on Palestine and Jordan, and currently expanding to Lebanon. My current research investigates theologies of missionary work in Arab Christian communities. Given that evangelizing efforts in Muslim-majority countries are often restricted both by law and social sensitivities, I am interested in this research in how practical limits of missionary work are mitigated theologically; whether the compulsion to evangelize is abandoned all together, or whether the concept of the mission discursively shifts as it enters into dialogue with Islam. I began the first phase of this research with ten months of fieldwork in Jordan as a National Endowment for the Humanities (NEH) fellow, and I am currently expanding the project to elsewhere in the region.

This new research builds on my first book, published in 2024 by University of Toronto Press, titled *Relative Strangers: Romani Kinship and Palestinian Difference*. Based on long-term ethnography with Romani groups in Palestine, I focus in my book on how memory and kinship work together to articulate a kind of alterity that is not visible by obvious markers like religious difference, race, or language; making difference as such undetectable by the antennas of the state. The book has received praise from top anthropologists and is poised to make a major intervention in scholarship on the region. Despite its recent publication, I have already received several invitations to present the book in several venues, including in February 2025 as part of the prestigious Gellner Seminar series in Prague, and to host a book launch at the Arabic cultural hub and bookstore Khan Aljanub in Berlin.

In addition to my monograph, I have recently finished co-editing a multidisciplinary book project conceptualizing Palestinian difference and plurality titled *Naseej: Life-Weavings of Palestine*—published in 2025 by Pluto Press. I have previously published research articles in *Anthropological Theory*, *Social Anthropology/Anthropologie Sociale*, *Jerusalem Quarterly*, and *CITY*, as well as public scholarship in several newspapers and online magazines. My work has been supported by grants and fellowships (in addition to the MSCA and the NEH) from the Palestinian American Research Center and the A.M. Al-Qattan Foundation, and I have received several grants to study Arabic from the Andrew W. Mellon Foundation and the Foreign Language and Area Studies program of the U.S. Department of Education.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias sociales
Nombre: KRAKOWSKI, KRZYSZTOF KONRAD
Referencia: RYC2024-048813-I
Correo Electrónico: krzysztof.k.krakowski@gmail.com
Título: Political economy of peace and conflict

Resumen de la Memoria:

My research focuses on the political economy of peace and conflict, exploring why some societies recover swiftly from violence while others remain trapped in cycles of polarization and underdevelopment. My work, published in leading journals such as American Journal of Political Science and American Political Science Review, provides key insights into discrimination, state repression, and civic engagement. As Principal Investigator, I have secured major research grants, including €9,700 for the Mapping Alumni Networks project at the European University Institute and \$6,000 for the Legacies of Conflict initiative at UNU-Wider. I have also co-led impactful studies, such as a £50,000 survey on political violence in Kosovo for the British Council and a \$30,000 field experiment on accountability in Argentina for the Inter-American Development Bank.

My academic output includes 14 peer-reviewed articles (9 in JCR Q1), two book chapters, and 14 working papers. I have presented my research at top universities, including Yale, NYU, and Oxford, reflecting the global impact of my work. Additionally, I have organized panels and contributed to interdisciplinary dialogue at high-profile conferences. My leadership in the field is demonstrated by the forthcoming special issue on political violence in democracies in the Journal of Peace Research, to which I am a contributing author.

I am also deeply committed to mentoring early-career scholars and students. At Collegio Carlo Alberto, I led the Allievi program, which prepared students for fully-funded PhDs at prestigious institutions such as the European University Institute and the University of Pennsylvania. I have supervised several master's and doctoral theses, including a project analyzing the effects of political memes on youth engagement in Italy, which is now awaiting public defense.

Beyond academia, I actively bridge theory and practice through policy briefs and media outreach. My research has informed organizations like the British Council and the Polish Debating Foundation, addressing governance challenges and promoting civic engagement. I have also presented my findings to practitioners, such as during the 2024 CIMCON event in Colombia, where I discussed strategies to combat organized crime. My public engagement extends to media outlets like Newsweek, The Guardian, and Project Syndicate, allowing me to reach broader audiences and contribute to public discourse.

Looking ahead, my research agenda focuses on four key areas: understanding post-conflict recovery dynamics, exploring the interplay between formal and informal institutions in divided societies, evaluating the effects of inclusion policies, and examining the sustainability of diverse societies. These avenues will not only advance evidence-based strategies for peacebuilding and governance but also generate high-impact publications, open-access tools, and practical resources for policymakers. My ongoing and future work aims to serve as a foundation for large-scale projects and further competitive grant applications, ensuring a lasting contribution to the fields of political economy and conflict studies.

Resumen del Currículum Vitae:

My research focuses on the political economy of peace and conflict, aiming to understand why some conflict-affected societies recover swiftly while others remain trapped in cycles of violence, underdevelopment, and polarization. I have published in high-impact journals such as American Journal of Political Science and American Political Science Review, addressing topics like discrimination, state repression, and intergroup cooperation. My findings reveal how violence influences both peaceful and radical forms of civic engagement, contributing significantly to academic understanding. I have led projects such as Mapping Alumni Networks (EUI, €9,700) and Legacies of Conflict (UNU-Wider, \$6,000), and secured two seed grants of €5,980 each at Collegio Carlo Alberto. As Co-Principal Investigator, I supervised a British Council study on political violence in Kosovo (£50,000) and a randomized controlled trial on school debating in Poland (NYU-Abu Dhabi, \$10,000). These projects have generated innovative hypotheses, robust results, and practical applications. International collaboration is central to my work. I have co-authored articles with researchers from WZB Berlin, Yale, and NYU-Abu Dhabi. My affiliations with Yale's Identity and Conflict Lab and the University of Bern (2022-2024) have fostered interdisciplinary research. Additionally, I organized the QPE Early Career Workshop at King's College London, reinforcing my leadership role in the field.

My research has tangible societal impacts, providing tools and insights for addressing challenges in conflict-prone areas. I have prepared policy briefs for organizations like the British Council in Kosovo and the Debating Foundation in Warsaw, promoting governance and critical thinking. Through media outlets such as Project Syndicate, Gazeta Wyborcza, and Polish Radio, I have shared findings on political violence, misinformation, and organized crime. I've also disseminated research via podcasts and blogs (e.g. Broadstreet Blog), ensuring accessibility to broader audiences. Furthermore, I am committed to creating open-access educational tools and protocols that promote cooperation and civic engagement, offering practical resources to policymakers and practitioners.

I have mentored postgraduate and undergraduate students at Collegio Carlo Alberto and King's College London. My students have secured fully-funded PhD scholarships at top institutions, including the European University Institute, University of Pennsylvania, University of Amsterdam, and University of Milan. I also supervised Pietro Saccomanno's doctoral thesis, which investigates the impact of political memes on engagement and polarization in Italy. Additionally, I contributed to the design of a master's program at Collegio Carlo Alberto and played an active role in building research teams. My editorial contributions include reviewing for top journals such as American Sociological Review, American Journal of Political Science, Comparative Political Studies, Journal of Conflict Resolution and Oxford University Press, ensuring academic rigor in the field.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

My research agenda advances knowledge in emerging areas, such as the impact of resource privatization in India, where I found that these policies reduced intergroup conflict by fastering water access for disadvantaged groups. This study provides causal evidence on how resource alloca



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Turno General

Área Temática: Ciencias sociales
Nombre: LAFUENTE FUNES, SARA
Referencia: RYC2024-051346-I
Correo Electrónico: sara.lafuente.funes@gmail.com
Título: A comprehensive study of the Spanish fertility market and reproductive landscape

Resumen de la Memoria:

Over a decade ago I started investigating how discourses and practices on reproduction reproduced sociopolitical, economic and gender ideals. As a sociologist of science, I specialized in assisted reproduction, studying it through interdisciplinary dialogues (with economists, anthropologists, biologists, etc.). I recently joined the department "Sociology: Methodology and Theory" at Universidad Complutense as a lecturer (Profesor Ayudante Doctor). On my previous position (2019-2024) I was a core part of the CRYOSOCIETIES ERC project at Goethe University Frankfurt. In it, I explored how freezing life embryos and egg cells shapes current modes of reproduction in Spain, the biggest reproductive hub in Europe, and modifies ways of understanding life through suspension. Prior to this project, I worked for a comparative study of egg donation in the UK, Belgium and Spain (EDNA) led by Nicky Hudson and funded by the UK Economic and Social Research Council (ESRC). For conceptualizing this project I contributed ideas from my PhD, which focused on the role of eggs in Spanish bioeconomies. The EDNA project allowed me to further investigate the role of egg donors in this bioeconomy, as my previous research focused on the professional's side of it. My PhD thesis, "Reproductive Bioeconomies: On how eggs come to matter within after-IVF biology" (2017) already studied the Spanish reproductive bioeconomy, focusing on egg donation from the side of professionals. This thesis was also developed under a full-time research contract, a FPI at the Spanish National Research Council (CSIC) under the research project BioARREME. The thesis obtained the maximum possible qualification and the Outstanding Award. Several publications came out of it including an extensively modified monograph "Mercados Reproductivos: Crisis, Deseo y Desigualdad" (2021).

Through these three research projects and positions I have studied assisted reproduction in Spain for over a decade. My aim at acquiring a RyC is to use this knowledge to keep on enlarging this research, the international and interdisciplinary links achieved through it, and to expand it into further domains and dialogues. The ever-growing field of AR is of key importance globally, but even more in Spain, where 11% of babies come from reproductive clinics, and demographic tendencies are characterized by a huge decrease of the birth rate (1,2) and a drastic increase of the age for a first child (32). This field is as well important given fertility clinics have come to be a key industry in Spain, with private clinics generating over a billion per year. I developed a theoretical approach to understand the Spanish reproductive bioeconomy and its context. To understand the current situation in the country I proposed the concept "reproductive crisis" an idea I aim at further developing under the RyC scheme. The concept aims to bring together the emergence of the fertility industry with low birth rates, the postponement of reproduction and the increasing levels of reproductive uncertainty and frustration. I have also coined a new term to analyze transferences of reproductive capacities in this context (such as egg donation), and I have specialized on following biotechnological developments in the field, in close collaboration with biologists, doctors, and other researchers internationally.

Resumen del Currículum Vitae:

I have 10 peer review indexed publications (JCR/SJR) published between 2019 and 2024, including Q1, Q2, Q3 and Q4 solo and co-authored publications. In addition to those, I published a monograph in 2021. Furthermore, I also participated in three edited volumes published in widely recognized Editorials: two in Palgrave and one in Tirant Lo Blanch. More publications, book chapters in Campus Vorlage and Bellaterra, and journal articles in JCR/SJR journals are expected soon. According to Google Scholar (reviewed and corrected for repetitions and self-citations) I have a total of 190 citations, the majority of which belong to the last five years. This makes up an h-index of 9 and an i10 index of 8. Given that most of the important publications are recent, the present trajectory in relation to publications and quality indicators allows to anticipate a sustained growth in the future.

The doctoral thesis "Reproductive Bioeconomies: on how eggs matter in post-IVF Biology" was evaluated with the maximum grade, received the European Mention and the Extraordinary Doctorate Award from Universidad Complutense Madrid. After my predoctoral contract (FPI) at CSIC, I worked on the EDNA project, funded by the ESRC (Economic and Social Research Council) of the United Kingdom and led by Nicky Hudson, whose PI in Spain was Vincenzo Pavone (CSIC) (Budget of 551.062,17€). As a result of this and the continued collaboration with the UK team I was awarded in 2020 an "Honorary Position" at De Monfort University, Leicester. From May 2019 and until August 2024, I worked for the ERC project "Cryosocieties" at the University of Frankfurt (Budget 2.497.587 €) led by Prof. Thomas Lemke.

My work has been cited in articles in Spanish media such as El País (Soledad Gallego-Díaz "El muy privado cuerpo humano"). On top of my book related interviews (7), I am frequently invited to give expert input in English (The Economist, Bloomberg), German (Deutsche Welle, Taz, ZDF), and Spanish (El País, El Diario, La Vanguardia, La Ser, La Directa, public TV from Valencia, TVE, etc.) in various media (Radio, TV, Newspapers). I have a strong commitment with Open Access (see Memoria, section 2), and with scientific transference, being active in participating and organizing public events and debates in Spain and internationally.



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Turno General

Área Temática: Ciencias sociales
Nombre: JOVER BÁEZ, JAIME
Referencia: RYC2024-050520-I
Correo Electrónico: jaimejover@gmail.com
Título: The housing-migration nexus and the geographies of urban inequality from an intersectional perspective (GEOQUALITY)

Resumen de la Memoria:

I am a social and urban geographer interested in analyzing uneven economic development and inequalities resulting from contemporary urban processes of housing financialization, digitalization, gentrification, and touristification, as well as how different social groups navigate them in the capitalist city. GEOQUALITY combines my research background and experience to focus on the increasing urban inequalities supported by a hypothesis of the interplay between housing and migration in Spanish and Latin American cities. On the one hand, housing is essential for social reproduction, where private life takes place, usually providing shelter and emotional comfort. However, from an economic perspective, housing is a commodity lacking subjective content, an asset to store value, and has increasingly become so in urban financialized and (over)touristified contexts. In recent years, the housing market has turned into an economic engine, especially after the pandemic, which has altered labor cultures and working environments due to the growth of remote work and fostered transnational mobilities. On the other hand, economic-, conflict-, or leisure-led migration flows toward cities have increased and become more complex. In Western societies, we find the “good/bad migrant” narrative by which “good” ones are foreigners, expats, or digital nomads from the Global North. They are usually white, high-skilled professionals, sometimes categorized as lifestyle migrants because they settle in culturally vibrant cities that have implemented marketing strategies and policies to attract them together with state governments. In contrast, the economic migrant is not as welcome, as exclusionary political and media discourses, as well as regulations preventing migration, illustrate across Western and, increasingly, some Latin American countries. These are migrants arriving from the Global South, poorer countries, settling in cities following previous networks and employment opportunities in sectors like care, and whose identities do not fit in a nationalistic-led ideal homogenous society. The project aims to challenge those discourses, raise awareness about diversity, and suggest innovative policies through empirical data about the nuances in and between high- and low-skilled migrant groups and their urban geographies by focusing on intersections of gender, race, nationality, and socioeconomic status. Through a mix-methodological, intersectional, and comparative urban approach, the project will explore these migrants’ demographic profiles, their relocation motivations, resistance daily practices, settlement patterns vis-à-vis housing and the urban space, and how they navigate regulatory systems. GEOQUALITY will additionally focus on state workers in the housing and planning departments at the city and regional government levels, whose mandate of reducing urban inequality and solving the housing crisis appears gridlocked. It will delve into their experiences, frustrations, and opinions, assuming no one better than them can come up with public policies to solve the issue. The project will provide significant theoretical, methodological, and analytical challenges for housing, migration, and urban studies as well as policy-making, and the context-sensitive high-quality outcomes will prove relevant for science, society, and policy across Spain and beyond.

Resumen del Currículum Vitae:

I have published 22 papers, with 17 indexed in WOS/Scopus, 8 of which are Q1 in JCR/SJR, 2 are SJR Q2, and 7 are JCR/SJR Q3/Q4, these latter mostly in Spanish-speaking journals. Out of the 17 indexed papers, I am the leading author in 10. I am also the author of a book on the intersection between urban geography, planning, and landmark conservation by Diputación de Sevilla after winning their Archivo Hispalense award, and 8 book chapters, 6 in SPI publishers, among them, 4 prestigious editorial houses in Geography such as Emerald, Tirant lo Blanch, Bellaterra, or Comares, and two in University-based press services, such as the Autonomous University of Madrid or the Autonomous National University of Mexico. According to Google Scholar, my publications have been cited 1190 times, with an h-index of 13 and an i10-index of 17. This impact illustrates my emerging role as a global scholar, engaging with critical debates at the forefront of urban geography and critical tourism studies, specifically advancing knowledge in gentrification and touristification research. Their high number of citations attests to the significance of some of these publications; my three most quoted works have 301, 208, and 162 citations each.

I have been able to undertake research and produce these scientific outcomes by securing public funding at different career stages and from diverse sources from highly competitive international and national calls. I enjoyed a pre-doctoral 4-year PIF contract from the University of Seville and subsequent postdoctoral fellowships in Lisbon and New York. I also got funding from the DAAD for a visiting fellowship at Goethe University in Frankfurt and from the University of Seville at the University of Manchester, as well as short research stays at the Universities of Sheffield (two weeks, funded by them), Buenos Aires (two months) and Valparaíso (one month) funded by AUIP thanks to the Iberoamerican Urban Conflicts Network that I co-founded. I have participated in 8 competitive research projects and am currently co-leading one at the national scale called VIVIENDIGNA. All these experiences have contributed to enriching my publication record, taking part in leading international debates in multidisciplinary contexts, and gaining research, networking, and communication skills.

My research has been awarded various times by diverse institutions, including the Seville City Council, the Diputación de Sevilla, the Center for Andalusian Studies, and the Spanish Association of Geographers (AGE). I am involved in the latter and other professional networks, such as the American Association of Geographers (AAG) and the Spanish Committee of the International Council of Monuments and Sites (ICOMOS). In this vein, I have been a reviewer for leading academic journals and, since 2021, also for the Spanish government's Ministry of Science and Innovation national projects. I have also focused on undertaking policy-oriented research to guarantee a social impact and on several knowledge-transfer activities to disseminate my scholarly endeavors, sometimes also getting public funding to do so. I have emerged as a distinctive voice in public outcries for the right to housing and the city. I am committed to this task by writing op-eds, giving interviews to mass media outlets such as TV and radio stations and the press, and actively engaging in social media.



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Turno General

Área Temática: Ciencias sociales
Nombre: FERNÁNDEZ URBANO, ROGER
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Correo Electrónico: roger.fernandez@barcelonagse.eu
Título: Subjective Well-Being, Social Inequalities, and Public Policy

Resumen de la Memoria:

Dr. Roger Fernandez-Urbano's research focuses on the intersection of subjective well-being, social inequalities, and social policy, primarily within the European context. His work integrates insights from multiple social science disciplines, including sociology, economics, social psychology, political philosophy, and European public policy. With a strong commitment to interdisciplinary research, Dr. Fernandez-Urbano employs both experimental and observational methods, combining qualitative interviews with advanced quantitative techniques such as panel data analyses and multilevel modeling.

Throughout his academic career, Dr. Fernandez-Urbano has explored the role of socioeconomic factors, individual perceptions, and institutional settings in shaping subjective well-being across diverse population groups, including the unemployed, public servants, working-age individuals, and the younger population. His research contributes to understanding how economic and social policies influence well-being and inequality, with an emphasis on policy-relevant insights.

As a visiting postdoctoral researcher at the Wellbeing Observatory of the Paris School of Economics and previously as a postdoctoral researcher at the University of Luxembourg, Dr. Fernandez-Urbano has expanded his focus to explore well-being and inequality among the young population in Europe. These positions have also involved regular engagement with policymakers, allowing him to disseminate findings through policy briefs, reports, and in-person consultations.

Dr. Fernandez-Urbano's research agenda includes expanding the understanding of how macroeconomic shocks, extreme weather events, and technological change interact with well-being and social inequality. His aim is to contribute to evidence-based policies that promote well-being and address disparities, positioning him as a leading scholar in the field.

Resumen del Currículum Vitae:

Dr. Roger Fernandez-Urbano holds a PhD in Political and Social Sciences from the European University Institute (EUI), where he was awarded the prestigious four-year Salvador de Madariaga doctoral fellowship, granted by the Spanish Government and the EUI. He also holds a Master of Research (MRes) from the EUI (2017), a Master of Arts (MA) in Social Policy from the University of Warwick (2016), and a Master of Science (MSc) in Economics of Public Policy from the Barcelona Graduate School of Economics (2013).

Dr. Fernandez-Urbano's research has been enriched by international experiences as a visiting researcher at renowned institutions, including the European Institute of the London School of Economics, the Centre of Welfare State Research at the University of Southern Denmark, and the Department of Political Science and Economics at the University of Pennsylvania. He also gained early research experience as a research assistant at the University of Oxford's Smith School of Enterprise and the Environment. These experiences, combined with his interdisciplinary academic training, have provided a robust foundation for his research.

As an early-career researcher, Dr. Fernandez-Urbano has conducted independent research and developed an impressive record of quality publications, working papers, and policy reports. He has authored 12 publications, including six articles in top-tier (Q1) peer-reviewed social science journals (all as first author, one solo-authored) published in *Work, Employment and Society*, *Social Indicators Research*, and the *Journal of Happiness Studies*. He also served as the main editor of *The Encyclopedia of Happiness, Quality of Life, and Subjective Wellbeing* (Edward Elgar, 2024), a work involving over 100 authors and 62 chapters, to which he contributed a chapter. Furthermore, he has two forthcoming book chapters with Springer and Routledge (one solo-authored) and two policy reports. Recently, he completed one *Revise & Resubmit* submission for the *Journal of Economic Psychology* and has seven working papers. He is also preparing to publish a solo-authored book with Springer.

His teaching experience spans both PhD and undergraduate levels. At the University of Luxembourg, he taught *The Science of Well-Being* to PhD students, and at the University of Barcelona, he delivered undergraduate courses on *European Integration*. In both roles, he mentored students, designed and graded assignments, and actively supported their academic growth.

In addition to his research and teaching activities, Dr. Fernandez-Urbano is deeply engaged in the academic community. He regularly participates in research events, presents his work at international conferences (4-5 annually), and has served as reviewer, executive committees and as a researcher representative, contributing to governance and administrative activities. He is also committed to making research accessible to wider audiences through social media, podcasts, blogs, and public presentations, fostering dialogue and knowledge exchange. Moreover, he has successfully secured research funding through competitive grant applications during both his predoctoral and postdoctoral roles.



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Turno General

Área Temática: Ciencias sociales
Nombre: RIVERA MÉNDEZ, MARÍA
Referencia: RYC2024-049144-I
Correo Electrónico: maria.riveramendez@gmail.com
Título: Co-Innovation in Action: Living Labs for Sustainable Agroforestry Systems

Resumen de la Memoria:

The research trajectory reflects an evolution from understanding systemic complexities to actively shaping transformative solutions in agriculture and forestry. Agroforestry systems play a critical role in addressing climate change and environmental challenges, necessitating innovative, multi-actor approaches to foster resilience and sustainability. The European Commission's promotion of Living Labs (LLs) through initiatives like Horizon Europe and the Green Deal has positioned LLs as vital platforms for co-creation and experimentation among diverse stakeholders, including farmers, researchers, businesses, and policymakers.

The scientific foundation of this research is built on the concept of LLs as transdisciplinary environments that integrate varied expertise and foster collaboration to address complex socio-environmental challenges. These labs facilitate localized experimentation, ranging from precision farming to biodiversity conservation, while addressing key challenges like governance, stakeholder engagement, and resource allocation. Despite their potential, LLs face barriers, including entrenched agricultural regimes, digital divides, and ambiguous implementation frameworks. The research therefore aims to refine the conceptualization and operationalization of LLs, offering practical tools to overcome these obstacles and promote their scalability.

This research is driven by four core objectives: achieving a deeper conceptual understanding of LLs, developing robust impact assessment tools, establishing a nationwide network of agroforestry LLs in Spain and Portugal, and contributing to policy mainstreaming. Specific initiatives, such as the Montado Living Lab pilot and an in-depth study of Canada's Agroecosystem Living Lab Network, are designed to foster cross-disciplinary learning and adapt best practices for local contexts. Furthermore, partnerships with European innovation networks and projects such as AF4EU will strengthen international collaboration.

The anticipated outcomes of this research are multifaceted. By advancing methodologies to measure LL effectiveness and scalability, the work seeks to generate actionable insights for policy development and institutionalization. The establishment of a nationwide network of agroforestry LLs will enhance knowledge exchange and promote innovation tailored to regional needs. Dissemination efforts through academic publications, global conferences, and workshops will ensure the findings reach diverse audiences, supporting the broader goal of addressing agri-food system challenges through user-focused, participatory ecosystems.

This research line aligns strategically with European Union priorities, including the Green Deal and Farm to Fork Strategy, and contributes to global goals such as the UN Sustainable Development Goals, particularly those related to hunger, climate action, and partnerships. Its foundation builds on previous work in projects like SALSA and H2020 LIAISON, which explored the role of small farms and multi-actor platforms in fostering food security and innovation. By integrating these insights, the research transitions from analysis to active transformation, emphasizing co-creation and iterative experimentation to address systemic challenges in sustainable agroforestry systems.

Resumen del Currículum Vitae:

Throughout my scientific career, I have presented findings at over 30 international conferences, including three keynote addresses. I have co-authored 21 peer-reviewed articles, with 16 in First Quartile journals, serving as first author on four. I was also invited as a guest editor for the journal Global Food Security and regularly review for prestigious journals like Sociologia Ruralis and the Journal of Rural Studies. Additionally, I edited and published one book, contributed to four book chapters, and participated in 11 research projects, including three as principal investigator. I have supervised four master's theses, one Ph.D. dissertation, and accumulated over 300 hours of teaching experience at various academic levels.

In terms of innovation and collaboration, I led the creation of a Community of Practice through the SALSA project, fostering collaboration among producers, shops, and local leaders. This resulted in the Km0 initiative in Évora, promoting short value chains and strengthening local food systems. I was also instrumental in establishing the Montado Living Lab in Alentejo, certified by the European Network of Living Labs in 2024. This platform unites 40 stakeholders to co-create solutions for regenerating the Montado agro-silvo-pastoral system. My leadership extends to projects such as Terralimta, DIVINFOOD, and LIAISON, focusing on co-creation processes in agricultural innovation. Additionally, I have organized and moderated events, including the 14th European Farming Systems Conference, the XIII FONCIMED seminar, and roundtables for the MED institute.

As a postdoctoral researcher, I tutored master's students in EU projects and currently co-supervise a Ph.D. candidate studying agroecology in Portugal. I teach the Landscape and Rural Spaces module for Geography students, incorporating cutting-edge research and collaborative activities. I also guided students in the 2023 Sustainable Samothraki Summer School, analyzing rural innovation. My editorial contributions include editing a book on rural development and guest-editing a special issue for the SALSA project. Additionally, I review papers for journals like Rural Sociology and Global Environmental Change and serve as an evaluator for Horizon Europe proposals.

At MED's Labscape Research Group, I lead the "Innovation Processes and Governance" research line, focusing on participatory approaches in agriculture and rural development. My professional memberships, including the International Farming Systems Association Steering Group and the European Network of Living Labs, underscore my commitment to integrating research, practice, and stakeholder engagement. To enhance my contributions, I am currently completing a course on Group Facilitation, equipping me to organize and manage workshops and co-creation processes effectively.



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Turno General

Área Temática:

Ciencias sociales

Nombre:

DANIELS, LESLEY-ANN

Referencia:

RYC2024-051343-I

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Título:

Conflict resolution and divided societies

Resumen de la Memoria:

I am an international political scientist working at the intersection of comparative politics and political behaviour. My research interests are on conflict resolution and divided societies and my work advances new approaches to persistent problems in international and domestic politics. I work primarily with quantitative methods, and I have generated many original datasets, which I put in the public domain. I use cutting edge techniques such as survey experiments to ensure robust analysis.

My scientific output can be grouped into three research themes: intergroup dynamics, conflict resolution and public opinion on post-conflict resolutions and has made scientific contributions in each one. I have developed new theoretical treatments of the phenomenon of low-level intergroup violence, the use of amnesty in the termination and consequences of civil war and identity concessions as part of civil war settlements. My recent work develops micro-level explanations of public attitudes on normative concepts such as justice and legitimacy. The novel datasets produced are publicly available on journal websites or Harvard Dataverse. I am committed to robust scientific methods and my recent work uses embedded experiments in public opinion surveys, which allow for robust causal claims.

I have been Principal Investigator on four prestigious research grants, from the European Commission Marie Curie Fellowship (€214,158.72), the Spanish Ministry of Science and Innovation (€58,322), the Institute of Self-Government Studies (€36,000) and the AXA Research Fund (€130,000).

Building on my solid foundation on public opinion in conflict situations and divided societies, my future research agenda is dedicated to deepening understanding on how perceptions of norms, specifically attitudes to justice, affect prospects for peace and the quality of democracy. I aim to tackle the monumental shift in society to a situation where the multi-lateral international order is crumbling and where previous assumptions are being destroyed by disinformation. Justice and the rule of law is fundamental to democratic processes and yet actors on the right of the spectrum present the rule of law as a partisan issue. Previously accepted norms such as the requirement of the institutions of the state to follow the rule of law (domestically) and for all states to abide by the norms of international public law (internationally) are being challenged by states' self-interests, thus leading to the perception of such norms as optional and even only applicable to the weak. Such positioning can lead to democratic erosion. The central question guiding my research is 'How do shifts in normative values on justice affect the quality of peace and democracy?' I envisage two linked research agendas looking at public opinion in a world of normative collapse and institutional resilience in a world of normative collapse. The case site will be Spain as this case combines a highly polarized society along the left-right axis with perceptions that justice is a political issue. I will test these questions through experiments embedded in a representative survey and interviews with political parties and justice institutions along with analysis of political statements. This is a relevant research agenda that will generate new theoretical insights and policy recommendations.

Resumen del Currículum Vitae:

I am a political scientist working on conflict and political violence and my work advances knowledge on how conflict impacts on post-conflict stability and the quality of democracy. I study these phenomena from a comprehensive perspective that contributes to the fields of conflict resolution and governance.

The high quality contributions of my scientific career is evidenced by the 14 papers I have published in international journals, 10 in Q1 journals, such as Comparative Politics, European Journal of Political Research, Journal of Conflict Resolutions and Journal of Peace Research. I have five solo-authored papers and the rest are equal authorship. This mix indicates my capacity to have my own research identity and at the same time achieve new synergies through teaming up with other researchers and their respective strengths. I also have a co-edited book, two expert reports, five magazine articles or blog posts and I have presented at more than 40 international conferences or workshops and seven events as invited speaker. I have been successful in attracting substantial research funding from competitive sources and I have received prizes from the American Political Science Association and the Institute of Self-Government Studies for Best Paper.

I have been Principal Investigator on four prestigious research grants, from the European Commission Marie Curie Fellowship (€214,158.72), the Spanish Ministry of Science and Innovation (€58,322), the Institute of Self-Government Studies (€36,000) and the AXA Research Fund (€130,000). I have developed strong international links with a group of prestigious international researchers, from Georgetown University, the University of Oxford, the University of Oslo, the University of Amsterdam and the Peace Research Institute of Oslo. I have benefited from international research stays, including a Marie Curie Fellowship of two years at the University of Oslo (September 2022-September 2024), and visiting stays at ETH, Zurich and the Universidad Los Andes in Bogota, Colombia.

My leadership and initiative are shown in managing complex projects involving research assistants, personal in-field data-gathering and managing survey companies, including training a local survey company in Aceh. I am currently Head of Studies at IBEI and was coordinator of a prestigious EU Jean Monnet Networking grant worth €300,000 (September 2021-September 2022).

My work has had an international policy impact. I contributed to a report commissioned by the Catalan Government on a Clarity Accord for Catalonia. I was sole-author of invited expert report on the impact of amnesties for the Centre of Humanitarian Dialogue, advising the Ukrainian government. I have made submissions to the Norwegian Foreign Ministry, the Peace Research Institute of Oslo, the British Academy, the Institute for Self-Government



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Studies and the Institute for Integrated Transitions (IFIT). I also disseminate my work through popular outlets and I have written five blogposts based on my academic work.

I have an atypical academic profile in that I have gone into academic research after a long prior career working hands-on in situations of societal and post-conflict reconciliation. These included policy and funding work at the European Peace Programme for Peace and Reconciliation in Belfast, Northern Ireland, and the Inter-faith Fund in Cambridge, UK.



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Turno General

Área Temática: Ciencias sociales
Nombre: MOISE , ALEXANDRU DANIEL
Referencia: RYC2024-048393-I
Correo Electrónico: alex.dmoise@gmail.com
Título: Resilience of Political Trust in Times of Crisis

Resumen de la Memoria:

I have spent my academic career in top Political Science departments in Europe, mentored by some of the most distinguished scholars in political science. In my studies and research, I have sought to equip myself with the skills and experiences necessary to develop and deploy a complex research agenda on pressing political problems. I focused my skillset on quantitative analysis, causal inference and experimental designs, survey design, and programming. My research has focused on how individuals relate to public policies, especially health policy, and the institutions that enact these policies. My findings have consistently shown the fundamental role of trust in institutions. Trust in institutions was crucial for individuals to sign up for the COVID vaccine and to follow public health advice. Trust is indispensable in an environment of disinformation and interference by foreign actors. Recent elections in the United States, Austria, Romania, and Italy, among others, have shown that voters increasingly distrust state institutions, and in some cases democratic practices. As both a scholar and a citizen, I am increasingly worried by declining trust in institutions and the rise of the extreme right. While my previous work has looked at how trust impacts policy compliance, voting, and attitudes to the EU, my future work will take trust itself as the object of study.

Democracies are facing a crisis of trust in political institutions. Individuals are turning away from reputable media, from independent experts, and are losing faith in governments and parliaments. Without support from the public, political institutions hollow out and citizens disengage from politics. However, trust also shows resilience and even resurgence. We know much about processes of distrust, but what explains resilience? I propose a new theory of trust. It reconceptualizes the role of political institutions during times of crisis, as mediators of political reality. Crises are complex, they require knowledge and expertise to ascertain the facts on the ground and the counterfactual thinking necessary for policies. They destabilize the normal workings of institutions and create a window of opportunity for citizens to redefine their relationship to them. Some crises, such as COVID, increase trust, while in others, such as the financial crisis, populist politicians undermine it. Why do populist actors manage to erode trust in institutions in some circumstances and not others? Why are some individuals more receptive to these efforts? I move beyond the argument that trust is determined by institutional performance and highlight the role of elite discourse. My research differentiates between constructive and destructive critique and breaks trust down into its competence and integrity components to show which types of attacks erode trust and which type of trust is fundamental for democracy. It considers the role crisis characteristics such as salience, individual impact, and blame attribution. Finally, it traces the intellectual roots of institutions to the Enlightenment and explores how individual enlightenment values preserve attachment to institutions. I will test this theory by collecting novel observational, experimental, and survey panel data to uncover the causal impact of discourse, individual crisis characteristics, and values, on trust.

Resumen del Currículum Vitae:

I am a political scientist working on health policy, EU integration, and trust in institutions. My career has taken me through some of the top Political Science departments in Europe. I am currently a Research Fellow in the SOLID-ERC project led by Hanspeter Kriesi, Waltraud Schelkle, and Maurizio Ferrera, at the European University Institute (EUI). I previously worked with Ellen Immergut as part of the prestigious Max Weber Fellowship. At the EUI, I was a Part-time Assistant Professor teaching Quantitative Methods. I also taught Risk Analysis as an Adjunct Professor at Johns Hopkins University and was a Visiting Professor at Ilia University. I completed my PhD in at Central European University (CEU) in 2019, working with Evelyne Huebscher, Dorothee Bohle, and Carsten Schneider. During my PhD I was awarded the highly selective fellowship of the Institute for Human Sciences in Vienna.

I have published 17 Q1 papers in prestigious journals such as the British Journal of Political Science, Political Behavior, West European Politics, and the Journal of European Public Policy. My research on attitudes to refugees received the 2024 Gordon Smith and Vincent Wright Memorial Prize in West European Politics. I have been the editor of two special issues at the Journal of European Public Policy and European Union Politics. I have recently published a coauthored book on the political impact of the COVID pandemic on European politics at one of the most prestigious publishers in the field, Oxford University Press. I have also published a coauthored book on the impact of the Russian invasion of Ukraine on European solidarity at another top publisher, Cambridge University Press. My research has featured extensive international collaborations, with scholars such as Gabor Scheiring (Georgetown), Tamara Popic (Queen Mary), Marcello Natili (Milan), Zbigniew Truchlewski (the LSE), and Chendi Wang (Amsterdam), among others.



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Turno General

Área Temática: Ciencias sociales
Nombre: MONTAÑÉS JIMÉNEZ, ANTONIO
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Correo Electrónico: q_pasa_xavales@hotmail.com
Título: Religious minorities, masculinities and migration

Resumen de la Memoria:

My research lies at the intersection of the Anthropology of Christianity and the study of cultural minorities in the contemporary world. I am particularly interested in tracing, mapping and examining the advancement of a form of spiritual Christianity, known as Pentecostalism, among Romani/Gitano and Latin American communities in Spanish speaking environments. My ethnographic methodological approach combines the use of long-term participant observation with qualitative and historical/hermeneutical techniques. My work has progressed following the development of a research agenda defined by three research stands.

Research strand 1: Pentecostalism, Gitanos and religious conversion

Based on twenty months of ethnographic research, my PhD dissertation (University of St. Andrews/UAB, Cum Laude mention) completed in 2021 was concerned with the large-scale religious conversion of Spanish Roma/Gitanos from Catholicism to Evangelical Pentecostal Christianity in Spain. Juxtaposing long-term participant observation, in-depth interviews with pastors and believers, and critical text-analysis of documents produced by Pentecostal Gitano Churches, it examined the emergence of religious Pentecostal worldviews, imaginaries, and identities among Gitanos in Spain. My PhD received funding from the Spanish Government's national funding (FPI) programme, the Banco Sabadell Foundation, the British Sociological Association, and the Ford Foundation, as well as extensive academic recognition. Prizes awarded to my PhD dissertation include the Best PhD Dissertation Award by the Spanish Society for the Study of Religious Sciences, a UK doctoral Research award (competition for junior academics: Management and Social Science category) by ABTA/Spring Nature and the Raymond Firth Award for anthropological research of outstanding merit, a special award by the Firth Centenary Fund: Association of Social Anthropologists of the UK. My first postdoctoral research project focused on the social effects of the pandemic on Gitano Pentecostal communities and involved the training of Gitano interlocutors in producing academic knowledge. The project looked at Gitano political and religious mobilization and imagination, showing how collective forms of organization became crucial to understanding how Gitano communities interpreted and dealt with the negative consequences of inhabiting the margins of society in a global crisis. In the project, I collaborated with my close Evangelical Gitano interlocutor Gory Carmona, and the internationally renowned Gitano activist Demetrio Gomez. It received two major grants from the Economic and Social Research Council (UK government) at the University of St. Andrews and the EU Next Generation/Margarita Salas Programme (Spanish Government) at the University of Oxford/ Autonomous University of Barcelona. My second ongoing postdoctoral project aims to investigate the diffusion of the Prosperity Gospel among Latin American immigrants in Spain and the USA. The project will contribute to advancing studies on migration, masculinity, and the social dynamics of money. My project secured a Fullbright scholarship to be held at the University of Miami in 2025.

Resumen del Currículum Vitae:

Soy doctor en Sociología por la Universidad Autónoma de Barcelona y en Antropología por la Universidad de St. Andrews, con una tesis cum laude en régimen de co-tutela internacional. Estoy interesado en el estudio etnográfico de las formas pentecostales de la religión cristiana en población gitana e inmigrante, con especialización regional en España y Estados Unidos. Analizando el fenómeno religioso desde ópticas como las masculinidades, la memoria colectiva, las expresiones urbanas y la lucha frente al estigma, mi trabajo ha redefinido paradigmas conversionistas basados en la pobreza, la ignorancia y la asimilación étnica.

Soy becario postdoctoral Fullbright en la Universidad de Miami y he sido investigador postdoctoral en las Universidades de Oxford, St. Andrews y UAB. Mis proyectos de investigación han recibido financiación de la Academia Británica, la Fundación Ford y el Banco Sabadell, y también del gobierno británico, el gobierno español y la Unión Europea (Cost Actions). He publicado en algunas de las revistas de antropología más importantes del mundo anglosajón, como el Journal of the Royal Anthropological Institute, History and Anthropology o Anthropological Quarterly y editoriales punteras, como Routledge. La calidad de mi trabajo científico me ha llevado a ser invitado como ponente en las más distinguidas universidades europeas, como la Universidad de Cambridge, Oxford, la Escuela Práctica de Altos Estudios de París o la Universidad de Colonia en Alemania. Durante mi trayectoria académica he recibido numerosos y prestigiosos premios en Reino Unido, España y Estados Unidos. La American Anthropological Association, el Royal Anthropological Institute del Reino Unido, la organización de Estudios Romanies más antigua del mundo (the Gypsy Lore Society) así como las asociaciones británicas de sociología del Reino Unido y Catalunya me han otorgado galardones reconociendo la calidad de mis artículos y producción académica.

A nivel docente, he sido profesor en el Master de Antropología de la Universidad de Oxford y en el Global Social and Political Thought de la Universidad de St. Andrews. A nivel de grado, he sido profesor en St. Peter's College, Mansfield College y New College, todos ellos pertenecientes a la Universidad de Oxford. Tengo experiencia de supervisión de estudiantes de postgrado en St. Antony's College Oxford y superviso un estudiante de doctorado en la Universidad Nacional Autónoma de México. También soy el fundador y director de las "Jornadas de investigación doctorales de espiritualidad y religión" un evento multidisciplinario anual vinculado al El Consejo Latinoamericano de Ciencias Sociales.

Mi trabajo tiene repercusión más allá de la frontera académica. He sido invitado como conferenciante en el Ateneo de Madrid, Matadero Madrid y el Palau Macaya (Fundación La Caixa) y mis opiniones expertas son frecuentemente requeridas en medios de comunicación, como el Diario Público o El Diario. También he sido conferenciante principal en foros religiosos como las Jornadas "Las Iglesias y Comunidades eclesiales evangélicas y su presencia en España" organizadas por la Conferencia Episcopal Española en Madrid o las jornadas "Belonging Together: Migrants, Refugees, Displaced People and Global Solidarity" organizadas por el Forum for Intercultural Dialogue con motivo de la Interfaith Harmony Week de Naciones Unidas, en Kenia.



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Turno General

Área Temática: Ciencias sociales
Nombre: MARQUEZ MERINO, JOSE MANUEL
Referencia: RYC2024-050377-I
Correo Electrónico: josetxomarquez@gmail.com
Título: Child and adolescent wellbeing

Resumen de la Memoria:

I am a quantitative social researcher with an interdisciplinary profile spanning sociology, education, psychology, and economics. My research has significantly advanced understanding of the levels, trends, and drivers of adolescent wellbeing (subjective and psychological wellbeing), with a focus on international comparisons and socio-demographic inequalities (e.g., by gender, age, sexuality, migrant status, etc.). Since the publication of my first paper in 2021, I have published 25 papers (19 in Q1 journals, 18 as the first author; H-Index 11; i10-index 11), contributed to numerous briefings/reports, presented at over 25 international conferences and seminars, collaborated with researchers worldwide. I have worked at top institutions, built a strong record of securing research funding, demonstrated research impact and gained extensive experience in academic service (teaching, supervision, peer review, etc.) and knowledge exchange and outreach activities.

My entire academic career has been overseas. Inspired by my MSc teachers and some pioneers in this field, my journey began in 2016 with a master's dissertation, a comparative qualitative study using expert interviews to investigate barriers and facilitators for considering child subjective well-being in policymaking in Spain and the United Kingdom (UK). I later secured ESRC funding for a PhD at the University of Leeds, which culminated in three academic papers. During my PhD, I gained additional funding for a 6-months visit to the OECD, and designed and delivered a "Stata for data analysis" course in several South Pacific Islands, supported by UNICEF. At Leeds, I also worked as a research assistant in a project on poverty-related barriers to school attendance, and taught undergraduate courses. Upon obtaining my PhD in March 2020, I worked on two projects at the universities of Sheffield (vulnerable migrant youth in Europe) and Glasgow (youth loneliness). In October 2020, I joined the U. Cambridge (Faculty of Education; Rudd Centre) on a highly-competitive ESRC Postdoctoral Fellowship, where I combined teaching (graduate and undergraduate teaching, and graduate supervision) with research. The latter included a paper on the links between life satisfaction and mental health in late adolescence, two papers on global trends in adolescents' wellbeing, a paper on migrant-based gaps in adolescents' academic outcomes in the UAE, and another one evaluating an intervention to promote student wellbeing during the covid-19 pandemic in the UAE. In 2021, I received an Al Qasimi Foundation for Policy Research Grant to study adolescent wellbeing in the UAE. In December 2021, I joined the #BeeWell project (U. Manchester) on adolescent wellbeing, where I was promoted to Research Fellow in February 2023. In February 2023, I officially joined the Wellbeing Research Centre at the University of Oxford after several collaborations with this Centre.

Migration has been an important theme throughout my academic work, as evidenced by many of my publications and the projects I have contributed to. In the coming years, I aim to specialise further in researching the wellbeing of children and adolescents with an immigrant background.

Resumen del Currículum Vitae:

1.Current position

Position

Research Fellow (1 FTE)

Initial date

06/12/2021

Institution

University of Manchester

Department/Center

Manchester Institute of Education

Country

United Kingdom

Key words

child; adolescent; wellbeing; mental health

Position

Research Associate

Initial date

01/02/2023

Institution

University of Oxford

Department/Center

Harris Manchester College Wellbeing Research Centre

Country

United Kingdom

Key words

child; adolescent; wellbeing; education

2: Previous professional status

01/10/2020-05/12/2021

ESRC Postdoctoral Fellow, U. Cambridge, Faculty of Education

01/06/2020-30/09/2020

Postdoctoral Associate, U. Glasgow, Institute of Health & Wellbeing

01/03/2020-31/05/2020

Research Associate, U. Sheffield, Dep. of Sociological Studies

01/03/2019-31/08/2019

Research Assistant, U. Leeds, School of Education

01/01/2018-31/03/2018

Consultant, OECD, Directorate for Education and Skills

01/07/2017-31/12/2017

Intern, OECD, Directorate for Education and Skills

01/09/2015-15/06/2016

Research Intern, Fundacion porCausa

01/10/2014-31/12/2014

Student Research Assistant, Syddansk Universitet

3. Education

PhD in Education

University of Leeds, UK

2020

MSc Comparative Public Policy & Welfare Studies

Syddansk Universitet, Denmark

2016

BSc in Economics

Carlos III University, Spain

2010



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Área Temática: Ciencias sociales
Nombre: SOJKA SWITON, ALEKSANDRA
Referencia: RYC2024-051119-I
Correo Electrónico: aleksandra.sojka@gmail.com
Título: European politics and societies

Resumen de la Memoria:

My research is interdisciplinary and multi-method, located at the intersection of politics and sociology. My work explores the socio-political consequences of regional integration and globalization in Europe from the perspective of public opinion and elites, with a particular focus on supranational identities and attitudes, and experiences of and reactions to increased mobility and migration. I combine advanced quantitative methods (as applied to big cross-national datasets to explore the relevance of national context) with qualitative approaches, such as in-depth interviews and (social) media discourse analysis. So far, I have published ten journal articles in some of the top journals in my field and 14 book chapters on these topics. All my publications after the PhD are either single authored or co-authored with colleagues from different institutions than my own. I currently have six working papers at different stages of review in leading academic journals in my field. At the UC3M, I collaborate with scholars from the EU-Research research group led by prof. Juan Díez Medrano and the Jean Monnet Center of Excellence MACIES, which I co-founded. Beyond the UC3M, I have established strong academic networks during my predoctoral research visits across Europe (CEU, MZES, EUI) and during my postdoctoral fellowships. In 2016, I was awarded a Visiting Fellowship at the Center for European Studies (CES) at Harvard University, a highly competitive program that brings together researchers dedicated to the study of Europe in different fields from all over the world. During my year at CES, I actively participated in the New Research on Europe weekly seminar, where I presented my research and worked on my postdoctoral project on backlash to globalization and European integration liaising with top scholars in my field at Harvard and beyond. I also had the opportunity to spend nine months in 2018/2019 as a Visiting Researcher at the European Institute of the London School of Economics in the UK. At the LSE I worked with Prof. J. White on my research on European identity and migration. I presented my research on the backlash to globalization, which was published as an LSE working paper. I have also participated in several international research projects as a research team member. These include "Value Conflicts in a Differentiated Europe" (ValCon) (2020-2024, Volkswagen Foundation) and "Polish Immigrant Organizations in Europe" (2015-2020, Polish Science Foundation). In 2022, I was awarded my first project as Principal Investigator: "Measuring European Socio-Political Integration through the Lens of Social Media: An Advanced Big Data Approach" (UE-MEASURE). The aim of this interdisciplinary project (co-PI Ángel Cuevas, Telematic Engineering, UC3M) was to develop a novel methodological approach leveraging big data from social media big data to measure Europeanization of national politics in a comparative and transnational perspective. The first article from this project has been accepted in European Union Politics (JCR Q1).

Resumen del Currículum Vitae:

I am a Postdoctoral Researcher (Contrato de Acceso a la Investigación) at the Department of Social Sciences at UC3M and a member of the Carlos III "Juan March Institute (IC3JM) at the same university. I am also a founding member and co-director of the Jean Monnet Center of Excellence MACIES "Madrid Center for Interdisciplinary European Studies and a member of the EU-Research research group at UC3M. I earned my undergraduate degree in International Relations (2007) from the University of Lodz in Poland (Polish Ministry of Science Award for best university students). I further pursued a Master's Degree in Gender and Ethnicity Studies (Summa Cum Laude, 2009) at the University of Utrecht in the Netherlands, with a TALENTIA scholarship for excellence in postgraduate studies. I continued my studies, earning a PhD in Social Sciences at the University of Granada (Summa Cum Laude, 2015). During my doctoral studies, I was supported by the highly competitive University Teacher Training (FPU) fellowship awarded by the Spanish Ministry of Education (2010-2014), as well as mobility grants which allowed me the opportunity to visit international institutions such as the Central European University (CEU) in Budapest; the Mannheim European Research Center (MZES) at the University of Mannheim in Germany, where I spent 3 months fine-tuning my methods skills, and the European University Institute in Florence, Italy, where I spent 2 months, finalizing the writing of the thesis. These experiences helped establish my international networks and enriched my research on European identification of citizens and elites in Central and Eastern Europe. In recognition of the quality of my doctoral research, I was honored with the 2017 award for Best Doctoral Thesis by the Spanish Association of Political Science (AECPA). Following the completion of my doctorate, I spent a year at the Center for European Studies (CES) at Harvard University. After returning from the US, I joined the Dept. of Social Sciences at UC3M as a Juan de la Cierva Researcher "Formación" (2017-2019) and continued as a Juan de la Cierva "Incorporación" (2021-2024) Fellow. I also joined the Carlos III-Juan March Institute and the EU-Research research group. At UC3M, I co-founded the Madrid Center for Interdisciplinary European Research (MACIES), recognized as a Jean Monnet Center of Excellence by the European Commission (2024-2027). In addition to actively building a community of scholars around the topics of EU/European studies at UC3M, I regularly collaborate with colleagues from leading European universities in research projects, publications, and conference panels. I have presented my research at 30+ international conferences, including regular attendance of CES, ECPR, APSA, EPSA, and EUSA conferences. For several years, I have organized sections on Identity of the General Conference of the ECPR. Since 2017, I have been an elected member of the executive of the ECPR Standing Group on Identity, and since 2021, of the executive of RC03 European Unification of the International Political Science Association (IPSA). In 2023, I was part of the Reflection Group for the Spanish Presidency of the Council of the EU, invited by the Spanish Ministry of Foreign Affairs. To date, I have secured >300.000 euros in individually awarded grants for my pre- and postdoctoral research through highly competitive calls.



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Turno General

Área Temática: Ciencias sociales
Nombre: GÜELL TORRENT, BERTA
Referencia: RYC2024-051208-I
Correo Electrónico: berta.guell@gmail.com
Título: Gender-based violence among female and LGBT+ migrants and refugees in Spain

Resumen de la Memoria:

Berta Güell has a long scientific career of more than 16 years in the field of migration from an interdisciplinary perspective (sociology, anthropology, political sciences). She is currently substitute lecturer at the Department of Sociology of the Autonomous University of Barcelona (UAB), researcher at ISOR (working on the project DIGITALISLAM) and research collaborator at CER-Migracions, both at the UAB. From 2020 to 2024, she worked at the renowned research centre called Barcelona Centre for International Affairs (CIDOB) with three EC-funded projects (BRIDGES, ADMIGOV and NIEM). Prior to that, she was awarded with the postdoctoral scholarship of the Irla Foundation (2018-2019) to undertake research on children of Asian migrants and she combined it with a project on forced marriages funded by RecerCaixa (2017-2019) at the UAB. While she was a MA and PhD student, she worked as a researcher at the European Social Research Unit of the Department of Anthropology of the University of Barcelona (2008-2016). In particular, she got involved in six EC-funded projects (PRISM, CITISPYCE, LINKAGE, TEAM, PROSINT and GENDERACE) and in the elaboration of proposals for different EC and national research programs.

During her career, she has developed four interconnected research lines: a) migration and labour market integration (especially in ethnic entrepreneurship); b) migration and gender (gender-based violence, intersectional discrimination, and LGBT+ refugees); c) migration and integration policies; and d) migration narratives.

Her academic production has a total of 50 publications, 5 of which indexed in JCR Q2 or SJR Q1, and 39 in Open Access. Her scientific contributions beyond publications include extensive work in European research projects, where she has increasingly held positions of leadership (e.g., role of Executive Coordinator in H2020 BRIDGES project), and diverse knowledge transfer activities like participating in a case of strategic litigation about multiple discrimination. She counts with 2 prizes and 2 research stays in renowned international universities, as well as with a large network of experts across Europe and 27 oral communications in national and international conferences.

Her research line is called "Gender-based violence (GBV) among female and LGBT+ migrants and refugees in Spain". Departing from the VIOMIG study on the use of public services among migrant and refugee women who have suffered GBV and the study on forced marriages, RYC will deepen this research line with new research questions. The overall objective is to analyse the causes and manifestations of different forms of GBV suffered by female and LGBT+ migrants and refugees, as well as the multi-level responses to cope with GBV effects in Spain. These responses consider the policies and institutional programmes to prevent and mitigate GBV (macro level), the use of sociolegal resources including complaints and services from NGOs (meso level), and individual and community agency strategies (micro level). In terms of methodology, this research will apply a mixed-methods design under a participatory-action approach. As for impact, it aims at filling a gap between migration and GBV studies, improving prevention and mitigation GBV policies according to the needs of migrants and refugees, and at raising awareness among the wider public.

Resumen del Currículum Vitae:

Berta Güell is a researcher and collaborating lecturer at the Department of Sociology of the Autonomous University of Barcelona (UAB). She holds a PhD in Sociology with international mention (Cum Laude) at the Autonomous University of Barcelona (UAB), as well as a MA on Research in Sociology and a Postgraduate in Immigration and Reception both at the University of Barcelona (UB). In 2023, she did a course of specialisation of Feminist Political Thought (ICPS, UAB).

RESEARCH: Dr. Güell has a long scientific career of more than 16 years in the field of migration and has been involved in 12 competitive projects (10 funded by the EC and 2 by national funds) in three main research centres: the European Social Research Unit of the University of Barcelona, CER-Migracions at the Autonomous University of Barcelona, and the Barcelona Centre for International Affairs (CIDOB). In addition, she has been PI of two research studies funded by the City Council, and collaborated with the Research Group on Intercultural Education and Gender (GREDI) of the UB.

PUBLICATIONS: She counts with 50 publications: 16 articles in indexed journals, 5 of which are Type A (JCR Q1/Q2 or SJR Q1), 5 book chapters (3 of which indexed in SPI), 2 monographs, 2 peer-reviewed articles in non-indexed scientific journals, 14 Working Papers and Scientific Reports, 10 popular science articles and 1 popular science booklet. 39 out of the 50 publications are Open Access. Metrics: 345 citations in Google Scholar; h Index: 12.

TEACHING: She teaches at the Bachelor's Degree in Sociology of the UAB since 2024, where she is in charge of the 'Migration Policies' subject. Since 2018, she has been the coordinator of the Labour Market Module of the Interuniversity Master's Degree in Contemporary Migrations of CER-Migracions, and lectures in other MA programmes and Summer Schools of several universities. In 2018 she was adjunct lecturer at the Department of Research Methods and Diagnosis in Education at the UB, where she taught 'Theory and Practice of Educational Research'.

INTERNATIONALISATION: Besides her involvement in 10 European projects, Dr. Güell has regularly presented her work at multiple international conferences with oral communications and as keynote speaker upon invitation. She has been a visiting postdoc research fellow at the prestigious City University of New York (CUNY) and a predoc research fellow at the Technische Universität Berlin. She is member of the Immigration Research Network of the Council of European Studies, as well as of the INTEGRIM LAB.



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OTHER ACHIEVEMENTS: She obtained an Extraordinary Prize for her PhD (UAB, 2019) and a Prize for her MA thesis (Catalan Institute of Studies, 2013). She is also committed to Open Science principles and participates regularly in knowledge transfer activities to disseminate scientific knowledge, including talks, round tables, and counts with more than 30 media impacts. In 2010 she also participated in the strategic litigation process of the Beauty Solomon case at the European Court of Human Rights presenting empirical evidence of the GENDERACE project about multiple discrimination.



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Turno General

Área Temática: Ciencias sociales
Nombre: LASTRA ANADÓN, CARLOS XABEL
Referencia: RYC2024-048425-I
Correo Electrónico: clastra@faculty.ie.edu
Título: Human Capital as a core state function and political arena, as an engine for opportunity and against political polarization

Resumen de la Memoria:

During my five years as a Ramón y Cajal fellow my goal is to build on my research line on the political consequences of governmental investments. In my recent paper "Learning to love government: Technological Change and the Political Economy of Higher Education", we look at whether the effects of automation are different (for economic performance and political attitudes) in places where higher education investment was present, using variation in the historical distribution of higher education institutions (and particularly community colleges) and surveys on support for pro-government spending. I want to build on this emerging insight through a major new theoretical and empirical project on the impact that the erosion of economic opportunities has had for the last thirty years or so on employment prospects, particularly for those with less than a college education and, through them, on the rise of a more polarized politics. I hypothesize that this results in a type of politics that erodes the support for government, and a type of politics that has not been particularly effective, somewhat paradoxically, at tackling those problems. But I also contend that there are particular conditions and particular actions, from institutions such as the European Union that can mitigate these negative political effects.

The key animating question for future work is to be carried out at as a Ramón y Cajal fellow is: what types of government investments can be effective in mitigating increasingly frequent economic shocks (due to automation, trade, or artificial intelligence) and also generate support for government action? This aims to explain a central aspect of the challenges for generating a more productive political process that serves citizens through the challenges of geographic inequalities and uneven shocks, as well as informing a policy program that can serve to tackle these inequalities. In the process, I first aim to develop a broader theory to distinguish between type of government policies and their effects on political attitudes. Beyond policies that lead to support for incumbents (which an extensive literature on retrospective voting addresses), I am interested in both changes in support for government spending or action in particular domains (health, education) or in shifting ideas about the role of the state and support or tolerance of the state.

My work will have over the five years a theory-development part, an empirical part (based on voting behavior), and the use of surveys and lab-in-the-field studies. I hope to build on these emerging insights to develop a series of articles and a book project which would put together the different strands. This work is a much overdue scholarly contribution to debates around the role of governments, but will also have implications for the long-range political effects of the old and new industrial and fiscal policies within the EU and beyond.

Resumen del Currículum Vitae:

I am a political scientist with broad interests in political attitudes and institutions. A lot of my work is at the intersection of political science and education policy. I have for a long time, including in my time working as a consultant prior to my doctoral studies, been working in education as a driver of development and of the equalization of opportunity, and at the challenges of delivering public services such as education at scale in systems that are laden with political influences. In my research, to give a few examples, I have studied the effects of decentralization of public services on political attitudes and on quality of outcomes across the world, in the United States and in Spain, how the education of politicians is perceived by the public in the United States, I have looked at the political effects of alternative public-private education systems (such as through Teach for America or charter schools), and at the role of education and the construction of human capital as a driver for mitigating political polarization. I have ten papers in leading journals (Q1 and above), with several in leading outlets (such as Political Science Research and Methods or The Journal of Politics), as well as two book chapters in highly regarded presses. My research is committed to the principles of open science and all my papers are available in my website, including with the associated data and code to reproduce them and extend them.

My first research agenda is on the governance structures of school systems and of new approaches to education and how they impact the performance of education systems. In a different research agenda I focus on the role of the public in demanding public goods, including education. Lastly, I also have a fledgling research agenda on the political consequences of educational investments upon which I build my proposed research line on general policy investments, particularly on EU spending.

I have benefitted from funding as a PI from organizations such as La Caixa or IBM Foundations (for more than 160K EUR), and participated in other funded research projects from the British Academy, or the Weatherhead Center at Harvard (for another 60K). I have engaged with scholarly audiences internationally through more than sixteen guest speaker and twenty-six conference presentations, as well as many discussant roles. I have also strived to engage with policymakers and the public through applied research (I have authored six policy reports) and published several articles in the popular press. My trajectory is marked by international mobility in Europe and the United States, having received all my higher education abroad. I am currently in the middle of a six month research stay at Harvard's Center for European Studies, funded by a Castillejo-Fulbright mobility fellowship. Most of my articles involve collaborations with scholars from universities in the US, UK, and the EU. I am actively involved in training scholars: at my current institution, I have supervised 8 Bachelor's Thesis (TFGs) and 10 Master's theses (TFMs). I have also mentored 8 undergraduate research assistants and one of my current working papers is coauthored with two.



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Turno General

Área Temática: Ciencias sociales
Nombre: ROS VELASCO, JOSEFA
Referencia: RYC2024-048855-I
Correo Electrónico: josros@ucm.es
Título: Bienestar y prevención del aburrimiento crónico y la soledad no deseada en las residencias de mayores españolas

Resumen de la Memoria:

Josefa Ros, Dra. Europea en Filosofía por la UCM (2017, FPU12/01877-MECD, 64.820€), Premio Extraordinario de Doctorado), es la mayor experta en Estudios del Aburrimiento de España y una de las más conocidas internacionalmente por sus investigaciones pioneras en esta rama del conocimiento. Desde hace más de una década analiza la experiencia del aburrimiento disfuncional desde un punto de vista multidisciplinar, en el que convergen perspectivas teórico-prácticas psicológicas, sociológicas y filosóficas, con énfasis en su padecimiento por parte de los mayores que viven institucionalizados en situación de dependencia, aplicando los principios de la Ética del Cuidado. Ha sido la primera persona en España en abrir esta línea de trabajo y en situar en el centro del diálogo social, político y científico la hipótesis de que el aburrimiento disfuncional es un factor de riesgo que pone en peligro el bienestar de los mayores. Actualmente, lidera como IP en la UCM el proyecto **PRE-BORED** (2021-2024, 36 meses), financiado con 35.532€ por el programa H2020 de la UE con un contrato MSCA (137.636€), para incidir en las causas y las consecuencias de la experiencia del aburrimiento en las residencias. Previamente (2017-2021, 48 meses), disfrutó del contrato Harvard University Postdoctoral Fellowships for Distinguished Junior Scholars en la Faculty of Arts and Sciences (104.306,62€), donde lideró como IP el proyecto **Psychopathology of Boredom**, desde el que creó un marco teórico propio para distinguir el aburrimiento funcional y disfuncional en contextos prácticos. En Harvard trabajó un año como Assistant Professor. También fue beneficiaria de un contrato de PAI25/21-9/2021-22 (5.341,87€) durante 3 meses para desarrollar el proyecto **Filosofía para el desarrollo de los modelos de Atención Centrada en la Persona** en la UCM y disfrutó de 3 estancias de investigación por 9 meses en la Stuttgart Universität, financiadas por el DAAD, el DLA Marbach y el MECD (7.500€). Realizó dos Másteres Universitarios en la UCM, en Filosofía Contemporánea (2011, Matrícula de Honor) y en Formación del Profesorado (2012, MH), homologados por la UNESCO/CEPES, además de dos licenciaturas, en Filosofía (2010) y en Publicidad y RRPP (2011, Premio Extraordinario Fin de Carrera). En los más de 12 años que la Dra. Ros lleva trabajando sobre el aburrimiento, no solo ha liderado proyectos de investigación nacionales e internacionales sobre su línea de trabajo, también ha dado lugar a colaboraciones en Europa, Estados Unidos y Latinoamérica en torno a fenómenos como la soledad no deseada, el suicidio o la depresión, estableciendo convenios de colaboración con entidades públicas y privadas de la Academia y del sector geroasistencial. La Dra. Ros ha demostrado independencia y liderazgo a la hora de establecer una línea de investigación propia con clara vocación de mejora de la sociedad, además de una alta capacidad para la consecución de financiación pública y privada. En el siguiente paso de su carrera investigadora, Ros pretende abordar la cuestión del aburrimiento disfuncional en las residencias de mayores junto con otros problemas como la soledad y el sentimiento de inutilidad, para plantear actividades holísticas capaces de erradicar estas tres plagas de la vida residencial e intervenir en las políticas públicas para el bienestar, así como desarrollar protocolos preventivos en centros.

Resumen del Currículum Vitae:

Los resultados de la carrera investigadora de la Dra. Ros han causado gran impacto en la comunidad científica nacional e internacional y en la sociedad desde su comienzo en 2012. Ha publicado 207 trabajos, incluyendo artículos científicos (63 [Q1: 10, Q2: 10, Q3: 8, Q4: 10]), capítulos (50 [Q1: 19, Q2: 3, Q3: 3, Q4: 12]), libros (19 [Q1: 11, Q2: 2, Q3: 1, Q4: 4]), informes (10), memorias (5) y artículos divulgativos (60) para medios. Su obra más reseñable es *La enfermedad del aburrimiento* (Alianza, 2022), que ha recibido 35 citas, 23 reseñas y 4 nominaciones (en traducción con Princeton University Press, 2025). La mayoría de sus trabajos están publicados en Open Access. Ros cuenta con un total de 358 citas, un h-index 10 y un i10-index 11. Sus conclusiones han sido presentadas en 189 congresos nacionales e internacionales, 16 de los cuales han sido organizados por ella en instituciones extranjeras (Georgetown University, UCLA, Harvard University, Universität Leipzig, etc.). Transfiere los resultados de sus investigaciones a la sociedad a través de los medios. Ha realizado 455 colaboraciones para televisión/YouTube (92), radio/podcast (171) y prensa (193). Ros lidera su propia línea de investigación como IP de dos proyectos de I+D+i y dos de Innovación (140.854,62€), ha conseguido 8 contratos de I+D+i (356.409,39€) y ha creado grupos de investigación en torno al aburrimiento, el suicidio y la depresión que aglutinan a +150 personas. Ha colaborado en 20 proyectos de investigación financiados por el MICINN, el FECYT o la FBBVA, en los que se han obtenido 535.681,37€. Forma parte de proyectos internacionales como Fútbol Viral (Harvard University), ha establecido lazos con el JRC ISPRA del ERC y ha ayudado a abrir la filial española de la ONG estadounidense The Eden Alternative. Asimismo, es titular del registro de la primera asociación del mundo para el estudio del aburrimiento, la International Society of Boredom Studies (Premio FICUM 2023), que hoy preside y desde la que se edita la *Journal of Boredom Studies* bajo su dirección. En el panorama nacional, Ros ha establecido convenios de colaboración con entidades del sector privado (Instituto Santalucía, ALBOR Consultores o Inforesidencias) y público (Fundación Alicia y Guillermo, Fundación Colisée, Cátedra Intent HQ de IESE o D. G. de Atención al Mayor y a la Dependencia, Comunidad de Madrid). Ofrece formaciones y servicios de consultoría para residencias y entidades como la Fundación Intress, la Fundación APROCOR o la Fundación ASISPA. Ros también es docente universitaria desde 2014 (acreditación ANECA a Profesor Titular en 2024, a Profesor Contratado Doctor en 2017, 8 evaluaciones EXCELENTES y +2.500 horas totales), dirige 2 tesis doctorales, ha supervisado 3 estancias Erasmus+ de doctorandos internacionales y trabaja para el Observatorio del Estudiante del VR de Estudiantes de la UCM. Es evaluadora para organismos como el MICINN, el CONICYT, el DAAD, el Observatorio Social La Caixa, el MIAS o The Leverhulme Trust, además de ser parte de 12 comités científicos y editoriales de revistas y haber participado en 16 tribunales de tesis. El trabajo de Ros fue galardonado con el Premio Nacional de Investigación del MICINN (2022), el Premio Alumni Investigador-UCM (2021), el Premio Nacional Medios de Comunicación DomusVi (2021), el Premio Julián Marías (2020) o el Harvard Lincoln Book Prize (2019).



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Turno General

Área Temática: Ciencias sociales
Nombre: ROCH GONZALEZ, JUAN
Referencia: RYC2024-049609-I
Correo Electrónico: juan.roch.gonzalez@gmail.com
Título: Housing Crisis and Far-Right Politics: A Multidisciplinary Analysis of Discourses and Societal Impacts
Resumen de la Memoria:

Since September 2024 Juan Roch is an Assistant Professor (Profesor Ayudante Doctor) at the Department of Political Science and International Relations at Universidad Nacional de Educación a Distancia (UNED). Prior to this, Roch was a Margarita Salas postdoctoral researcher at Universidad Autónoma de Madrid (April 2022 to September 2024), a postdoctoral researcher at the University of Hildesheim in Germany (October 2020 to March 2022) and a Visiting Professor at the Universidad Carlos III de Madrid (January to June 2020). He holds a PhD in Political Science from the Free University of Berlin (November 2019, Magna Cum Laude) and was a visiting researcher at the University of Berkeley, California in 2019 and at the European University Institute in Florence in 2023. Since the beginning of his education and PhD studies, Juan Roch has been a passionate learner of a wide array of political and social science topics focusing especially, and most recently, on the emergence and consolidation of populist and nationalist discourses, the crises of the European Union, and the rise of the far-right in contemporary democracies. The problems of representation, which underlie the rise of new political actors and the challenges linked to the legitimacy crisis in democracies and citizen deliberation, have been central to Juan Roch's research interests and work. To make progress in this sub-field of study, Juan Roch has followed an ambitious training programme and built an international career based on several steps, milestones and achievements.

The topic of populism and Euroscepticism is further explored in Roch's Margarita Salas postdoctoral project "DEMO-CRISIS? New forms of legitimation and European integration" (April 2022- September 2024). While this project has Guillermo Cordero as the internal sponsor at UAM, the applicant himself is Principal Investigator. Securing this competitive grant and the other scholarships and competitive positions highlighted above; see 10. C1 demonstrate the candidate's growing leadership and independence in the field of political science. Through an interdisciplinary, comparative and innovative approach, the focus of Roch's latest DEMO-CRISIS project lied on the changing role the EU when legitimising political action and the main EU challenges during the last three European crises. The two-years fellowship at UAM has resulted in several publications and contributions, some of them mentioned above. Roch's own project DEMO-CRISIS was integrated into the research activities of three different projects at UAM, where he is a team research member.

Roch's current line of research builds on his academic background while expanding his networks with colleagues at UNED. He has integrated his ongoing work on populism and the far-right with that of collaborators at UNED, particularly through his involvement with the "Grupo de Estudios sobre Sociedad y Política" and the "Grupo de Estudios Críticos Urbanos". As Co-Principal Investigator alongside Ana Santamarina, Roch plans to lead the RIGHTS-HOUSING project: "Housing Crisis and Far-Right Politics: A Multidisciplinary Analysis of Discourses and Societal Impacts". With an excellent team, Roch seeks to investigate the links between the housing crisis and the surge in far-right support, with particular attention to the emergence of far-right actors politicizing housing and their social

Resumen del Currículum Vitae:

Roch holds a PhD in Political Science from the Free University of Berlin (November 2019) and was a Visiting Researcher at the University of Berkeley in 2019 and at the European University Institute in Florence in 2023. Juan Roch earned a master's degree in information and Knowledge Society from the Universidad Oberta de Catalunya in 2014 with Extraordinary Distinction for achieving the highest grade point average (9,7 out of 10). In 2016, he pursued a (partial) master's in political science at the Free University of Berlin, achieving a grade of A. He completed his bachelor's degree in Sociology at the Universidad Complutense de Madrid in July 2012. In 2021, he was certified by ANECA as a Contratado Doctor, Profesor Ayudante Doctor, and Private University Professor.

Since his doctoral studies in Berlin, he has published 23 peer-reviewed contributions, including JCR articles in prestigious journals, peer-reviewed Scopus/non-JCR articles, two books with Routledge and Tecnos and other publications such as book chapters, media contributions and reports. His first single-authored monograph is The populism-Euroscepticism nexus: A discursive comparative analysis of Germany and Spain. (Routledge, 2023) and he has recently published his second book: ¿Polarizados o paralizados? Surgimiento y transformaciones del movimiento democrático. (Tecnos, 2025). His academic work has been published in some of the most prestigious journals in political and social sciences such as the Journal of Common Market Studies, European Political Science Review, Journal of European Integration, South European Society and Politics, Political Studies, The British Journal of Politics and International Relations, , or Nations & Nationalism, among others. In the medium term he intends to further develop these lines of research and undertake a project to study the rise of far-right institutional and extra-institutional actors, their evolution and interconnections, and in particular their discourse and public policy impact on the housing issue.

Overall, Juan Roch's research is gaining recognition and visibility in the academic arena (Google scholar citations 163/ h-index 6/ i10-index 5). A number of achievements demonstrate the quality of his work: he gained a doctoral grant by the prestigious Hans Böckler Foundation in Germany that allowed him to improve his ability to work independently and acquire a broad and comprehensive knowledge of comparative politics and discourse analysis. He secured a postdoctoral position at the University of Hildesheim and was also awarded the Margarita Salas postdoctoral grant by Spain's Ministerio de Universidades. More recently, he was selected through a highly competitive process, with over 60 applicants, for the position of Profesor Ayudante Doctor at UNED. Throughout his academic career, he has conducted research on the interplay between populism and Euroscepticism at some of the most renowned institutions in Europe and the United States, including the European University Institute and the University of California, Berkeley. In addition to his research, he has substantial teaching and mentoring experience, having supervised undergraduate and master's dissertations and participated as a jury member for undergraduate and MA defenses. He was awarded with a Recognition for Teaching Excellence (2019/2020) by the Vice-Chancellor of the Universidad Carlos III de Madrid and has consistently received excellent evaluations from students.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias sociales
Nombre: RAMIREZ SMITH, DANIEL
Referencia: RYC2024-051279-I
Correo Electrónico: danielramirezsmith@gmail.com
Título: Early-life adversity and later-life health
Resumen de la Memoria:

Trajectory summary

Throughout my pre-doctoral period at Penn State University, I established a robust research agenda focusing on how exposures to frontlines and famine in early life elevate the risk of cardiometabolic and psychiatric conditions in later life, increase socioeconomic inequality, diminish longevity, and heighten the risk of such conditions in subsequent generations. This work furthered the DOHaD theoretical paradigm (Developmental Origins of Health and Disease). I successfully presented this work as oral presentations at three esteemed conferences (ASA, PAA, IUSSP). Due to this achievement, I secured three dissertation awards (RSGO, Joan Huber, and Milton B. Dollinger). Prior to my dissertation defense, I was able to publish as lead author in one of the field's top journals—*Demography*—alongside Steven Haas (associate professor at Penn State).

In 2021, I was hired as a postdoctoral researcher within the ECHO ERC-Advanced grant (GA No 788582) housed by CSIC-IEGD and in collaboration with the University of Wisconsin-Madison and the University of California Los Angeles. Within the ECHO program, I studied early life adversity and its long-term consequences by combining biology and social science, paying particular attention to the roles of genetics, epigenetics, biological aging, and developmental critical periods. My research resulted in the publication of 4 articles in high-impact journals, a book chapter, and participation as either an invited guest speaker or via competitive application as an oral presenter in multiple conferences of high prestige (e.g., PAA, ASA, ESHD).

After ECHO, I initiated my second postdoctoral post within the CenSoc grant (NIA - R01AG058940) at the University of Wisconsin-Madison and University of California—Berkeley. Within this grant, I studied the long-term effects of exposures to natural disasters while in-utero.

Proposed line of research for the Ramon y Cajal Grant

The Developmental Origins of Health and Disease (DOHaD) framework has recently emphasized epigenetic mechanisms as crucial elements in understanding the onset and prevalence of CVD, obesity, and diabetes. Epigenetic clocks, which are based on DNA methylation patterns, provide a powerful tool for understanding how early-life exposures impact health trajectories over the life course. They offer an objective measure of biological age acceleration, helping to identify individuals at higher risk of developing chronic conditions such as cardiovascular disease, obesity, and diabetes long before traditional clinical symptoms manifest. Incorporating epigenetic clocks into public health strategies can enable early detection, targeted interventions, and a better understanding of how social and biological factors interact to shape long-term health outcomes. My specific aims are to: (1) assess how epigenetic clocks can be utilized to evaluate the long-term impact of modern early-life adversity—such as poverty, stress, and behavioral risks—on the development of cardiovascular disease, diabetes, and obesity; (2) integrate epigenetic clocks into life course and DOHaD models to inform policies aimed at slowing biological aging and improving health outcomes; and (3) evaluate existing epigenetic clocks to determine the most suitable or develop more precise metrics for use in public health and aging research.

Resumen del Currículum Vitae:

A.2: Previous professional status

Period Position/Institution/Country/Interruption cause

2023-2024	Postdoctoral Researcher/University of Wisconsin-Madison/ USA/End of contract (1 year)
2021-2023	Postdoctoral Researcher/ECHO—ERC Advanced Grant/CSIC—IEGD/ Spain/Obtained Postdoctoral fellowship (3 years)
2020-Present	Associate Fellow/ D-Lab/UC3M/Spain
2020-2024	Research Associate/RSM-NSF-Pennsylvania State University/USA/End of NSF project (4 years)
2020-2023	Lecturer/ UC3M/Spain/(Taught courses intermittently - 4 years)
2018-2019	Researcher/D-Lab/UC3M/Spain/End of contract (1 year)
2014-2020	Predoctoral Researcher—Pennsylvania State University/USA/ Obtained PhD (6 years)
2012-2014	Researcher/Elcano Royal Institute/Spain/Obtained Predoctoral Scholarship (2 years)

A.3. Education

PhD, Licensed, Graduate	University/Country	Year
Bachelor's Degree—Sociology and Political Science	Complutense University of Madrid/Spain	2012
MA—Sociology & Demography	Pennsylvania State University/USA	2016
PhD—Sociology & Demography	Pennsylvania State University/USA	2020
MSc—Data Analytics	University of Glasgow/Scotland - UK	2022

Part C. RELEVANT MERITS

Awards:

Milton B. Dollinger Graduate Fellowship, Pennsylvania State University.



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RGSO dissertation support award, Pennsylvania State University.
Joanne Huber Dissertation Award, Pennsylvania State University.
Graduate Student Travel Grant (Total 6), Pennsylvania State University.
Professional Development Grant, Pennsylvania State University.
Graduate Scholar Award, Pennsylvania State University.
Honor Student Awards (Total 5), Complutense University of Madrid.

C.1. Selected publications

1. Ramirez, Daniel (CA), Elena Povedano, Aitor García, and Michael Lund. "Smoke's Enduring Legacy: Bridging Early-Life Smoking Exposures and Later-Life Epigenetic Age Acceleration." *Demography* 62, no. 1 (2025) Forthcoming. (Q1: Impact factor 3.5 / OA)
2. Ramirez, Daniel (CA), and Joeun Kim. "Not One of Us": Anti-Immigrant Sentiment Spread to Multiple Immigrant Groups in the Wake of Islamic Terrorism. *Social Forces* (2024), soae172. <https://doi.org/10.1093/sf/soae172>. (Q1: Impact factor 3.44 / OA)
3. Tufiş, Paula A (CA), Duane F Alwin, and Daniel N Ramírez. "A Catch-22: The Test-Retest Method of Reliability Estimation." *Journal of Survey Statistics and Methodology* 12, no. 4 (September 1, 2024): 1011-34. <https://doi.org/10.1093/jssam/smad043>. (Q1: Impact factor 1.6)
4. Haas, Steven A. (CA), and Daniel Ramirez. "Early-Life Exposure to War and Later-Life Physical Functional Health." *The Journals of Gerontology. Series B* 79, no. 6 (2024): gbae029. <https://doi.org/10.1093/geronb/gbae029>. (Q1: Imp factor 4.8 / OA)
5. Palloni, Alberto (CA), Daniel Ramírez, and Sebastián Daza. "Early Childhood Origins of Modern Social Class Health Disparities." In *Handbook of Health Inequalities Across the Life Course*. Edward Elgar Publishing, 2023. ISBN: 978-1-80088-815-9 <https://doi.org/10.13039/501100000781>.
6. Ramirez, Daniel (CA), and Steven A. Haas. "Windows of Vulnerability: Consequences of Exposure Timing during the Dutch Hunger Winter." *Population and Development Review* 48, no. 4 (2022): 959-89. <https://doi.org/10.1111/padr.12513>. (Q1: Impact factor 3.48 / OA)



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias sociales
Nombre: NAVARRETE MARTÍN, ROSA MARÍA
Referencia: RYC2024-050968-I
Correo Electrónico: rmnavarrete@gmail.com
Título: Navigating Truth in the Digital Age: How Voting Behaviour and Party Strategies Are Shaped by Disinformation

Resumen de la Memoria:

My academic career is marked by extensive international collaboration and leadership in interdisciplinary projects that bridge political science and innovative data and methods.

In this respect and linked to my current role as director of the Observatory of Online Politics at the Interdisciplinary Institute for Societal Computing at the Saarland University and taking the insights from the project Political Deception in the Digital Era that I am leading as Principal Investigator, I plan to study how political accountability can be improved by understanding the mechanisms that make citizens choose politicians who use deceptive methods, and analysing the incentives political actors have to contribute to the spread of misinformation using the possibilities of digital platforms and Artificial Intelligence. This research builds on my published analysis on misinformation and attitudes towards democracy (Navarrete and Eder 2024) as well as takes insights from some of the projects in which I worked before joining the Saarland University, among others, the digilog@bw in which I researched the impact of digitalisation in the dynamics of political participation.

Building on insights from my ongoing projects, the research I plan to develop with this Ramon y Cajal grant aims not only to advance academic understanding but also to provide strategies for strengthening democratic resilience against disinformation. By fostering integrity in political processes, the project aspires to bridge academic inquiry with societal impact. The proposed research examines a key paradox in democratic behaviour: while citizens claim to dislike dishonest politicians, they rarely penalize parties and individual politicians engaging in deceptive tactics. This line of inquiry is crucial for understanding democratic accountability in an era where digital platforms amplify misinformation, often strategically employed by political actors.

As described in my application, the research will leverage findings from my ongoing projects and will address critical questions: Why do citizens tolerate deceptive narratives? How do political parties exploit disinformation to mobilize support? What role does AI-driven content, such as deepfakes and algorithmic amplification, play in shaping political communication and voter perceptions?.

Resumen del Currículum Vitae:

I am an international scholar interested in understanding how political accountability can be improved by assessing how citizens decide their vote and what leads political parties to hold certain positions and use distinct electoral strategies to attract voters. In doing so, I use innovative approaches and advanced quantitative methods.

I received my PhD in Political Science at the University of Mannheim in November 2019 and since December 2022 I have been a research associate and teaching fellow (equivalent to Assistant Professor) at Saarland University where I actively contribute to new research lines and the development of new study programs. I am also a scientific researcher at the Interdisciplinary Institute for Societal Computing at Saarland University where I work together with other social scientists and computer science researchers in applying new research methods for the social sciences as well as innovative research questions. In this respect, I am also the Director of the Observatory of Online Politics and lead an interdisciplinary team of computer and social scientists who monitor politicians' social media activity and collect data from different digital platforms.

Since January I am the Principal Investigator of the research project Political Deception in the Digital Era (initial funding of 13177€ for this year) that assesses how digital tools affect the use of deceptive methods by politicians and how citizens respond to this and to the spread of misinformation.

During my career, I have been a member to several competitively funded research projects adding millions of euros and I have held several research positions in Spain, United Kingdom and Germany. Since 2020 I have published 12 peer-reviewed research papers (most of them in Q1 and Q2 journals) and 3 book chapters (also peer-reviewed) in books published by reputable publishers such as Oxford University Press. Also, as researcher at the digilog@bw project, I led the design and data collection of a panel-study, a cross-section study and a conjoint experiment, being all these datasets publicly available at GESIS.

In my academic and research career I had a total of 3 years of breaks due to maternity leaves of children born in 2014, 2018 and 2021. Despite this, I have maintained a high level of research and academic activity. I have taught courses at different academic institutions and participated in dozens of international research and academic events. I have been invited to present my research, among others, at seminars organized by relevant organizations such as the Association for the Studies of Nationalities based in the United States, the Universidad Autónoma de Madrid and the Universidad de la Republica de Uruguay.

I am also a scholar committed to creating networks and public outreach, and this is why I am member of different research groups and my comments have appeared in national and international media.



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Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: ZARRABEITIA IPIÑA, MAIDER
Referencia: RYC2024-051014-I
Correo Electrónico: maiderzarrabeitia@gmail.com
Título: Beyond Li batteries: materials and interphases

Resumen de la Memoria:

I have a Chemistry (2012), and Master's degree in New Materials (2013) and a PhD in Material Science and Technology (2016) from the University of Basque Country (UPV/EHU) (Spain). The PhD thesis was developed at CIC energigune (Spain) and supported by a predoctoral fellowship (3 years), including two research stays at the University of Camerino (Italy) and received two Extraordinary Doctoral Prizes (UPV/EHU and Basque Government). I joined UPV/EHU as a postdoctoral researcher in 2017, and in 2018, I was awarded a 3-year postdoctoral fellowship at Helmholtz Institute Ulm (HIU) (Germany). In 2020, I became a researcher and project manager at Karlsruhe Institute of TechnologyKIT (Germany). Since 2022, I have been an Associated Principal Investigator (PI) and Group Leader of "Beyond Li-batteries: materials & interphases" at HIU/KIT (Germany). I also joined other collaborator institutions as a short research stay, such as Warwick Manufacturing Group (UK, 2023) and ICTP-CSIC (Spain, 2024, financially supported by i-link 2023), for manufacturing solid-state polymer electrolyte-based Na-pouch cells and broadband dielectric (BSD) experiments, respectively. My research activities are focused on the synthesis, design, optimization, and physicochemical and electrochemical characterization of anode and cathode materials/electrodes and polymer electrolytes for beyond lithium-based batteries, e.g., sodium- and potassium-based batteries. The developed materials (cathode, anode, and polymer electrolytes) are based on sustainable and highly abundant (in the EU) non-critical materials to enhance the competitiveness of the EU in the battery field. In addition, my main expertise is in understanding the electrolyte (liquid and polymers) degradation products/mechanism by deeply investigating the electrode-electrolyte interfaces by surface techniques (i.e., X-ray photoelectron spectroscopy (XPS)) and electrochemical method (electrochemical impedance spectroscopy). Indeed, I am one of the scientific heads of the XPS, collaborating with the group members, as well as with abroad groups. The aim is to boost the electrochemical performances of the batteries by optimizing the electrode-electrolyte configuration, modifying the electrode surface, and designing electrolytes with wide electrochemical stability, always keeping in mind the sustainability and safety aspects of the battery.

Resumen del Currículum Vitae:

I became an associated principal investigator and group leader of "Beyond Li-batteries: materials & interphases" at Helmholtz Institute Ulm/Karlsruhe Institute of Technology (HIU/KIT) (Germany) in 2022. However, I have been working since 2020 as a project manager, where I was/am the (co-) PI of 8 national and international competitive research projects (2.3M EUR for HIU) and collaborations with 6 industrial projects. I am the author of 62 scientific publications and 1 book chapter in international high-impact journals in the fields of Chemistry, Material Science, Electrochemistry, and Energy, with >2200 citations (index h=28, Q1 journals, 13 articles/book chapter as the first author and 7 as a corresponding author). I contributed to training young researchers, as I supervised 1 TFG, 2 TFM, and 2 PhD theses. I am currently (co-)supervising 7 PhD students. I have also been invited to participate in several Workshops related to electrochemistry and electrode-electrolyte interfaces for young researchers and disseminated the results at >50 national and international conferences (myself, 23 (inter)national conferences (10 oral and 4 invited talks). I have also contributed to the scientific society as a regular reviewer of high-impact index scientific journals in the areas of Material Science, Electrochemistry, and Energy, and for M-ERA.NET project calls. I have also participated as PhD tribunal member, co-organizer of the 7th International Conference of Sodium Batteries (ICNaB 2022) at Ulm (Germany), and a guest editor of Special Issue: Original researcher contribution from ICNaB 2022 international conference (ChemSusChem, Batteries & Supercaps, and Energy Technology) and Advanced Anode Materials for Alkali-Ion Batteries (Materials). I am a member of RSEQ and RSEQ-GEE; finally, I obtained the R3 Certificate (2024 call).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: PICCHIO, MATÍAS
Referencia: RYC2024-048187-I
Correo Electrónico: matias.picchio@polymat.eu
Título: Innovative Soft Materials for Biomedical Applications

Resumen de la Memoria:

My research experience spans the fields of polymer colloids and soft matter, focusing on the design, preparation, and characterization of macro- and nanoscale platforms for biomedical applications. My work has resulted in 57 high-impact publications, including original research articles, reviews, and book chapters. Of these, I am the first author on 15 publications and the corresponding author on 16. My research has achieved an h-index of 19 and accumulated over 1,067 citations (Scopus, 12/2024). Most of my articles are published in Q1 journals, including Adv. Funct. Mater., Angew. Chem. Int. Ed., Adv. Sci. (x2), Mater. Horiz., and ACS Mater. Lett., among others. I also serve as a peer reviewer for high-impact journals such as Chem. Eng. J., ACS Appl. Mater. Interfaces, and Angew. Chem. Int. Ed..

I have been invited to deliver lectures at three international conferences: "Polyphenols as Natural Building Blocks to Prepare Soft Functional Materials" at Queen's University Belfast, School of Pharmacy Seminars (Belfast, UK, August 21, 2024); "Natural Deep Eutectic Solvents as Emerging Low-Cost Electrolytes for Designing Ionic Soft Materials" at Polymat Seminars (Donostia-San Sebastián, Spain, March 25, 2022); and "Deep Eutectic Solvents and Eutectogels: Novel Materials for Biomedical Applications" at Biomaterials International (Sapporo, Japan, July 30, 2023).

During my postdoctoral research, I initiated independent research lines focused on nanomedicines for healthcare. I secured competitive funding from ANPCyT (Argentina) for young researchers (PICT-2018-01032, \$7,000). In 2021, I was awarded a Marie Skłodowska-Curie Individual Fellowship (MSCA-IF) for the project "Engineered Nanoparticles Targeting Hair Follicles for Alopecia Areata Treatment" (ID: 101028881, \$160,932). Additionally, I am the Co-PI of the European Project IONBIKE 2.0 MSCA Staff Exchanges, "Innovative Eutectogels for Emerging Applications" (ID: 101129945, \$1,600,000). Recently, I received an Ikerbasque Research Fellowship (tenure-track) with a start-up budget of \$10,000 and the Entreprenari Award of \$7,000.

I began my Ph.D. training in 2011 at INTEC (Santa Fe, Argentina). In 2012, I undertook my first international research exchange at Polymat (University of the Basque Country, San Sebastián, Spain) as part of a global network funded by the Argentine Ministry of Education. My postdoctoral research included international visits in 2024 to Charité Hospital (Berlin, Germany), Queen's University Belfast (UK), and the University of Coimbra (Portugal). Currently, my primary research lines include nano- and macromaterials for drug delivery systems and deep eutectic solvents, and ionic soft materials for bioelectronics. I am the founder and Principal Investigator of the EutectoMatter Group, supported by Ikerbasque and Basque Foundation for Science. I currently supervise three Ph.D. students working on various projects related to eutectic solvents and eutectogels.

For more information about my current research, please visit: <https://www.linkedin.com/in/eutectomatter-group-1391b0263/>.

Resumen del Currículum Vitae:

I have a multidisciplinary academic background with expertise in polymerization in dispersed media, polymer films, polymer crystallization, drug delivery systems, theranostic nanomaterials, soft ionic gels, and deep eutectic solvents for biomedical applications.

During my Doctoral studies, I focused on synthesizing hybrid acrylic-casein latexes for eco-friendly coating applications, a topic with significant technological impact. This work earned me the Best Argentinian Doctoral Thesis in Polymers Award (2017), and the results were successfully transferred to Allnex Company (The Netherlands) through a collaborative publication (DOI: 10.1021/acs.iecr.6b02105).

In 2016, I transitioned from an engineering approach to a chemical perspective during my Postdoctoral research at the Faculty of Chemistry, National University of Córdoba (Argentina). My focus was on developing responsive materials for controlled drug delivery and creating therapeutic platforms based on casein micelles. My project, FormulARG Pharma, was shortlisted for the MinCyT-Merck Award for innovation in healthcare. Continuing this research, I secured funding from ANPCyT (PICT Start-Up 2018-00905) to support the creation of an SME.

During my Postdoc, I laid the groundwork for independent research as a junior subgroup leader, eventually earning a tenured position as an Assistant Researcher at CONICET (Argentina) in 2019. Since then, I have led multiple research lines as a Principal Investigator and supervised MSc and Ph.D. theses.

In 2021, I was awarded the prestigious and highly competitive Marie Skłodowska-Curie Individual Fellowship (success rate below 10%) to conduct research at Polymat (University of the Basque Country, Spain). Here, I lead a project on nanomedicines for Alopecia Areata treatment. In September 2024, I received a tenure-track position from Ikerbasque and Basque Foundation for Science to establish my independent research group, EutectoMatter. More details about my profile can be found at: <https://www.ikerbasque.net/es/matias-picchio>.

In recent years, I have gained significant visibility in my research field, fostering a collaborative network with esteemed researchers, including Dr. Allegret from CIC biomaGUNE (Spain), Dr. Paredes from Queen's University Belfast (UK), Prof. Coronado from INFIQ (Argentina), Dr. Domínguez-Alfaro from the University of Cambridge (UK), and Dr. Capezza from KTH Royal Institute of Technology (Sweden). Additionally, I am actively involved in technological development projects in collaboration with Beiersdorf AG (Germany) and I+Med-Biotechnology for Health (Spain), focusing on developing materials for wound care, drug delivery, and biodegradable excipients. I have participated in a Technological and Social Development Project (PDS N° 0319-CONICET, Argentina) aimed at transferring acrylic-casein adhesives to the private sector through TECNICOM SRL.

In addition to my research activities, I have a strong commitment to teaching. From 2015 to 2024, I served as an Assistant Professor in Physical Chemistry for the Chemical Engineering degree program at the National Technological University (UTN Villa María, Argentina). Furthermore, I engage in science dissemination activities for both general and specialized audiences, including radio interviews (Unciencia, Argentina) and outreach talks for young students at the 11th and 12th Encuentro de Vidas Científicas (Spain) and the European Research Night 2024 (Spain).



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Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: MERINO , DANILA
Referencia: RYC2024-049688-I
Correo Electrónico: danila.merino@polymat.eu
Título: Trayectoria investigadora de Danila Merino

Resumen de la Memoria:

Dr. Merino currently leads the Sustainable Biocomposite Materials (SusBioComp) group at POLYMAT, where her research focuses on designing innovative biocomposite materials to sustainably protect and enhance agricultural and food systems. Since joining in June 2023, her work has centered around three key research lines: (1) Zero Waste & Circular Economy, (2) Food Production & Resource Efficiency, and (3) Food Protection & Extension of Shelf-life.

Resumen del Currículum Vitae:

Dr. Danila Merino holds a Bachelor's degree in Chemistry (2014) with honors from the National University of Mar del Plata (UNMDP) in Argentina, where she also completed her PhD in Materials Science (2019) under a National Scientific and Technical Research Council (CONICET) scholarship. Her doctoral research, conducted at the Materials Science and Technology Research Institute (INTEMA) under the supervision of Dr. Vera Álvarez and Dr. Claudia Casalongué, focused on "Development of Innovative Bioinputs for its Application in Modern Agriculture" and was recognized as the best thesis in materials science in Argentina for the 2018-2020 period.

From 2019 to 2023, Dr. Merino worked as a postdoctoral researcher at the Italian Institute of Technology (IIT) in Genoa, contributing to the Smart Materials group led by Dr. Athanassia Athanassiou. There, she developed methods for converting plant waste into bioplastics, further advancing her expertise in sustainable materials. During this period, she secured several prestigious grants, including the Emakiker Grant, the MSCA Postdoctoral Fellowship, and the Gipuzkoa Fellowship. In 2023, Dr. Merino joined POLYMAT, the Basque Center for Macromolecular Design and Engineering, as an independent researcher. In 2024, she was awarded the Ikerbasque Research Fellowship, consolidating her leadership in the field. She currently leads the Sustainable Biocomposite Materials (SusBioComp) group within POLYMAT's Polymers and Sustainability division, focusing on the development of sustainable biocomposite materials for agriculture and food systems with minimal environmental impact.

Throughout her scientific career, Dr. Merino has made significant contributions to the field of sustainable materials, particularly in the science and technology of composite polymeric materials. She has demonstrated an exceptional ability to generate innovative ideas, formulate strong hypotheses, and achieve meaningful results. Her achievements are reflected in an extensive publication record of 45 contributions, including 36 articles in high-impact scientific journals, 8 book chapters, and 1 literature review. Notably, she is the first author on 33 publications, the corresponding author on 30, and the last author on 4. She has presented her findings at 59 national and international conferences and holds three national patents in Argentina.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: GUALDRÓN REYES, ANDRÉS FABIÁN
Referencia: RYC2024-050481-I
Correo Electrónico: andres.gualdron@uach.cl
Título: Use of 2D halide perovskites and inspired semiconductors as photoelectrodes for solar-(photo)electroreduction of NO_x- and CO₂ from eutrophic waters

Resumen de la Memoria:

I am B.Sc., M.Sc., and Ph.D. in Chemistry at Centro de Investigación en Catálisis (CICAT) Universidad Industrial de Santander (UIS, Colombia), where I obtained my experience on preparing the boron-doping of TiO₂ nanoparticles prepared by sol-gel method, and introducing reduced graphene oxide as an electron transporter, with the purpose to fabricate efficient photoelectrodes for the photoelectrochemical (PEC) phenol oxidation in wastewaters. During my Ph.D., I was directly involved in the synthesis of boron-doped TiO₂ nanotubes through Ti anodization, for the PEC oxidation of glycerol and emerging pollutants in wastewaters, and fabrication of chalcogenide QDs-based solar cells. Then, after my incorporation at Institute of Advanced Materials (INAM), at Universitat Jaume I (UJI, Spain) as a postdoctoral researcher, I developed innovative strategies to obtain high-quality halide perovskite nanocrystals (PNCs) with improved photophysical properties for the fabrication of efficient LEDs, obtaining important achievements in photo(electro)chemical oxidation/reduction reactions of recalcitrant organic molecules, PNCs stabilization in polar solvents through surface passivation and the preparation of white-emitting composites for promising applications in liquid crystal displays. Another type of semiconductor-based nanocrystals was prepared to be efficient light absorbers for the fabrication of long-term stable solar cells. Lastly, as assistant professor at Universidad Austral de Chile (UACH, Chile), I am working on i) the synthesis and characterization of anion-exchanged PNCs stabilized through surface passivation for fabricating bright color converters and LEDs, and ii) PEC degradation of recalcitrant organic compounds and energy generation using water-stable lead-free halide perovskites in aqueous systems. This consolidated experience is pivotal to develop the proposed project entitled: (PHoto)electroreduction of NO_x-/CO₂ to urea in eutrophic aquifers by using water-stable lead-free halide perovskites and pnictohalide Semiconductors (PHOCUS)" which exhibits as the main objective to carry out the photovoltaic-assisted PEC reduction of NO_x- and CO₂ contained into eutrophic aquifers, producing urea in the process, using water-resistant LFHPs and inspired semiconductors (IS) with modulable light absorption and high (photo)electroactivity. With this approach, it will be possible to promote the water remediation with high CO₂ saturation, generating added-value products as urea, valorizing NO_x- and CO₂ targets.

The project will consider five (5) specific objectives: 1. To stabilize LFHPs based on 2D A₂SnX₄ structure in water through ligand and composition engineering. 2. To tailor the optical and electronic properties of IS by the choice of a suitable particle size and chemical composition. 3. To fabricate water-stable photoelectrodes by studying different deposition techniques, the nature of hole transporting layers (HTLs). 4. To evaluate the (photo)electroactivity of the stable photoelectrodes for the PEC NO_x-/CO₂ reduction and concomitant urea production. 5. To develop a PV/PEC tandem system for performing the solar-(photo)electroreduction of NO_x- and CO₂ contained in eutrophic aquifers. This project centers the efforts on the production of a solar-sustainable system to give solutions urgently needed to restore the quality of hydric sources.

Resumen del Currículum Vitae:

I am a chemist, educated in the materials science field, with strong research and dissemination skills focusing the work I do towards the generation of innovative strategies for sustainable and ecofriendly energy generation and transformation. Throughout my experience in M.Sc., Ph.D., I started to develop my critical thinking and independence in a wide range of fields, mainly the preparation of photoactive materials for photo(electro)catalytic oxidation of recalcitrant organic compounds, fabrication of chalcogenide- and perovskite-based solar cells and efficient light-emitting applications. In particular, during my Ph.D., I studied the control of phase segregation in mixed halide perovskites (MHPs) through the particle size, inhibiting this phenomenon under nanocrystal regime (nanoconfinement). Furthermore, I have fabricated halide perovskite based photoelectrodes with modulable band structure through the chemical composition for carrying out the photoelectrochemical oxidation of recalcitrant compounds. These research lines have allowed me to obtain a Postdoctoral position at Institute of Advanced Materials (INAM)-Universitat Jaume I (UJI), a subsequent academic position as Assistant Professor at Universidad Austral de Chile (UACH) and perform several international stays (México, Chile, Spain, Belgium Czech Republic and South Korea), consolidating top-level and fruitful scientific collaborations and favoring my scientific maturity, leadership.

After my Ph.D., Postdoctoral Stage and now being Assistant Professor at UACH, my consolidated scientific production is summarized in 67 scientific contributions, divided in 65 peer-reviewed papers (18 as corresponding author, 15 as first author, 5 as last author, 1 as single author and 39 published in open access), 1 patent, 1 book chapter, 18 scientific congresses (10 oral contributions), 2 invited talks, and 1 seminar, leading to a h-index = 22 (>1860 citations in Scholar Google and >1570 in Scopus).



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Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: PARDO MONTERO, ALBERTO
Referencia: RYC2024-051322-I
Correo Electrónico: alberto.44444@gmail.com
Título: Design of Advanced Magnetic Nanomaterials and Biomaterials for Theranostics and Tissue Engineering
Resumen de la Memoria:

I started my research career by developing my PhD in the Colloids and Polymers Physics Group (GFCP) at the Univ. Santiago de Compostela (USC) under the supervision of Prof. P. Taboada and Prof. S. Barbosa. During this period, I pioneered a new research line in the group focused on the synthesis and characterization of magnetic nanoparticles (MNPs) with optimal physicochemical properties for their theranostic application. Novel results were obtained regarding the ideal morphology, composition, or magnetic behavior of the MNPs for their use as magnetothermal nanotools and as contrast agents for magnetic resonance imaging. My PhD was interdisciplinary, covering also works on the use of MNPs for bioremediation purposes or the design of gold-based nanostructures for drug delivery applications. During my predoctoral step, I performed an international internship of three months in the Univ. Marburg (Germany) under the supervision of Prof. W.J. Parak, where I learned the polymer coating technologies for which Parak's laboratory is recognized worldwide.

After completing my PhD, in May 2019 I began a four-year postdoctoral position at the 3B's Research Group (Univ. Minho, Portugal) to work in the scope of the ERC-CoG "MagTendon" under the supervision of Prof M.E. Gomes and Prof. R.L. Reis. This new position gave me the opportunity to apply my expertise in the design of magnetic nanomaterials to a completely novel research area for me, such as tissue engineering (TE). In this period, my research was focused on the incorporation of advanced strategies for MNPs synthesis into the field of TE, as well as the design of optimal experimental setups to generate the required magnetic fields, and the development of a still largely unexplored biofabrication technique at that time, such as magnetically-assisted 3D bioprinting. This allows the development of a new generation of biomimetic scaffolds and novel organotypic on-chip models for tendon TE applications.

After this international postdoctoral stage, I obtained a new competitive two-year postdoctoral contract from Xunta de Galicia to continue my work back at the USC until May 2025. This contract was associated with a research project to develop my own research line, which is focused on the biofabrication of novel TE scaffolds that replicate the typically overlooked piezoelectric properties of most native tissues through the use of magnetoelectric nanomaterials.

In summary, my research is highly multidisciplinary, being framed at the interface between physics, nanotechnology, material science and biomedicine. Although the common thread throughout my career has been the design of magnetic nanomaterials, my work has evolved to explore complex modifications and synergies of MNPs, including novel multi-doping, the growth of piezoelectric nanoshells, or their integration with biomaterials. This has allowed my research to span diverse biomedical fields such as theranostics, TE, or organ-on-chip models.

Because of this interdisciplinary nature of my research, I was involved since the beginning of my career in collaborations with many prestigious international research groups, resulting in multiple joint publications which can be found in my CV.

Resumen del Currículum Vitae:

I completed my PhD in Materials Science (2019) at the Colloids and Polymers Physics Group (GFCP) of the Univ. Santiago de Compostela (USC), being my PhD dissertation awarded with the summa cum laude honour and the European doctorate distinction. As part of my PhD, I performed a three-month stay in the AG Biophotonics Group of the Univ. Marburg (Germany). During my predoctoral step, I was awarded a competitive four-year University Teaching Staff Training (FPU) fellowship, also receiving a competitive FPU-secondment fellowship for my international internship, both funded by Spanish Government.

After a short postdoctoral stay in the GFCP, in May 2019 I obtained a postdoctoral fellowship under the scope of the ERC-CoG "MagTendon" to work in the 3B's Research Group of the Univ. Minho (Portugal). In October 2019, I was awarded a competitive postdoctoral fellowship from Xunta de Galicia to continue my work at the Univ. Minho for another three and half years.

After four years of international postdoctoral stage, I obtained a new competitive two-year postdoctoral contract from Xunta de Galicia to continue my work back at the USC until May 2025. This contract was associated with a research project funded with 25,000 € to develop my own research line. My research has resulted in the publication of 1 book chapter and 27 peer-reviewed papers in JCR-indexed journals (22/5 articles in Q1/Q2 journals, with 8 in D1). I have contributed as first author to 8 of these publications, second author to 4, and corresponding author to 5 (860 citations, h-index 14). I have made more than 40 contributions to conferences, including 1 invited talk and 13 oral presentations. Moreover, I have been part of the organizing committee for 5 international conferences, and I have also participated in several outreach seminars and talks.

Currently, I am the principal investigator (PI) of two research projects, obtained in national and regional calls. Additionally, I am a member of the research team in four other ongoing projects, and a collaborator in a recently awarded ERC-CoG project. In the past, I was involved in one knowledge transfer contract and eleven other competitive projects, including four short projects as PI. The total budget obtained through the projects in which I was involved as PI, team member, or collaborator, exceeds 4,3 M€.

Throughout my scientific career I have established an extensive network of international collaborators, including the Iberian Nanotechnology Lab. (Portugal), the Dept. Chemical and Biological Engineering (Univ. Colorado Boulder, USA), or the Dept. Radiology and Precision Health Program (Univ. Michigan State, USA), amongst others. Moreover, I belong to different scientific societies such as the USC-Materials Institute.

I have supervised 2 BSc theses and collaborated in the guidance of 1 MSc and 2 PhD theses, being currently involved as supervisor in 2 BSc and 2 PhD theses. Moreover, I have 280 hours of teaching experience at USC, and I have taught five classes as an invited professor at the Univ. Minho. I have participated in the committees for three PhD theses, and I have served on the committees for the evaluation of BSc theses in Physics at USC in the past two academic years. Furthermore, I am a reviewer in different journals such as Chem. Soc. Rev. or Nat. Commun., ranked D1 in their categories.



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Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: HERNÁNDEZ RUEDA, FRANCISCO JAVIER
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Título: Laser-induced Ultrafast Dynamic Mechanisms at the Micro- and Nano-scale for Applications

Resumen de la Memoria:

Past and present research positions and internationalization:

My international career has been held at several research institutes and universities (postdoc ~8 years abroad, other stays 5,5 months abroad).

Current position:

2-2022 – today, PI of Atracción de Talento Project (mod.1), Universidad Complutense de Madrid.

Postdoctoral stays abroad (~8 years)

12/2019 – 01/2022 (2.2) Postdoc/Advanced Research Center for Nanolithography/the Netherlands

12/2018 – 11/2019 (1.0) Postdoc/Kavli Institute/Delft University of Technology/the Netherlands

05/2016 – 11/2018 (2.5) Marie Curie Fellow/Debye Institute/Universiteit Utrecht/the Netherlands

05/2014 – 04/2016 (2.0) Postdoc & Lab manager/University of California Davis/California, USA

PhD, MSc and BSc projects in Spain

08/2009 – 04/2014 (4.8) PhD student/CSIC Instituto de Óptica Daza de Valdés/Madrid, Spain

Experimental and theoretical research:

My main research interest focuses on theoretically and experimentally understanding fast and ultrafast processes at the nanoscale that originate through the interaction of ultrashort light pulses with materials via linear and nonlinear optical mechanisms. Such interactions have a clear multiscale character, and my goal is to individually and collectively understand these mechanisms throughout different time-scales to exploit them for applications in nanophotonics, fs-laser micromachining and EUV generation for nanolithography. I currently focus on investigating nanomaterials, including nanoparticles, 2D materials and metamaterials. Part of my research is carried out in isolated trapped nanosystems in vacuum and controlled atmospheres, for which I employ a quadrupole Paul trap. My work has been acknowledged and supported by the scientific community through more than ten scientific prizes, personal grants and dissemination awards, as well as by the AEI's I3 Certification 2020.

Throughout my career, I have contributed to solve multi-physics problems in the fields of ultrafast nanophotonics, fs-laser-materials processing and EUV plasma processes by designing, building and automating several state-of-the-art experimental systems in combination with theoretical models and numerical simulations. The most relevant milestones include:

- A time-resolved scattering microscope combined with a Paul trap and a multi-photon system (UCM).
- A new Hermite-Gaussian-based set basis to generate Airy surface plasmon polaritons (UCM).
- A shadowgraphy system combined with a droplet generator to investigate EUV plasmas (ARCNL).
- Radiation-hydrodynamic simulations to characterize Sn plasmas for nanolithography (ARCNL).
- A multi-photon microscope to study nonlinear optics in 2D materials and metamaterials (TU Delft).
- A Paul trap to manipulate and investigate levitating nanoparticles in vacuum (Universiteit Utrecht).
- Strong field ionization of electron plasmas integrated with house-made FDTD code (Univ. Utrecht).
- A time-resolved microscope to investigate ultrafast dynamic mechanisms (University of California).
- An SLM-based fs-laser pulse shaper used for 2D and 3D laser nanofabrication (CSIC).

I have combined my experimental work with theory, numerical methods and artificial intelligence, which ultimately has helped to provide a better understanding of the above-mentioned chain of processes through the time-scales at the μm - and nm-level.

Resumen del Currículum Vitae:

I hold a PhD in Physics from the Universidad Complutense de Madrid (UCM), honored with a Premio Extraordinario of the materials science department. After my 8-year-long postdoc abroad, I joined the UCM as PI of a 5-year-grant CAM Atracción de Talento Investigador (mod 1) and later as PI of a Generación de Conocimiento project. I investigate ultrafast light-driven transient processes in 2D materials and nanoparticles by combining experimental and numerical methods with theory for a variety of groundbreaking applications in nanophotonics, laser-materials processing and EUV nanolithography.

Projects:

During my career, I have participated in 13 research projects funded with 8.1 M€, of which I am or was PI of 3 of them funded with 850 k€. My research contributions in different research groups have led to 6 research projects with industry (ASML and Thorlabs).

Independence and publication record:

My current publication record includes 36 open-access peer-reviewed JCR articles in top-tier journals, including ACS Phot., Appl. Surf. Science, ACS Appl. Mat. & Interf., Appl. Phys. Letters and Opt. Lett.

- More than 80 % of my papers are in Q1 (1st quartile) and 17 % in D1 (1st decile) (SCImago J. Rank).
- A 61 % of my articles have been co-authored with my international collaborators.
- I am first (15) or last author (2) of a 47 % of my articles and corresponding author of 45 % of them.
- I have also disseminated my work through 90 conference contributions, 5 invited talks, 1 patent, 10 conference proceedings and 1 book chapter.



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Transfer of knowledge:

Over the past ten years, my research has been of interest for technology companies, including ASML (Netherlands-USA) and Thorlabs (USA). These, and other collaborations, were supported by industry via 6 technology-oriented research projects, which originated several scientific manuscripts. Besides, I am co-inventor of a patent of a metrology method for analyzing Sn plasmas in EUV radiation sources of nanolithography machines manufactured by ASML, which is the world leader manufacturer of lithography machines (total assets €42 billion). At the University of California, I led a technical support contract with the company Thorlabs. In 2016, the company ASML supported my Marie Curie project with a tech-support contract.

Mentoring of young researchers and teaching:

Currently, I supervise the research of a PhD student, a postdoc, a MSc student and an undergraduate student (BSc). During the last 10 years (8 of which abroad), I have mentored 3 PhD students, as daily supervisor, and supervised the research projects of 2 postdocs, 6 MSc theses, 5 BSc projects and 9 undergraduate students with introduction to research projects. Together, we coauthored 17 peer review articles and 50 conference contributions in the topic of materials science and photonics. Overall, I have lectured in physics subjects (theory and labs) at 5 universities at the BSc, MSc and PhD levels. In Utrecht, I founded a Student Chapter funded by the Optical Society of America, where my I led students to promote dissemination activities in photonics.



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Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: PUSZKIEL SALDIVAR, JULIÁN ATILIO
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Correo Electrónico: julian.puszekiel@hereon.de
Título: Investigations on multifunctional materials for hydrogen-energy storage-compression and CO₂ capture and conversion: Development and applied proof of concept

Resumen de la Memoria:

Since the beginning of my research career, I have been contributing to high-quality scientific and technical production. Most of my published papers as a first and co-author were prepared after finishing my Ph.D. thesis in quite an independent way (as first author: 13 papers and as a co-author: 39 papers published independently after finishing my Ph.D.). Furthermore, book chapters and patents were released during my research career after getting my Ph.D. The open-access philosophy is also part of my scientific output since I have been using repositories such as Zenodo, and I try to publish open access every time possible so that not only the scientific community can have access to the information but also people out of the science field. In my Ph.D. (2007-2012, CONICET grant), I developed hydrogen storage materials. I also contributed to a transfer of technology project in 2009 in the frame of an agreement between Comisión Nacional de Energía Atómica (CNEA) and the company INVAP S.E. and through a consultant activity, showing a high degree of professional expertise and innovation even in the early stage of my scientific career. I also did part of my Ph.D. in the Dept. of Nanotechnology, Helmholtz Zentrum HEREON (2010-2011) after gaining a DAAD-ALEARG grant. There, I acquired experience with different advanced material science techniques like those applied in the synchrotron and also explored the applied aspects of hydrogen storage technology. After obtaining my Ph.D., I continued developing the basic and applied line of hydrides, showing a high degree of independence demonstrated by two acquired and successfully developed projects as principal investigator PI for the synthesis and characterization of forming hydride compounds. I also explored the applied science aspect of metal hydride technology in a post-doctoral position funded by an Alexander von Humboldt fellowship in the modality of applied research (Georg Forster) from 02/2017 to 04/2019 at the Institute for Materials Research, Helmholtz-Zentrum HEREON, Germany. Such post-doctoral work resulted in 3 patents about tank and system design for hydrogen storage and two publications in cooperation with different universities and institutes. I also contributed to the supervision of a student, as well as the completion of publications about CO₂ capture and conversion through hydrides in the frame of the EU project called CO₂MPRISE. With knowledge of material science and applied science, I developed a project about applying 3D printing to manufacture micro-catalytic reactors for CO₂/CO conversion (3D4GREEN) in the Institut de Recerca en Energia de Catalunya (IREC) through a Marie Skłodowska-Curie ACCIÓ-program (2019-2021). Such results and development from the 3D4GREEN project have been included in the ongoing process of getting the degree of professor at Helmut Schmidt University (HSU), Hamburg, through an accumulative habilitation, which is an ongoing process, expected to be closed during 2025. Since June 2021, I have been working at HSU University and HEREON research center in leading positions. I have been managing two large projects as PI about the development of hydride-based integrated systems for renewable energy conversion, and supervising Ph.D. students (number of 7), among the main activities. I aim to develop my research career further in Spain through the Ramon y Cajal program.

Resumen del Currículum Vitae:

I am committed to seeking solutions to energy and environmental problems through international cooperation, human resources training, and scientific contribution. I am flexible and have vast experience in mobility, adaptability to different working environments, and developing my career towards a clear leadership position. I have more than 10 years of experience in different fields of materials science, applications of hydrogen and energy technology, and capture-conversion CO₂, demonstrated by my scientific contributions (h-index: 25 / citations>1800): 2 theses written (specialization and Ph.D.), more than 60 peer-reviewed publications in renowned journal ranked in the first (Q1), second (Q2) and third quartal (Q3) of impact factor (69 % of all papers in Q1), 4 granted patents, 1 technology transfer, 2 chapters in books and more than 40 participations in congresses. I have been training students through teaching and supervision at different stages. I have been in contact for over 10 years with teaching activities in various positions, including teaching assistant and lecturer positions in Argentina and Germany. I have been involved in lectures on materials science and energy applications. I have supervised and co-supervised students and post-docs in Argentina, Spain, and Germany. I have experience as a responsible researcher and collaborator in projects since developing my doctoral thesis. I was the principal investigator in 4 projects successfully evaluated in the Argentinean research system and the frame of the European Union. I also contributed to the revision process for renowned peer-reviewed journals, participated as a guest editor two times, and evaluated projects for different research institutions and universities (LE STUDIUM France/LCER CO Singapore/ANPCyT Argentina). I pursued my Ph.D. in engineering sciences from 2007 to 2012 through grants from CONICET and DAAD-Argentinean Ministry of Education (ALEARG). I defended my PhD thesis on the 14th of March 2012 about hydride-forming materials for hydrogen storage at the Balseiro Institute-University of Cuyo, Argentina, obtaining an outstanding grade. After my PhD, I have been in 8 different post-positions in research centers in Argentina, Spain, and Germany, obtained through competitive evaluation processes in the frame of agencies and institutions providing different programs: CONICET, Alexander von Humboldt (AvH), and EU-Marie Skłodowska-Curie-ACCIÓ program. I obtained two post-doctoral fellowships of renown and excellence. The AvH fellowship in the modality of applied research (Georg Forster) was from 01/02/2017 to 30/04/2019, and in the development of hydrogen storage tanks based on the hybrid gas-solid concept at the Institute for Materials Research, Helmholtz-Zentrum Geesthacht, Germany, from which 3 patents were granted. The Marie Skłodowska-Curie contract under the ACCIÓ-TECNIOspring PLUS was a post-doctoral stay from 01/05/2019 to 31/05/2021 on the topic of 3D printing for green chemistry. There, a 3D-printed catalytic reactor was designed and successfully tested. Since 06/2021, I have been the head of the laboratory in the Dept. of Applied Materials Engineering at HSU Hamburg and, from 10.2023, deputy head of the Dept. of System Design for Mobile and Stationary Hydrogen-Energy Applications in Helmholtz-Zentrum HEREON.



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Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: SANCHO ALBERO, MARIA
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Título: Nano-engineered and bio-inspired materials applied in biomedicine

Resumen de la Memoria:

I have over 10 years of exceptional multidisciplinary research experience in nanomedicine, chemical engineering and cancer laboratories. I developed my PhD at the Institute of Nanoscience and Materials of Aragon (INMA) from the U. Zaragoza. During my predoctoral period, I become expert in working with extracellular vesicles (EVs) and combining them with nanostructured materials. Specifically, I worked on the creation of the first photothermal EVs never published before. These nano-engineered structures exhibited exceptional antitumoral properties in vitro and in vivo against primary and advanced cancers. In parallel, I established a new robust and mild strategy to enable the controlled assembly of Pd nanosheets (NSs), Pt nanoparticles (NPs) and Au NPs directly within EVs. A gasphase CO was employed to generate a mild reduction of infiltrated noble metal precursors inside the EVs, creating the first catalytic EVs. This procedure was able to maintain the membrane integrity and functionality compared to the standardized membrane disruption methods (sonication, electroporation, permeation of the membrane or thermal shock). On the other hand, during my postdoctoral period in the Mario Negri Institute (Milan, Italy) my research was focused on the design of silica-based frameworks that feature peptides or oligonucleotides (as building blocks) with disulfide bonds (cleaved in the presence of specific biomolecules overexpressed in cancer cells, i.e. glutathione or upon recognition of complementary sequences). Part of my efforts were also devoted to combine key proteins and phospholipids with drug-loaded and stimuli-responsive organosilica NPs. I deeply studied the proteomic and lipidomic profile of EVs and their ability to recognize and target tissue specific features. Specifically, I worked on breaking down and emptying EVs from their biological content through a membrane extrusion approach and then reassemble the EVs-derived membrane fragments around the silica NPs. These constructs served as source of inspiration to build artificial nanomaterials that mimic the EVs and enable them to fight other clinically unmet diseases, such as metabolic bone disorders or hard-to-treat cancers.

My research line is focused on 1) the development of new specific and selective bio-inspired nanostructures for the controlled release of drugs and active agents; 2) create multicomponent platforms with several molecules or drugs to increase their therapeutic efficacy against cancer obtaining a synergistic effect; 3) synthesize multifunctional hybrid nanosystems capable of exhibiting theragnostic properties; and finally, 4) promote the results obtained from the laboratory to the clinical setting to promote their establishment in the clinic effectively and quickly. In summary, my scientific objectives are to provide essential knowledge regarding the behavior of bio-inspired hybrids mimicking extracellular vesicles in biological fluids and their interactions with biological media components for using extracellular vesicle-based therapeutic nanoparticles as a powerful delivery selective and specific tool against several diseases such as cancer.

Resumen del Currículum Vitae:

Degree in Biotechnology from the University of Zaragoza (Spain), 2015. Master degree in Nanostructured Materials for Nanotechnological Applications from the University of Zaragoza (Spain), 2016. Doctorate (PhD) in Chemical Engineering from the University of Zaragoza (Spain), 2020.

Postdoctoral stays: Mario Negri Institute for Pharmacological Research (Milan, Italy,) and Polytechnic University of Turin (Turin, Italy).

Predocctoral stays: ETH Zurich (Zurich, Switzerland) and Polytechnic University of Milan (Milan, Italy).

Research: New techniques for the synthesis of nanomaterials, nanomaterials in biomedicine: diagnosis, hyperthermia and bioorthogonal catalysis, smart organosilica breakable nanoparticles for drug, RNA and peptide delivery, extracellular vesicles for targeted cancer therapy and diagnostics.

Projects as PI: SAMCA Catedra for Nanotechnology-INMAGINA 1014, Proyectos de Generación de Conocimiento 2023, Marie Skłodowska-Curie Action-MSCA Postdoctoral Fellowship 2023, Ayuda a Talento-AECC 2023, Postdoctoral grant AIRC-for Italy projects from the Italian Foundation for Cancer Research 202 and Mario Negri Young Investigator Grant 2021.

Projects team member: MIMIC-KEY (FET-Open, 2021-2025, 2902527.50); CADENCE (ERC Advanced Grant, 2017-2022, 2483136).

Research results: Total citations 916 (Scopus) / 1057 (Google scholar). H-index: 12 (Scopus) / 12 (Google scholar). 29 publications in international peer-reviewed journals: most of them in top-impact factor journals: Nat. Catal., Nat. Protocols, Adv. Funct. Mater., Nanoscale, J. Extracellular Vesicles, J. Biotechnology and JACS.

Patent: One Italian patent 102023000015396 (Prot. Num. 4907/VI/18 with the Polytechnic University of Turin and the University of Milan.

Scientific conferences/congresses: more than 23 communications to scientific congresses; international (18) and national conferences (8);oral communication (15), invited talk (4), keynote (2) and poster (5).

Scientific committees: Local committee of the UCRA2019 (First International Conference on Unconventional Catalysis, Reactors and Applications). 2019. Local committee XXXCI JNIO, Trends and Challenges in Chemical Engineering Research, 2019.



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Prizes Tercer Milenio-Heraldo Aragon Award: Accésit Premio Joven Talento Investigador, 2023; Seal of Excellence. 1st Edition of EWMD Award. Giovane promessa TIWS memorial Louhabi, 2022; Best PhD Thesis Award in the field of Nanoscience and Nanotechnology from Cátedra SAMCA de Nanotecnología, 2022; distinction of one of the best 10 PhD thesis of 2021 in Experimental and Technological Sciences by the Real Academia de Doctores de España, 2022; Extraordinary Prize of Doctoral Thesis of the University of Zaragoza, 2022. Journal Nanobiotechnology; article of the year 2019. (Sancho-Albero M, et al., J. of Nanobiotechnology, 2019, 17, 1-13 DOI: 10.1186/s12951-018-0437-z) for being the highest accessed and cited article of the journal, demonstrating the capability of her research to have impact in the field; recognition to the article (Sancho-Albero M, et al., J. of Nanobiotechnology, 2020,18:1-18) by Hemato journal for its contribution and impact to new advanced in hematology.



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Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: SAURA MÚZQUIZ, MATILDE
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Título: Structure-property relationship in magnetic systems

Resumen de la Memoria:

I carried out a PhD (2013-2017) at iNANO, AU, (Supervisor: Prof. M. Christensen) funded by the national project Improved Permanent Magnets through Nanostructuring and the EU project NANOPYME. I investigated nanostructuring processes for development of high-performance magnetic materials, and was involved in projects related to the nucleation mechanisms and crystallization dynamics of nanoparticles using in situ synchrotron X-ray scattering techniques. My Ph.D. involved 2 scientific stays at neutron facilities: a Scientific Stay (2014) at the IFE, Norway, working with Dr. S. Deledda and Dr. K. D. Knudsen on neutron powder diffraction (NPD) and small angle neutron scattering of magnetic nanoparticles, and a Scientific Stay (2014) at ANSTO, Australia, working with Prof. M. Avdeev and Dr. V. Luzin on high-resolution NPD and neutron pole figure analysis. Following my PhD, I was employed as postdoctoral researcher (2017-2019) at the Centre for Materials Crystallography, AU, investigating nanostructured magnets and up-scalability as part of national and EU projects (MAGFLY and AMPHIBIAN).

In 2019 I was employed as postdoctoral research associate in the group of Prof. B. J Kennedy, School of Chemistry, University of Sydney (USyd), Australia, where I studied the structure and rare phase transitions of 4d and 5d transition metal oxides for various applications.

In 2022, I returned to Europe with a 4-year Atracción de Talento Investigador Fellowship from Comunidad de Madrid (Mod.2) (2022-2026) at the Faculty of Physics, UCM, Spain, which I interrupted recently, in favour of a prestigious Marie Skłodowska-Curie Individual Fellowship (2024-2026). Here, I lead a research line in collaboration with Prof. L. Pérez, where I leverage my expertise in synthesis and structural characterization using scattering methods, for the study of magnetism and other spin-related phenomena in 2D and 3D nanostructures.

My ambition is to ultimately lead my own research lab and group specialized in using scattering techniques for understanding the structure-property relationship of nanostructured magnetic materials. In this context, the proposed RyC project is divided into two interrelated research lines, designed to leverage my expertise in nanoparticle synthesis and structural analysis by neutron and synchrotron scattering techniques to provide new insights and progress in the field of magnetic materials. I intend to: (1) work on the development of binary exchange-coupled nanocomposites with superior magnetic performance consisting of hard magnetic ferrite nanoparticles, optimized using nanostructuring and crystal engineering techniques, and soft metallic nanowires, optimized using electrodeposition. Additionally, I will (2) use in situ scattering methods to explore the synthesis-structure-property relationship of the giant coercivity iron oxide phase γ -Fe₂O₃.

Resumen del Currículum Vitae:

PhD in Nanoscience (11/08/2017) from Aarhus University, Denmark. Currently, employed as a Marie Skłodowska-Curie Fellow at the Faculty of Physics, UCM, Spain. I have carried out 4 postdocs (2017-present) at 3 different research centres and countries, 2 of which have been self-funded by individual research grants obtained through competitive calls.

Participation in 9 research projects (7 research team & 2 Principal Investigator), of which 4 are EU projects, and 4 are consortiums with industry partners. Winner of 3 independent research grants (Total research grant support won: 456.053€, incl. declined María Zambrano Fellowship).

Author of 40 articles in peer-reviewed indexed scientific journals, with the majority being in high-impact leading journals in the corresponding fields (D1=48%, Q1=85%). First author of 10 (D1=50%, Q1=90%) and corresponding author of 3 (D1=76%, Q1=100%). The publications have gathered a total of 684 citations (H-index=15). I am also author of 1 international patent, 1 open access book chapter; Ceramic Materials - Present and Future, Intech Open, 2023, and 1 article in a non-indexed journal (Neutron News, 27(1), p.7). I am in the Editorial Review Board of the scientific journal IEEE Magnetics Letters, and I am a member of the ANSTO Scientific Committee for the Physical Sciences, Engineering & Technology at ANSTO, Australia.

Author of over 60 contributions to conferences/workshops, 32 as presenting author, including 16 oral presentations (8 invited), and session chair at the European Conference JEMS 2023. Notably, I have received two Best Talk Awards (iNANO Autumn School 2015 and 16th iNANO Annual Meeting 2018), and in 2023 I received the Erwin Felix Lewy Bertaut Prize, awarded jointly by the European Neutron Scattering Association and the European Crystallographic Association, for my impressive early career contributions to the field of crystallography of functional materials.

Participation in 47 experimental beamtimes (16 as PI, 24 as co-PI, 7 as participant) and >100 days (33 as PI, 69 as co-PI) employing diffraction, scattering and absorption instruments at synchrotron light sources (SLS, PETRA III, ESRF, Australian Synchrotron (AS), ALBA) and neutron spallation (SINQ, SNS, J-PARC) and reactor (ANSTO, JEEP-II) sources. I have obtained beamtime as PI/co-PI through competitive calls with an estimated value of 2.006.381 € (PI: 649.123 €; co-PI: 1.357.758 €) according to AS data (~19.670 €/day).

Directed 4 TFG (A. Ortega, Y. Grohman, 2023; A. Moreno, J. Rosado, 2024), 1 MSc (TFM, L. Lorenzo, 2023) and 2 Beca de Colaboración Projects (A. Moreno, A. Arroyo, 2024) at the Faculty of Physics, UCM, Spain. Additionally, I co-supervised 3 BSc (P. S. Rasmussen, 2015; F. H. Gjørup, 2016), 3 MSc projects (G. Perversi, 2013; F. H. Gjørup, 2017; M. Mørch, 2019) at AU, Denmark (2013-2019), and 1 PhD projects (B. G. Mullens, 2023; non-official) at USyd, Australia (2019-2021).

Conducted a total of 664 hours of teaching in undergraduate, graduate and PhD level courses at the Dept. of Chemistry (560 hours), AU, Denmark, and Faculty of Physics (104 hours), UCM, Spain, and 140 hours to dissemination tasks at AU, Denmark. Invited lecturer at international schools for PhD students and early-career researchers (2021 Powder Diffraction Data Analysis Workshop, AS, Australia, and SMART-SOLID-Q-MAT Summer School, AU, Denmark).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: ZENG, MULING
Referencia: RYC2024-048288-I
Correo Electrónico: mzens@icmab.es
Título: Multicatalytic Nanozymes for the Treatment of Fatty Liver Disease and Liver Cancer: An Integrated, Versatile Single-Treatment Approach (LiverZymes)

Resumen de la Memoria:

My scientific career and research focus encompass a diverse range of fields, including crystallization, nanomaterials, biomedicine, and environmental remediation, where I have contributed to advancing knowledge and fostering innovation.

1) Crystallization and Mineralization: I led a pioneering study on the crystallization of aragonite, a calcium carbonate polymorph, in confined spaces without additives, challenging traditional methods. This breakthrough, achieved in collaboration with Spanish researchers at ICMAB-CSIC and the ALBA Synchrotron, resulted in four high-impact publications (PNAS, Small, etc.) and enhanced my expertise in mineralization processes and advanced characterization techniques.

2) Healthcare Application and Innovation: My research on cellulose-based materials for healthcare led to the development of antibacterial, reusable face masks by integrating bacterial cellulose with CeO₂NPs. This innovative approach filled critical gaps in healthcare materials by delivering sustainable, durable, and multifunctional bio-textiles, resulting in four publications (AHM), six patents, and the launch of two products in the Chinese market through a spin-off company. I secured funding from three public projects and two industrial contracts, while supervising eight student theses, which contributed to both academic and entrepreneurial success.

3) Environmental Remediation: I have focused on developing TiO₂-based photocatalysts, including TiO₂-Au and TiO₂-CeO₂ hybrids, for the degradation of pharmaceutical pollutants at various concentrations. Also, I have investigated polyoxometalate-based materials, known for their exceptional catalytic performance and potential in wastewater treatment. For instance, I combined POMs with metal-organic frameworks, resulting in enhanced catalytic activity, improved stability, and broader applications in enzyme immobilization and environmental sustainability. This work has led to 5 publications and 1 granted patent.

4) CeO₂-Based Nanocomposites for Liver Disease Treatment: I have demonstrated the therapeutic potential of CeO₂NPs for fatty liver and liver cancer through vitro and vivo studies, highlighting their enzyme-mimetic activities and antioxidant properties. I have collaborated with international experts in pharmaceuticals, nanomaterials, and medical doctors from Spain, China, and Finland, resulting in five publications, three granted patents, and contributions to public projects and student training.

Building on these, my future proposal aims to combine Au and CeO₂ in mesoporous silica nanocarriers to design novel multicatalytic nanozymes. This could pave the way for a new, integrated, and versatile therapeutic approach for liver diseases. Preliminary results support this hypothesis, revealing that AuCeO₂@SiO₂, which I synthesized and tested in a rat model of liver steatohepatitis, significantly down-regulated steatosis and inflammation related genes compared to CeO₂ alone, indicating a strong synergistic effect.

Resumen del Currículum Vitae:

As an independent researcher with approximately 10 years of experience, I have expanded interdisciplinary research areas including chemistry, materials science, biomedicine and nanotechnology, and published high-quality work. My experience in securing funding from public and private sources has enhanced my leadership, innovation, and entrepreneurial skills, equipping me with the tools necessary for advanced research and effective administration. Following 3 years of postdoctoral research at Leeds University, I was recruited by a local government high-talent program for a PI position in China, where I co-led the Applied Nano-biomaterials Group. I set up a chemistry lab from scratch, managed projects and budgets, handled administrative duties, taught, and organized conferences. My research there centered on creating sustainable and functional materials for applications in healthcare and nanomedicine. One notable achievement was the creation of cellulose-based materials for reusable antimicrobial face masks during the COVID-19 pandemic, which led to the successful creation of a spin-off company. In October 2024, I returned to ICMAB-CSIC as a senior project researcher to advance my career in Spain, aligning with personal and family commitments, including my Spanish husband and two daughters. Since then, I have applied for the ERC Starting Grant and "La Caixa" Junior Group Leader fellowship, reaffirming my dedication to contributing to Spanish research.

In summary:

- 1) 37 publications (23 in Q1 and 10 in Q2 journals), H index 15, >800 citations (651 citation in the last 5 years).
- 2) First/corresponding author for 19 papers (Among these 19, IF>10 including PNAS, Small, Advanced Healthcare Materials, 8 more IF>6)
- 3) Secured 6 grants (2 from industry) as PI, totaling over 3 million RMB (390,000 EUR)
- 4) 5 granted patents and 1 licensed
- 5) Established a spin-off company and collaborated with local government and universities
- 6) Supervised over 20 students and taught 6 university courses
- 7) Mentored students in outreach competitions, resulting in 2 national, 2 provincial, 1 municipal-level award
- 8) Hosted an international conference and presented at over 30 conferences, including 7 oral presentation with 3 invited and 12 posters
- 9) Main editor for a topic Advanced Functional Nanomaterials and review editor of Nanobiotechnology



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Turno General

Personally, I am studious, imaginative, adaptable, organized, and a good team player. I stay positive, work well in multilingual environments, and am open to changes.

- 1) I self-studied English to secure a competitive PhD scholarship and adapted quickly to new cultures by learning Spanish and Catalan, earning relevant language certificates
- 2) Established the lab at Wuyi University from scratch, handling equipment and chemicals procurement, student recruitment, experiment setup, safety protocols, etc.
- 3) Developed innovative courses inspired by European ways, enhancing student engagement and understanding through industrial visits, lectures, and practical activities, winning national awards
- 4) Settled my Spanish husband and children and balanced life and work. *Emma and Aurora were born while I was working in China. Aurora was born with a rare genetic mutation, which required me to take extended maternity leave to manage her medical care.



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Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: SOUSA CASTILLO, ANA
Referencia: RYC2024-050125-I
Correo Electrónico: ana.sousa@uvigo.es
Título: Hybrid Plasmonic Nanostructures with Advances Functionalities

Resumen de la Memoria:

Dr. Ana Sousa's research focuses on hybrid plasmonic nanostructures, with expertise in their synthesis, characterization, and applications in catalysis and sensing. During her PhD and postdoctoral studies, she specialized in bottom-up synthesis of plasmonic-semiconductor hybrid nanoparticles. Building on this foundation, her research under the Ramón & Cajal (RyC) fellowship will pioneer a new class of plasmonic-zeolitic imidazolate framework (ZIF) metal-organic frameworks (MOFs). These advanced materials aim to enhance catalytic efficiency and stability by minimizing diffusion barriers and optimizing interfacial structures, a critical area for further exploration in her work.

In addition to hybrid nanostructures, Dr. Sousa plans to explore electrospinning, a versatile method for fabricating polymer nanofibers, which has not yet been part of her research. This technique, valued for its simplicity and adaptability, offers potential for integrating plasmonic structures into fibers, leading to innovative advancements in sensing and photocatalysis. With the acquisition of electrospinning equipment in her group, Dr. Sousa is positioned to leverage this technology for transformative applications.

Her work on hybrid plasmonic nanostructures also aligns with critical global challenges, such as sustainable catalysis and clean energy production. As the demand for materials like biomass and fossil fuels grows, plasmonic hybrid nanosystems present opportunities for enhancing heterogeneous photocatalysis, contributing to the transition toward a circular economy and greener energy solutions. Moreover, these structures hold promise for developing highly sensitive and specific plasmonic nanoparticle-based sensors, revolutionizing fields such as medical diagnostics, environmental monitoring, and security.

Throughout her career, Dr. Sousa has demonstrated a strong ability to synthesize plasmonic nanoparticles, assemble them, and explore their diverse properties. Her contributions span key areas like photocatalysis, sensing, and biomedicine, showcasing her versatility and innovative approach to research. Her work has resulted in high-quality, peer-reviewed publications and the development of an extensive international collaboration network, underlining her commitment to global scientific partnerships.

Dr. Sousa has actively participated in competitive funding opportunities and demonstrated exceptional project management skills. Her vision for future research under the Ramón & Cajal program reflects her proactive approach and readiness to address emerging challenges in plasmonic nanostructures, catalysis, and sensing.

Resumen del Currículum Vitae:

Dr. Ana Sousa began her scientific career in 2013 at the Universidade de Vigo with Prof. Miguel A. Correa-Duarte's group, completing her PhD in 2017 with a cum laude distinction. Her thesis included pioneering work on plasmonic nanoparticles for hot electron-driven photocatalysis, cited over 250 times. During her PhD, she conducted research stays at Case Western Reserve University (2014) on thermoresponsive polymers and the Universidade de Porto (2017) on a portable Raman spectrometer for detecting cancer biomarkers, resulting in several impactful publications.

After her PhD, Dr. Sousa joined the Klinkova Lab at the University of Waterloo, focusing on catalytic systems for hydrogen generation and storage. In 2019, she secured a competitive postdoctoral fellowship from Xunta de Galicia, spending 2.5 years at Ludwig-Maximilians-University (LMU) in Munich. At LMU, she co-directed master's students, assisted PhD researchers, and led collaborations with LMU and TUM, resulting in eight high-impact articles in journals such as Science Advances, Nature Catalysis, and ACS Nano.

To date, Dr. Sousa has authored 30 scientific articles, including four as corresponding author, with publications in top-tier journals (70% D1, 94% Q1). She has contributed a book chapter, holds one patent, and has submitted another. Her work reflects extensive international collaboration, with nearly 80% involving researchers from multiple countries. She has presented at 14 international conferences and actively engages in multidisciplinary projects. Currently, Dr. Sousa's research focuses on plasmonic metal nanoparticles for photocatalysis and sensing, supported by a 2023 Postdoctoral Fellowship from Xunta de Galicia. As a Principal Investigator, she has secured funding for projects such as SOLARPLASM, NANOMAFRUC, and DESENANOQUO, the latter featuring her as a corresponding author. She also leads work packages in two European projects and collaborates with industry.

Dr. Sousa is deeply committed to science communication, participating in outreach events like Open Days at CINBIO, Women in Science celebrations, and workshops for schools. She mentors two PhD candidates and has supervised numerous master's and bachelor's theses. Her efforts in promoting academic excellence and fostering the next generation of researchers have earned her recognition, including the CeNS Young Investigator Award (2021) and Best Poster Award (2020).



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Turno General

Área Temática: Ciencias y tecnologías de materiales

Nombre: YANG YANG, BIN

Referencia: RYC2024-048820-I

Correo Electrónico: byang2@ed.ac.uk

Título: Dr.

Resumen de la Memoria:

I am an accomplished researcher specializing in composite materials and their applications in advanced engineering structures. My academic journey began with a PhD in Ocean Engineering from Shanghai Jiao Tong University, where I laid a strong foundation in structural mechanics and failure analysis. This was followed by a prestigious National Postdoctoral Program for Innovative Talents fellowship at Tongji University, where I pioneered research on material performance under extreme conditions, producing impactful publications and patents. Currently, as a Marie Skłodowska-Curie Actions Fellow at the University of Edinburgh, I lead a multidisciplinary project focused on advancing hydrogen storage technologies through the integration of experimental testing, computational modeling, and machine learning (ML).

My work spans three core research areas: understanding failure mechanisms and post-impact behavior in composite materials, leveraging ML to enhance predictive modeling, and developing applications in hydrogen storage and renewable energy systems. These efforts have led to over 37 peer-reviewed journal articles, six patents, and over 600 citations. My contributions have been recognized globally, including being named among the "World's Top 2% Scientists" in 2023.

I have demonstrated leadership in international research collaborations, including managing large-scale projects, organizing international workshops, and contributing to editorial committees. My active engagement with industry partners in aerospace, automotive, and renewable energy sectors bridges the gap between research and application, ensuring the societal and economic relevance of my work.

Building on my research achievements, I aim to advance the design and testing of composite materials by developing virtual design platforms that reduce reliance on physical testing, accelerate development cycles, and improve safety and sustainability. My long-term vision is to establish a global research network that fosters innovation in composite materials and supports the transition to clean energy solutions. By addressing critical challenges in hydrogen storage and renewable energy, I contribute to global decarbonization efforts and the development of technologies that align with environmental sustainability goals.

Resumen del Currículum Vitae:

Accomplished researcher and innovator in the field of composite materials and structural mechanics, with a focus on advancing sustainable technologies and renewable energy solutions. With a career spanning over a decade, I have authored 37 peer-reviewed publications in top-tier journals, co-authored four patents, and garnered over 600 citations. My work addresses critical challenges in hydrogen storage systems, including multiscale modeling, machine learning (ML)-enhanced failure prediction, and post-impact fatigue analysis, contributing directly to global efforts toward decarbonization and sustainability.

Currently, as a Marie-Curie Postdoctoral Fellow at the University of Edinburgh, I lead cutting-edge research on hydrogen storage vessels, integrating advanced computational modeling, experimental testing, and ML algorithms to develop safer and more efficient energy solutions. I have secured over £540,500 in competitive research funding as Principal Investigator, including prestigious grants from the National Natural Science Foundation of China and the European Commission, enabling impactful advancements in composite materials for aerospace, automotive, and hydrogen energy industries. My career is defined by a commitment to international collaboration, with research stays at globally renowned institutions such as Tongji University in China, University of Lisbon in Portugal and The University of Edinburgh at UK. These experiences have fostered enduring academic and industrial partnerships, resulting in high-impact joint publications and technology transfer initiatives. My collaborative approach extends to mentoring the next generation of scientists, having co-supervised multiple PhD and Master's students, many of whom have published in high-impact journals and presented at international conferences.

Recognized among the "World's Top 2% Scientists" in 2023, I bring a blend of technical expertise, innovation, and leadership. My work on lightning strike protection for aviation composites, dynamic buckling of lightweight structures, and ML-driven prediction models has not only pushed the boundaries of scientific knowledge but also translated into practical, industry-relevant applications. My patented innovations in composite material testing and vibration isolation have sparked interest from leading aerospace and engineering firms.

Dedicated to open science, I actively disseminate my research through open-access publications, workshops, and public forums. My contributions include the development of virtual testing platforms and data-sharing frameworks, ensuring transparency and broad accessibility of scientific outcomes. I have chaired sessions at international conferences such as ISOPE and MARTECH and organized symposia to promote dialogue between academia and industry on the future of composite materials in clean energy systems.

Driven by a vision to bridge the gap between academic research and industrial innovation, I aim to establish an independent research group focused on sustainable composite technologies. My multidisciplinary expertise, spanning experimental mechanics, computational modeling, and AI integration, positions me to tackle some of the most pressing challenges in engineering today, contributing to a cleaner and more sustainable future.



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Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: GONZALEZ VIVAS, LAURA
Referencia: RYC2024-050907-I
Correo Electrónico: lauragvivas@gmail.com
Título: Functional Magnetic Nanostructures: Design, Fabrication, Characterization and Computational Modeling
Resumen de la Memoria:

My research is dedicated to identifying and addressing challenges that arise in the context of functional magnetic nanostructures from various perspectives, including fabrication, characterization, and computational modeling. This work involves both the development of new techniques for designing magnetic nanostructures and computational micromagnetic simulations aimed at describing and discovering new phenomena.

Independence. Throughout my postdoctoral career path, I have been awarded grants to fund my position and research in competitive international funding calls: (1) FNR postdoctoral fellowship, a highly competitive research fellowship funded by the Luxembourg National Research Fund Luxembourg (2015-2017) and (2) Marie Skłodowska-Curie Postdoctoral Individual Fellowship, at the Instituto de Micro y Nanotecnología (2023-2025).

Leadership.- I have opened several research lines in the groups hosting me during my research career: (1) Investigation of magnetic reversal mechanisms in electrodeposited magnetic nanowires. During my PhD, I gained expertise in growing high-quality, ordered magnetic nanowire arrays via electrodeposition with precise control over parameters. This enabled me to demonstrate reversal through topological magnetic textures along the nanowires, using analytical and computational methods I pioneered. This research has since become a cornerstone of the nanomagnetism community, leading to numerous follow-up publications and a significant number of citations, reflecting its impact. (2) Magnetic SANS interpretation for magnetic nanoparticles. As an AFR Fellow at the University of Luxembourg, I developed a hybrid theoretical and computational model to interpret small-angle neutron scattering data in magnetic nanoparticles. Using custom code integrated with the open-source software MuMax3, I computed magnetic SANS cross-sections from magnetization configurations. I established a comprehensive workflow that integrated micromagnetic simulations performed with mumax3 and my SANS computation code, enabling the calculation of magnetic SANS cross-sections for nanoparticles. This approach has since been adopted to analyze magnetic SANS in nanostructures. (3) Magnetic 3D nanowire networks for space applications As an MSCA Postdoctoral Fellow at the Instituto de Micro y Nanotecnología, I am opening a new research line in the group FINDER led by Prof. Marisol Martín-González related to the potential use of 3-dimensional magnetic nanowire networks for aerospace applications.

Line of research to be developed. During my Ramon y Cajal Fellowship, I plan to follow two complementary research lines: (1) fundamental study of the magnetic properties of 3-dimensional (3D) magnetic nanowire networks, this involves the fabrication, characterization and modelling of 3D nanowire networks, as a follow-up of my current postdoctoral period and previous research lines, but with special emphasis on finding strategies to make them multifunctional. (2) Fabrication of 3DNNs for space technology, this one being a high-risk high-gain research line, as well as the most different to the lines I have developed in my previous career stages.

Resumen del Currículum Vitae:

Since October 2023, I have been a Marie Skłodowska-Curie Postdoctoral Fellow at the Institute of Micro and Nanotechnology. I am leading an ambitious and multidisciplinary research project to investigate emergent magnetic phenomena in 3D magnetic nanowire networks for aerospace technologies. My work integrates experimental techniques, theoretical analysis, and computational modeling to tackle these challenges comprehensively.

May 2015 – Jan 2020, I joined the Physics Department at the University of Luxembourg funded by the highly competitive FNR Luxembourg National Research Fund fellowship. I developed a hybrid theoretical and computational model for interpreting experimental small-angle neutron scattering data in magnetic nanoparticles. These efforts culminated in two high-impact theoretical studies, which I led and published in Physical Review Letters and Scientific Reports and a related, impactful experimental/theoretical work in Physical Review B.

Jan. 2014 – March 2015, I worked as a postdoctoral researcher at the University of Zaragoza (Spain). My research centered on the structural, electronic, and magnetic properties of granular Co-Pd alloy thin film multilayers systematically studied using advanced techniques, including high-resolution transmission electron microscopy, SQUID-based magnetometry, x-ray diffraction, and x-ray absorption spectroscopy methods.

Jan. 2013 – Dec. 2014, I joined the Physics Department at Los Andes University (Colombia) as a lecturer in General Physics and a postdoctoral researcher. My research focused on investigating the magneto-transport and magneto-optic properties of ferromagnetic/superconducting thin film heterostructures.

Jan. 2008 – June 2012, I pursued my PhD under the supervision of Prof. Manuel Vázquez at the ICMN-CSIC in Madrid, Spain. My research, funded by a grant from the Iberian Nanotechnology Laboratory in Braga, Portugal, focused on the fabrication and characterization of magnetic nanostructures. I conducted two long-term research stays in Portugal and Chile. I conducted micromagnetic simulations under the co-supervision of Dr. Oksana Chubykalo-Fesenko.

Jan. 2007 – Dec. 2007, in my Master's studies I worked under the guidance of Prof. Marcelo Knobel at the University of Campinas (Brazil), where we reported the synthesis and characterization of transition metal-doped CuO.



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Turno General

I have presented 3 invited talks, 15 oral presentations and 10 poster presentations. I am also referee of journals such as Phys. Rev. Lett., Phys. Rev. B., Adv. Mater., I have experience in teaching and professional service, and actively participating in outreach activities and talks. Member of committee for PhD defense of Zengxin Wei (ICMM, 2024). Research funding. - I have participated in several national and international research projects.

Currently, I am PI of a Marie Skłodowska-Curie Individual Postdoctoral Fellow.

I have communicated all this generated knowledge in the form of 23 regular articles, many of those in the most prestigious journals in the field: Phys. Rev. Lett., Nanoscale (cover), Appl. Phys. Lett., Nanotechnology, Phys. Rev. B, with > 49 citations per paper, 11 as first author and 1 as last author. Three of my papers have gathered more than 100 citations. As of January 2025, total number of citations (Google Scholar): 1129, h-index = 17, i10-index = 20 and h100-index=3.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: NETO CARNEIRO NETO, ALBANO
Referencia: RYC2024-048927-I
Correo Electrónico: albano_@hotmail.com
Título: QNano-Ln: Quantum Photophysics Modeling in Real-Sized Lanthanide Nanoparticles
Resumen de la Memoria:

During my BSc and MSc in Chemistry at the Federal University of Pernambuco (Brazil), under the guidance of Prof. Oscar Malta, I focused on studying f-f transitions in lanthanide coordination compounds and their relationship with the covalency of the Ln-X bond (X = ligating atom). I applied Judd-Ofelt theory and gained experience in synthesizing and characterizing lanthanide complexes. Over time, I became increasingly interested in computational and theoretical studies of luminescent materials.

While deeply exploring Judd-Ofelt theory, I questioned the established concept that the Ω_2 parameter is highly influenced by covalency, as introduced by C.K Jørgensen and R. Reisfeld [10.1016/0022-5088(83)90454-X], leading figures in the field. My MSc research proved otherwise: Ω_2 is less impacted by Ln-ligand covalency, while Ω_6 is more sensitive to such effects. This finding was published in my fifth paper [10.1016/j.jlumin.2015.08.016], which has since received over 100 citations.

In May 2016, I started my PhD at the same institution with Prof. Malta as my supervisor and Dr. Renaldo Moura Jr. as co-supervisor. My research shifted to energy transfer mechanisms in lanthanide systems, focusing on dipole-dipole, quadrupole-quadrupole, and exchange interactions under various conditions (e.g., symmetry, chemical environment, donor-acceptor distance, and shielding effects). Combining my expertise in luminescence spectroscopy and computational chemistry, I started with Dr. Moura Jr. the development of the JOYSpectra program.

I completed my PhD on December 18, 2018, graduating with distinction. During this time, I published 10 papers and contributed a book chapter [10.1016/B978-0-08-102378-5.00002-7] in collaboration with Prof. Reisfeld, who eventually agreed with the new interpretation of the relationship between covalency and Judd-Ofelt parameters.

Before completing my PhD, I applied for a postdoc fellowship in Brazil, but my request was denied due to budget constraints amid political turbulence. I then applied for a postdoc fellowship at the University of Aveiro in Portugal, where I was awarded the position. In April 2019, I moved to Portugal with my wife and young son and joined Prof. Luís Carlos's group, specializing in luminescence thermometry.

As the sole theoretician in the group, Prof. Carlos challenged me to predict the thermal performance of dual-center thermometers based on energy transfer mechanisms. This challenge culminated in a 2021 publication in Advanced Optical Materials [10.1002/adom.202101870], where we introduced the concept of energy transfer-driven thermometers and demonstrated how to tailor thermal properties.

Despite the difficult times of the COVID-19 pandemic, I maintained high productivity, publishing 11 papers in 2020, 12 in 2021, and 14 in 2022. Since 2022, I have held a researcher position at the University of Aveiro, focusing on theoretical and computational studies of lanthanide-based materials.

Resumen del Currículum Vitae:

I am an independent researcher in theoretical and computational modeling of luminescent materials, with a focus on lanthanide-based compounds.

I have authored 79 publications, including 12 as the first author, 20 as the second author, and 23 as the corresponding author. The papers where I am the first author have an average Field-Weighted Citation Impact (FWCI) of 4.287, indicating a significant impact in the field (<https://www.scopus.com/authid/detail.uri?authorId=56728851400>). FWCI compares the actual number of citations a paper receives to the average for similar publications, highlighting the influence of my work.

My research has been published in leading journals such as Advanced Materials, Advanced Optical Materials, Inorganic Chemistry, Journal of the American Chemical Society, and Coordination Chemistry Reviews. I have served as a reviewer for over 100 manuscripts in journals such as Journal of Luminescence, Angewandte Chemie, Advanced Science, Chemical Engineering Journal, ACS Applied Materials & Interfaces, and Journal of Materials Chemistry C. I have also served as a guest editor for special issues in Frontiers in Chemistry and Journal of Luminescence.

My network of collaborators includes researchers from Brazil, Portugal, France, Poland, Italy, the USA, and other countries, contributing to global research efforts and advancing cross-disciplinary work. Additionally, I have actively participated in international conferences and workshops, further strengthening my connections within the scientific community. In recognition of my contributions, my name was included in the 6th Edition of the World's Top 2% Scientists list (<http://www.doi.org/10.17632/btchxktzyw.6>).

I have supervised students and delivered lectures on topics such as lanthanide spectroscopy and computational chemistry. These roles, along with my work as a researcher, reviewer, and editor, highlight my contributions to the scientific community.

My highlighted work list includes the development of the first model for temperature-dependent energy transfer involving lanthanide ions [10.1002/adom.202101870; 10.1002/adom.202001938] and introducing the concept of energy transfer-driven thermometers; the understanding of covalency effects in Judd-Ofelt intensity parameters [10.1016/j.jlumin.2015.08.016]; corrected flaws in the literature on Nd-Yb energy transfer



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efficiency [10.1021/acs.chemmater.4c00362]; demonstrated the role of the Tb³⁺ 7F₅ level in energy transfer processes [10.1016/j.jlumin.2022.118933]; and developed models addressing the emission enhancement effect of lanthanide-nanoparticles under the influence of surface plasmon of metallic nanostructures [10.1021/acs.jpcllett.0c03613; 10.1039/d4nr02484b].

I am a creator of JOYSpectra (<http://joyspectra.website>), a web platform for analyzing luminescence properties of lanthanide-based compounds. The platform has over 120 registered users from 45 countries, supporting researchers worldwide.



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Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: GOUJON, NICOLAS JEAN-CHRISTOPHER
Referencia: RYC2024-048376-I
Correo Electrónico: nicolasjeanchristopher.goujon@ehu.eus
Título: Redox-active organic electrode materials for energy storage applications
Resumen de la Memoria:

Dr Goujon has over 13 years of research experience in the development of advanced polymeric materials for energy storage and membrane separation applications. Since 2016, his research interests are mainly focus of the development of energy storage materials, which can be divided into two main research lines (chronological order): 1) Development of polymer electrolyte for solid-state lithium metal battery application. 2) Development of sustainable organic electrode materials, based on redox polymer, for application in next-generation energy storage technologies, such as Alkali metal-organic batteries, all-organic batteries and pseudo supercapacitors.

In 2016, Dr. Goujon started exploring new polymer electrolyte materials for energy storage applications (1st research line), when he joined the research group of Prof. Forsyth (Deakin University, Australia), who is one of the most internationally renowned research expert in the field of electrolyte for next generation battery technologies. During the course of this appointment, Dr. Goujon acquired a great deal of expertise on ion conduction in polymeric matrix and battery technologies. Dr. Goujon worked actively in this line of research between 2016 and 2019, and co-authored eight publications and one patent. He also developed a strong international network, collaborating with highly renowned researcher in the field, such as Prof. Armand (Spain), Prof. Howlett (Australia). Dr. Goujon has been invited to co-author two review articles on the topic in Advanced Materials (IF: 27.4) and Accounts of Chemical research (IF: 20.4). His work has been selected twice as cover feature article in the journal of Batteries & Supercaps (Wiley), highlighted the novelty and relevance of the work produced by Dr. Goujon.

Dr. Goujon started working in redox polymers for energy storage applications (2nd research line) in 2019, when he seized the opportunity to join the research group of Prof. Mecerreyes, a world leading expert in the field. Dr. Goujon has recently reviewed the state of the art of this new research field, by authoring a review article (Progress in polymer science, IF: 26.0), a perspective (Polymer chemistry, IF:4.1) and a book chapter (Royal Society of Chemistry, RSC). In the last six years, he has also produced eight research articles, of which one was selected as a cover articles. Dr Goujon has been also awarded a prestigious Marie Skłodowska-Curie Individual Fellowship in 2021 to work on the development of redox polymers with synergetic electrical and ionic conducting properties. Dr. Goujon has also leading several research project on the topic, with international collaborators, including Prof. Mateo-Alonso (POLYMAT, Spain), A/Prof. Sardon (POLYMAT, Spain), Prof. Baena (Universidad de Huelva, Spain), Dr. Marcilla (IMDEA, Spain), Dr. Ponrouch (ICMAB, Spain) and Prof. Unterlass (University of Konstanz, Germany). His expertise and leadership in the field has been recognized by his peer through the delivery of several invited and accepted talks in major international conference on the topic, and recently (Organic battery days, OBD, Spain 2023; Organic battery days, OBD, Japan 2021; Power our future, POF, Spain 2022).

Resumen del Currículum Vitae:

Dr. Goujon's research is mainly focused on the development of advanced polymeric materials for application in energy storage. Through his international career path (France, Australia, Italy, and Spain), Dr. Goujon has acquired extensive knowledge in Material Science, Polymer Chemistry, Electrochemistry, Organic Chemistry, and various battery technologies.

After the obtention of his PhD in 2016, Dr. Goujon joined, as an associate research fellow, the research group of Prof. Forsyth (Deakin university, Australia), who is one of the most internationally renowned research experts in the field of electrolyte for the next generation battery technologies. In this regards, Dr. Goujon also carried out a secondment in the research group of Prof. Di Noto, based on a transfer of knowledge between the two research groups. In addition to research articles outcome, this project generated intellectual property (WO2019084623), with licensing agreement currently in discussions between CSIRO (Australia) and various industrial partners.

In 2019, Dr. Goujon joined the research group of Prof. Mecerreyes, a world leading expert in the field of redox polymers for energy storage application. This position enabled him to expand his knowledge on polymer synthesis and energy storage technologies. In 2021, Dr. Goujon was awarded a prestigious Marie Skłodowska-Curie Individual Fellowship (14 % success rate, total number of applicants: 12,338) to work on the development of novel redox polymers with synergetic conducting properties for all-organic battery applications. During this appointment, Dr. Goujon was leading the redox polymers team for energy storage applications within Professor Mecerreyes' group. This involved the supervision of three PhD students, in addition to leading several collaborative research projects.

In 2022, Dr. Goujon was also appointed, as oversea project scientist consultant, to lead a \$1.8 M research project (2 postdoc, 2 PhD students) with the Future battery industries cooperative research centre (Australia) on lithium metal and lithium-ion battery technologies with several industry and academic partners.

In May 2023, Dr. Goujon joined CIC energiGUNE to lead the electrolyte development sub-project (2 postdoc, 3 laboratory technicians) of an €3.0 M per year multi-stream industrial project (electrolyte development, cathode development and prototyping/cycling development sub-projects/streams) with a European solid-state battery manufacturer, resulting in five patents submitted.

In 2024, Dr. Goujon was awarded the prestigious 5-year Ikerbasque research fellow fellowship, which is aimed to offer a track towards a principal investigator role and independent research for only 20 promising young researchers per year (success rate of 19%). This award triggered this last



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mobility to the University of the Basque Country (UPV/EHU, Spain) to become an independent principal investigator and develop his own research on polymeric materials for energy storage.

Over the course of his career, Dr. Goujon has acquired extensive experience in leading both academic and industrial research projects on energy storage materials and battery technologies. He has co-authored 32 articles in peer-reviewed journals, 6 patents and 1 book chapter. His current h-index is 15 with an overall 1294 citations.



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Área Temática: Ciencias y tecnologías de materiales
Nombre: MORLÀ FOLCH, JUDIT
Referencia: RYC2024-048403-I
Correo Electrónico: juditmofo@gmail.com
Título: Potentiating cancer immunotherapy using nanoparticle-based photodynamic therapy
Resumen de la Memoria:

Significance. Immunotherapy has revolutionized the treatment of cancer. Activating the immune system using immunotherapy, e.g., immune checkpoint inhibitors (ICIs), has been integrated into standard-of-care regimens for patients with advanced cancers. Despite their enormous success, only a minority of patients respond to these agents. The reason behind immunotherapy resistance is likely related to the presence of immunosuppressive innate immune cells. Broader immune activation, involving both the innate and adaptive immune system, will likely boost immunotherapy's efficacy and response rates. On the other hand, photodynamic therapy (PDT) is a minimally invasive clinical treatment that is approved by both the FDA and the EMA as curative therapy for precancer lesions and solid tumors. PDT is based on a photosensitizer (PS), light, and molecular oxygen. Exciting a PS using (laser) light stimulates its reaction with the surrounding O₂ to produce various reactive oxygen species (ROS). PDT-generated ROS not only induces tumor cell death but also triggers an acute inflammation and immune response. The broad immune response induced by PDT could significantly potentiate immunotherapies.

Innovation and research plan. Despite the many merits of improving PDT performance in vivo, PDT has not achieved an expected therapeutic effect due to limited light penetration, phototoxicity of PSs, and limited activation of host immunity. On that basis, my line of research aims to a) Design a universal platform for nanoparticle-based PDT to overcome the current challenges, and b) Assess the effects of combining nanoparticle-based PDT with nanobiologics that have immunomodulatory effects. Nanotechnology is an astute strategy for PDT since superior PS's luminescence efficiency, improved PS's photostability and stability in aqueous media as well as cell-targeted delivery can be achieved. Based on my previous experience on formulating fluorescent nanoparticles, I plan to formulate a fluid-like nanovesicle (e.g., LNP) loaded with NIR PSs, either commercial (e.g., ICG dye-810) or newly chemically synthesized, to minimize aggregation-caused quenching typically observed in PS-loaded polymeric nanoparticles and maximize light penetration depth. I plan to implement a universal targeting strategy by utilizing bi-specific nanobodies, a technique I mastered during my time at Mount Sinai. In the second stage, and after proving efficacy in preclinical models, I plan to examine the best PDT-combinational therapy. PDT directly kills primary cancer cells and produces an acute inflammatory response, combined with immunotherapies that induce trained immunity could generate systemic tumor-specific T-cell response and promote the regression of distant tumors (i.e, using ICIs or nanobiologics loaded with pathogen-associated molecular patterns).

Idoneity. It lies in the unique blend of expertise that I have developed during my postdoctoral work, which positions me to effectively execute this multidisciplinary research line. The experience gained in the preparation, characterization and testing of PS-loaded nanoparticles, combined with my in-depth understanding of therapies for modulating the innate immune system, acquired during my time at Mount Sinai, provides a solid foundation for the successful completion of the research line proposed.

Resumen del Currículum Vitae:

The development of nanomaterials for biomedical applications has been the focus of my research since graduation. During my PhD (URV-Medcom Advance SA, Prof. Ramon Álvarez-Puebla), I developed an ultrasensitive technique for cancer diagnostics. Key achievements from my Ph.D., which earned me the Special Doctoral Prize for excellence, include the direct quantification of epigenetic DNA modifications and the identification of K-Ras point mutations for colon cancer diagnostics. These results led to significant interest from pharmaceutical companies, culminating in Grifols SA acquiring a 51% stake in Medcom Advance SA in 2019. During my Ph.D., I also spent six months at Nanyang Technological University (Prof. Ling Xing Yi, Singapore, 2016). After my Ph.D., I joined Beauty Cluster Barcelona as Innovation Manager, focusing on bridging academic research and industry which intensified my capacity to establish intersectoral collaborations and strengthened my leadership skills.

In June 2018, I was awarded the competitive Marie Curie Tecniospring+ Postdoctoral Grant (EC) for the FONBIO project (PI: Dr. J. Morla-Folch, Supervisor: Prof. Nora Ventosa, ICMAB-CSIC). I spent one year in Prof. Kevin Belfield's Group (NJIT, USA), a leader in photophysical properties of nanomaterials, before joining ICMAB-CSIC. My project aimed to develop ultrabright fluorescent quatsomes (QS) nanoprobes for bioimaging, yielding compelling scientific contributions and a potential patent for QS nanoprobes in image-guided surgery (currently under patentability process). Several collaborations (e.g., Hospital Germans Trias i Pujol, NJIT, Hamamatsu Photonics) have continued through funded projects, advancing QS nanoprobes. In July 2021, I joined the Nanomedicine Lab at Mount Sinai Hospital (New York) as a postdoctoral researcher (co-PIs: Prof. Zahi Fayad and Dr. Bram Teunissen). As a project co-PI, I led the development of nanoparticle-based photodynamic therapy (PDT) for anticancer treatment, establishing the first Laser Lab at BMEII. This research earned recognition, including two awards at WMIC (Miami, USA, 2022 and Czech Republic, 2023). Additionally, I contributed to clinical translation projects using non-human primate models (NHP) and co-designed and taught a graduate course on Nanomedicine at the Icahn School of Medicine (Aug-Dec 2023) with Dr. B. Teunissen.

After a maternity leave (March-Sep 2024) and international relocation, I joined the Nano4Rare EU project as Entrepreneur in Residence (European Innovation Council, EIC), in October 2024. In this role, I ensure that the nanoGLA (leading nanomedicinal candidate) progresses through preclinical phases toward First-in-human trials, overseeing timelines and resources. I also hold the position of Senior Researcher at ICMAB-CSIC, supporting the R+D of this project.

I am passionate about science outreach, having given over 8 science talks at schools, organized Researcher's Night workshops, and participated in FameLab contest as science monologist. In 2023, I co-founded the Trainee Liaison Committee (TLC) at Mount Sinai, fostering cohesion between faculty and trainees. I have contributed to over 10 international conferences, mentored 11 trainees (MSc theses and TFGs), and served as a peer reviewer. Additionally, I have prepared a variety of grant proposals for highly competitive European and north-American calls.



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Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: KAKARAPARTHI, KRANTHIRAJA
Referencia: RYC2024-048724-I
Correo Electrónico: kranthirajakakaraparthi@gmail.com
Título: Rational design and synthesis of new benzodithiophene based 2D-conjugated polymers and small molecules for organic/perovskite solar cells

Resumen de la Memoria:

If we truly wish to achieve carbon neutrality by 2050, we must substantially enhance our sustainable research agenda and invest in new, advanced, greener technologies. One of the effective ways to fulfill the increasing global energy demand (estimated to be between 28-35 TW by 2050) is by harnessing environmentally sustainable solar energy. The current use of solar energy falls far short of its untapped potential, representing a grand challenge in solar cell research. In this quest, non-fullerene organic solar cells (NFOSCs) and perovskite solar cells (PSCs) are two promising alternatives to inorganic solar cells with fascinating features including semi-transparent windows, agrivoltaics, Internet of Things and space applications. For instance perovskite materials have all the requirements (low cost, high light absorption coefficients, charge carrier lifetimes and evolving high PCE beyond first and second-generation solar cell (SC) technologies. The inherent features associated with perovskites enabled the SC efficiency to be increased from 3.8 to 26% in the last ten years. Besides the perovskite absorber engineering, the incorporation of appropriate hole transport materials (HTMs) into lead-PSCs facilitated great milestones in PCE. For instance, integration of HTMs like 2,2',7,7'-tetrakis[N,N-di(4-methoxyphenyl)amino]-9,9'-spirobifluorene (spiro-OMeTAD) and poly(bis(4-phenyl)(2,4,6-trimethylphenyl) amine) (PTAA) into the PSCs delivered high efficiencies that are comparable with the silicon based solar cells. However, the association of hygroscopic and toxic dopants makes them less ideal for use in bulk production. On the other hand, NFOSCs are evolving as a competent technology owing to their high evolving PCE >19%, lightweight, printability and tunable properties of photoactive materials. However, scalability (photoactive materials, HTMs for PSCs and polymer donors for NFOSCs / Figure 1) and stability (long-term stability at various ambient conditions) are the issues that need to be addressed before their commercialization. Therefore, the development of conjugated polymers with inherent rich optoelectronic properties with scalability is certainly an interesting area to advance this research to practical use. The advancement of high-performance conjugated polymers has led to significant breakthroughs in photovoltaics. Especially, the development of conjugated polymers is driven by inspiration from existing research, relying on extensive trial and error methods. However, this requires significant amount of time, man-power and resources. Nevertheless, a complete survey of materials including never-explored molecular space would certainly difficult to achieve considering the limited resources. Henceforth, machine learning (ML) technology has gaining significant attention in the field of organic electronics due to its faster material screening over conventional quantum computations. Additionally, ML algorithms can provide answers from a big data repository, which is impossible task for the human brain. There has been no investigation on a experiment based ML for screening conjugated polymers with multifunctionality. This would certainly help in the development of efficient multi use polymers (as donors in NFOSCs and as dopant-free HTMs in PSCs).

Resumen del Currículum Vitae:

Since September 2022, I have been working as a research fellow at Queensland University of Technology (QUT), Australia. My research focuses on the development of innovative stretchable and radical-substituted conjugated polymers for wearable energy, electronic, and biomedical devices, including transistors, solar cells, and electronic skins (e-skins). Through this work, I have developed high-performance organic semiconducting materials with stretchable properties (K. Kranthiraja et al. Adv. Electron. Mater. 2024, 2400614; K. Kranthiraja et al Solar RRL, 2024, 2400185). Several other noteworthy results are in various stages of preparation, submission, and revision. Previously, I worked at University of North Texas (UNT), USA (10/2021-02/2022) as a postdoctoral research associate. During this time, my research focused on understanding the stability dynamics of 3D and 2D perovskite solar cells (PSCs). We successfully identified the degradation pathways and proposed a mechanism of degradation, which involves the interaction of Ag with the absorber layer through the formation of AgI in the PSCs (Sci. Rep., 2022, 12, 18754; Link). Prior to moving to the USA, I worked as a Japan Society for the Promotion of Science (JSPS) (09/2018-10/2020)/specially appointed research fellow (11/2020-08/2021) at Osaka University (OU), Japan. The JSPS fellowship is highly competitive, with an acceptance rate of approximately 10% through open international recruitment. At Osaka University, we developed an experimental-oriented machine learning (ML) for the efficient screening of conjugated polymers for organic solar cells (OSCs) achieving a high correlation coefficient of 0.85. This advancement assist in the development of high performance materials for OSCs (K. Kranthiraja et al Adv. Funct. Mater. 2021, 31, 2011168, Link; cited:80; K. Kranthiraja et al ACS Appl. Mater. Interfaces, 2022, 14, 28936). Prior to this, I worked as a research fellow at the National University of Singapore, NUS (01/2018-08/2018). During this period, I contributed to an industry-collaborated project where I developed various oligo- and polyanilines for biomedical applications, such as less toxic hair dyes and tattoos, as well as electronic applications. This work resulted in one co-authored paper, along with a project report and materials submitted to COTY, Germany. Before moving to Singapore, I worked as a postdoctoral researcher at Pusan National University (PNU), South Korea (03/2016-12/2017). During this period, we successfully demonstrated multiuse π-conjugated polymers for high performance additive-free OSC or dopant-free PSCs with high economical and environmental sustainability. (K. Kranthiraja et al Adv. Mater. 29, 201700183 (cited:156); K. Kranthiraja et al Adv. Funct. Mater., 2017, 27, 1701256). I got my Ph.D. in chemical materials (03/2012-02/2016) from PNU, South Korea (One of the ten Flagship Korean National Universities). My doctoral thesis focused on the Rational design and synthesis of new benzodithiophene based 2D-conjugated polymers and small molecules for organic/perovskite solar cells. During my doctoral and postdoctoral research at PNU, I authored 29 research papers, where 22 as first/equal contributions.



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Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: THAKUR, SUMAN
Referencia: RYC2024-050085-I
Correo Electrónico: sumanchem89@gmail.com
Título: Sustainable Advanced Smart Materials

Resumen de la Memoria:

2012-2016. PhD in Chemical Science, Tezpur University, India. Supervisor: Prof. N. Karak. I obtained two PhD studentships in highly competitive open calls, as Junior Research Fellow, by the Depart. Science and Technology (DST, within the Science Ministry) and as a Senior Research Fellow, by the Council of Scientific and Industrial Research (CSIR, equivalent to the Spanish AEI), India.

2016-2025. Postdoctoral researcher. My understanding of the international character of research led me to seek a postdoctoral position in South Korea, a leading R&D country in area of industrial research. Hence, I joined Prof. Joong Hee Lee's Lab at Chonbuk National University in 2015 (after submitting my PhD thesis, before the final PhD defense) to develop graphene-based photocatalyst for the sustainable production of hydrogen peroxide. Here, I led different projects such as BK21 PLUS, a human resource development program, funded by the Government of the Republic of Korea, and an industrial project. Afterwards, I joined the Hong Kong Polytechnic University (PolyU) in 2016, one of the top universities in the world, thanks to a national funded GRF project and, later, an industrial project with a company, Breathex, China. This position at PolyU allowed me to expand my experience on shape memory polyurethane towards practical applications as the advanced self-adaptive breathable garment to provide more comfort and durability. Since my research objective aims to develop sustainable biobased smart polymer composites, I join the Bioproducts Discovery and Development Centre (BDDC), a renowned sustainable polymer research group at the University of Guelph (UoG), Canada in 2018. There, I developed sustainable and moisture-resistant coating materials from downstream corn oil, a waste by-product of the bioethanol industry. In 2019, I joined as a postdoctoral researcher (Juan de la Cierva, formación) at the Institute of Polymer Science and Technology (ICTP, CSIC), where I started a research line on biobased smart materials. At ICTP, I have set up the required synthesis lab and I developed biobased self-healing epoxy thermosets by using dynamic chemistries. In 2021, simultaneously, I got a "Juan de la Cierva-Incorporación" contract (which I resigned) and a "Jóvenes Investigadores sin vinculación" contract, which is my actual position. The objective of my current project (SABIO) is to develop biobased smart anticorrosion coating with self-healing and self-cleaning properties. In 2024, I have received R3 certificate, one of the most relevant recognitions of research excellence in Spain.

Line of Research: My research is centered around three main areas:

1. Sustainable Materials: Transforming biomass and waste into sustainable polymers and composites.
2. Smart Materials: Advancing materials with adaptive properties like self-healing, shape memory, and self-cleaning for durable, functional applications.
3. Energy Saving Materials: Developing materials that contribute to energy efficiency in buildings and personal comfort through innovative textiles and insulators.

Moving forward, my goal is to continue pioneering in these areas, leveraging life cycle assessments for environmental impact, promoting closed-loop recycling, and expanding the application of smart materials in health, robotics, and beyond, all while fostering a sustainable future.

Resumen del Currículum Vitae:

I am a dedicated researcher with a focus on sustainable and smart materials. With a Ph.D. from Tezpur University, India, I've carved a niche in green chemistry, particularly in the sustainable synthesis of polymers and nanomaterials. My academic journey is rich with international exposure, having held postdoctoral positions in South Korea, Hong Kong, Canada, and Spain, where I've developed a robust network of global collaborations.

My research endeavors have resulted in 35 publications in high-impact journals (18 first author, 26 Q1, 12 D1, 12 open-access) and 3 articles in non-SCI journals. Additionally, I have contributed to 5 book chapters (3 corresponding author), and edited a book. My scholarly impact is reflected in an h-index of 23 and a total citation count of 2,286 according to Scopus. Furthermore, 25 international conferences and 2 national conferences, being invited in 2 of the international conferences and awarded with the best poster and oral communication. This publication record and the high level of internationalization of my career prove the quality of the research I have carried out so far.

International Experience and mobility:

- o Chonbuk National University, South Korea: Led projects on sustainable photocatalysts, enhancing hydrogen peroxide production with a green approach.
- o Hong Kong Polytechnic University: Innovated in shape-memory polyurethane, producing smart garments, and was offered an indefinite postdoctoral position due to my contributions.
- o University of Guelph, Canada: Focused on valorizing waste into value-added materials, securing industrial funding for sustainable coating projects.
- o Instituto de Ciencia y Tecnología de Polímeros (ICTP), Spain: Currently leading the SABIO project, developing advanced biobased coatings with self-healing and self-cleaning features, supported by significant grants.

Leadership and Independence:

- o Principal Investigator for national projects, securing funding like the JIN Model grant (PID2020-119546RJ-I00).
- o Editorial roles, including Guest Editor for special issues in prestigious journals like 'Polymers' and co-editor for books on advanced materials.
- o Recognized for research excellence with the R3 certificate in Spain.
- o Supervised numerous students at various academic levels, including 2 ongoing Ph.D. theses, 2 master's theses, and several undergraduate projects, enhancing my mentorship skills.
- o Engaged in academic dissemination through conferences, winning awards for presentations, and contributing to significant publications where I'm often the first or corresponding author.



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Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: PÉREZ GALERA, JUANA MARÍA
Referencia: RYC2024-048173-I
Correo Electrónico: jperez.galera88@gmail.com
Título: Synthesis, characterization and evaluation of catalytic activity of homogeneous and heterogeneous metallic catalysts

Resumen de la Memoria:

I began my research career in 2012 with my doctoral thesis, focusing on the synthesis and characterization of heterogeneous catalysts based on magnetite and evaluating their catalytic activity in various organic transformations. During this period, I completed a 3 month research stay at Imperial College London under the supervision of Dr. S. Díez, where I worked on homogeneous Cu(I)-phosphinite complexes for organic reactions. Subsequently, I collaborated with Prof. A. Baeza from the University of Alicante (UA), developing a straightforward methodology for the allylation of silyl enol ethers using activated alcohols like HFIP. Additionally, I worked with Prof. I. Martín at the UA on the preparation of biodegradable thermoplastic starch materials and the study of oxidative debris formation during the synthesis of graphene oxide. During my postdoctoral research at the University of Groningen (The Netherlands) with Prof. S. Harutyunyan, I focused on the development of enantioselective reactions using homogeneous copper- and manganese-based complexes. In 2020, I joined the University of Almería (UAL) under the mentorship of Prof. I. Fernández, where I contributed to various projects including the polymerization of L- and rac-lactide using homogeneous lithium-anthraquinone complexes to synthesize cyclic polymers and the use of anthraquinoid ligands for the preparation of bio-based heterogeneous organocatalysts, such as those derived from olive stones, testing their reactivity in organic transformations. Furthermore, I investigated the application of rare-earth-based metal-organic frameworks synthesized via solvothermal routes for similar reactions. Currently, my research focuses on the functionalization of lignocellulosic materials such as olive and almond stones with silanes and metal oxides for use in chemical reactions. To date, I have employed a wide range of advanced characterization techniques, including multinuclear magnetic resonance (^1H , ^{13}C , and ^{15}N NMR), elemental analysis, TG, DSC, surface area and pore size distribution analysis, XRF, XPS, FTIR (ATR and DRIFT), TEM, SEM, moisture content (Karl Fischer), particle size distribution, Z-potential and optical microscopy. Since joining the NMRMBC group at UAL, I have been awarded a 3 year HIPATIA postdoctoral fellowship (2022). Additionally, in 2024, I secured two projects as Principal Investigator: the Knowledge Generation Project 2023 (PID2023-150047OA-I00), funded by the Ministry of Science, Innovation, and Universities, and the Lanzadera Research Project 2024 (P_LANZ_2024/009), supported by the UAL. With the Ramón y Cajal grant, I aim to consolidate my research expertise and establish an independent research group. My primary research focus will be the development of sustainable, Co-free heterogeneous catalysts for the polymerization of unsaturated polyester resins (UPRs) under mild conditions comparable to or softer than current industrial standards. I also plan to improve the resulting materials' properties by incorporating novel reactive cross-linking agents. I intend to utilize bio-based lignocellulosic materials as supports and as sustainable alternatives to siliceous mineral-based fillers widely used by companies like Cosentino for the production of Silestone®. This innovative approach will enable the development of eco-friendly catalytic methodology for UPR polymerization.

Resumen del Currículum Vitae:

A.ACADEMIC TRAINING
A1. Chemistry Degree, UA. 2006-2011
A2. Master in Medical Chemistry. UA. 2011-2012
A3. PhD, cum laude, international mention. UA. 2012-2016
A4. Extraordinary Doctoral Thesis Award.
A5. Positive evaluation ANECA Assistant Professor Doctor. 2016
A6. Positive evaluation ANECA Contracted Professor Doctor and Private University Professor. 2019
A7. Positive evaluation Junta de Andalucía Contracted Professor Doctor, Private University Professor and Assistant Professor Doctor. 2023
A8. University master's degree in compulsory secondary education and baccalaureate teaching, vocational training and language teaching. 2024
B.CONTRACTS AND GRANTS
B1. Collaboration grant. 2010
B2. Research initiation grant (BII5428). 2011
B3. FPI grant for completing the doctorate (BES-2012-053869). 2012-2016
B4. Short-stay predoctoral mobility grant (EEBB-I-14-08732). 2014
B5. Research contract UA Department of Chemical Engineering. 2016
B6. Marie Skłodowska-Curie-IF fellowship (ChirPyr-746011). 2017-2019
B7. UAL postdoctoral contract. 2020-2022
B8. Hipatia postdoctoral contract (Plan Propio 2021). 2022-2025
C.RESEARCH
C1. Author of 43 publications
-H-Index 16
-662 total quotes
-7 articles as corresponding author
-10 articles derived from supervised bachelor (TFGs) and Master (TFMs) thesis.
C2. Author of 1 international patent extended to Europe, USA, Canada, Japan and Australia (WO2023052647A1, Publication 06-04-2023))
C3. Participation in 52 conferences with 7 oral communications and more than 40 posters.
C4. Participation in 16 research projects and one teaching innovation project.
C5. Participation in research contracts. Famosa SA, Kinsy SL, Applynano Solutions, Cosentino R&D, Haza Roraima, Agrobio, Viagro.
C6. Cosupervision of 10 TFM's, 8 TFG's and 4 exchange students. Currently cosupervising 3 PhD Thesis.



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Turno General

C7. Member of the organizing committee of the 11th NMR GERMN Biennial NMR meeting 2022.
C8. Editor of the book of abstracts of the 11th NMR GERMN Biennial NMR meeting 2022. ISBN: 978-84-1351-172-6.
C9. Reviewer of research articles in journals such as ACS Catalysis, BCAB, Molecules, Chem. Eur. J., Dalton Trans. or Inorg. Chem.
C10. PhD tribunal (Dra. Amalia García García, UGR, 06/07/2021).
C11. External Evaluator PhD Thesis (Dra. Omayra Hernández Rubio, USAL, 09/01/2019).
C12. Member of the committees of PhD (2), Master (4) and Bachelor (5) Thesis.

D.STAYS ABROAD
D1. 3 months at Imperial College London (UK). May-August 2014
D2. 2 years and 3 months at the University of Groningen (The Netherlands). 2017-2020.

E.TEACHING
169 h teaching in the pre-doctoral period at the UA in the degrees of Chemistry, Biology, Optics and Chemical Engineering
210 hours of teaching in the postdoctoral period at the UAL in the Bachelor's and Master's degrees in Chemistry.

F.AWARDS AND RECOGNITIONS
F1. JIQ travel bag 2016
F2. JIQ 2022 travel bag
F3. Recognition of initiatives and professional trajectories that contribute to the sociocultural, tourist and economic development of the municipality of Oria (Almería). 2018
F4. San Alberto 2022. UAL (best publication)

G.MANAGEMENT AND DIFFUSION ACTIVITIES
G1. Representative of the research staff in the teaching, research and permanent commissions of the Department of Organic Chemistry of the UA. 2012-2016.
G2. Representative of the research staff of the Department of Chemistry and Physics of the UAL. 2024-today.
G3. Article published in Nova Ciencia Magazine. December 2024



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Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: PUIGGALI JOU, ANNA
Referencia: RYC2024-048177-I
Correo Electrónico: anna.puiggali@hest.ethz.ch
Título: From material science to tissue engineering

Resumen de la Memoria:

My research career began in 2013 with my Bachelor's and Master's theses at University College London, where I developed polymersomes as nano-bioreactors under Prof. Giuseppe Battaglia's supervision. This experience fueled my passion for bioengineering and propelled me toward advanced research. During my PhD (2014-2019) at the Polytechnic University of Catalonia (UPC) with Prof. Carlos Alemán, I developed drug delivery systems based on conducting polymers. Alongside my doctoral work, I pursued internships at renowned institutions: at the University of Warsaw with Prof. Slawomir Sek, I utilized liquid Atomic Force Microscopy to analyze lipid bilayers' mechanical and transmembrane properties; at the University of Namur with Prof. Eric Perpète, I focused on transmembrane protein production and isolation; and at the Free University of Berlin with Dr. Marcelo Calderón, I explored thermally responsive polymers combined with conducting polymers for photothermal ablation under Near-Infrared irradiation. These experiences broadened my expertise in biophysics, nanotechnology, and bioengineering.

Following my PhD, I was awarded a Marie Skłodowska-Curie Individual Fellowship to join Prof. Marcy Zenobi-Wong's lab at ETH Zurich. Here, I expanded my expertise in light-based materials for tissue engineering, particularly using Filamented Light (FLight) biofabrication. My postdoctoral work focuses on engineering cartilage and osteochondral grafts. I modified natural polymers for light-based bioprinting, achieving precise scaffold architectures and tissue maturation with mechanical properties exceeding 1 MPa. These scaffolds are currently in preclinical trials in mice and sheep. My results have secured national and European grants. I mainly worked on different polymer functionalization to allow chain-growth and step-growth crosslinking, such as hyaluronic acid decellularized extracellular matrix (ECM) and collagen type I. Also, by using ruthenium/sodium persulfate photocrosslinking, I managed to preserve collagen's structure during light crosslinking without chemical modification, achieving high cell viability and improved tissue maturation. These breakthroughs underpin future projects, such as my proposed kidney fibrosis model, as the next steps for my scientific career.

Besides polymer chemistry, I used advanced biofabrication techniques such as, Microporous Annealed Particles (MAP) hydrogels for enhancing cell migration, proliferation, and extracellular matrix production or FLight, which allowed the creation of structural anisotropy within hydrogels mimicking the deep zone of cartilage, aligning collagen and enhancing mechanical stiffness. I plan to adapt this methodology to fabricate tubular structures for endothelial vessels and proximal tubules of the kidney.

The Ramon y Cajal fellowship will enable me to combine my expertise in materials, biofabrication, cellular biology, and mechanical characterization to develop light-sensitive resins for renal structures and study fibrosis progression. It will also facilitate my transition into a group leader role, equipping me with essential skills in project management, leadership, and dissemination. This opportunity will allow me to make significant contributions to tissue engineering, organ-on-chip technologies, and disease modeling.

Resumen del Currículum Vitae:

My academic journey is marked by a strong foundation in biomedical engineering, biochemistry, and biomedical research. I earned my Bachelor's degree in Biochemistry from the University of Barcelona in 2013, where I developed a solid grounding in biological and chemical sciences. I then pursued a Master's in Biomedical Research at Pompeu Fabra University in 2014, sparking my interest in the interface between biology and technology. During these studies, I had the opportunity to do my thesis abroad at the University College London (UCL) with Prof. Giuseppe Battaglia.

I then continued with a Ph.D. in Biomedical Engineering at the Polytechnic University of Catalonia (UPC), under the supervision of Prof. Carlos Alemán, where I defended my thesis titled "Biointerfaces based on the combination of synthetic polymers and biomolecules," earning a Summa Cum Laude distinction in 2019. Furthermore, I received the Special Doctoral Thesis Award for the class of 2018-2019 (Premio Extraordinario de Doctorado de la convocatoria 2018-2019). My postdoctoral experience began at the same university, focusing on conducting polymers and cardiac patches. Subsequently, I secured a Marie Skłodowska-Curie Actions (MSCA) postdoctoral fellowship at ETH Zurich under Prof. Marcy Zenobi-Wong, where my research has been centered on developing anisotropic biomaterials for engineering cartilage in vitro. A topic I am deeply passionate about. Throughout my career, I have completed academic stays at several European universities, including UCL, Warsaw University, Namur University, and Freie Universität Berlin, where I expanded my expertise in various biomedical research areas through collaborations with renowned researchers. After finishing the MSCA fellowship, we secured Innosuisse funding to continue developing technologies for treating cartilage injuries.

I have published numerous articles (33) in prestigious scientific journals, such as Advanced Healthcare Materials, Acta Biomaterialia, and Journal of Controlled Release, among others. Additionally, I have been actively involved in the scientific community, serving as the Educational Officer for the Young Scientists Forum of the European Society for Biomaterials. I have supervised undergraduate and master's students, helping them develop essential research skills. Currently, I am co-supervising two Ph.D. students. I have also played a significant role in securing funding for research projects, including leading a project funded by the Swiss Innovation Agency (Innosuisse project), participating in another funded by the Swiss National Science Foundation and being part of a European consortium called Luminate. These experiences have enhanced my ability to identify funding opportunities and develop strong proposals to advance innovative research.



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Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: PIAGGI, PABLO
Referencia: RYC2024-049807-I
Correo Electrónico: pm.piaggi@nanogune.eu
Título: Atomistic Machine Learning and Simulation for Materials Science

Resumen de la Memoria:

During my career I made several important scientific contributions in my field. As part of my PhD thesis, I developed methodologies to study rare events, such as crystal nucleation, using molecular dynamics simulations. I focused on developing methods based on the introduction of a bias potential which is a function of a small number of collective variables. The techniques that I have proposed are available via multiple software packages, such as PLUMED, Ovito, and LAMMPS, and have been adopted by many users around the world. The methods have been used to study multiple rare-event scenarios, from protein folding to ice nucleation at complex surfaces. Later, during my postdoctoral work, I made contributions to the study of liquid water and ices from first principles using machine learning. This methodology is based on training machine learning models for the potential energy surface using data from first-principles electronic-structure calculations. With this tool, we provided evidence from first principles for the existence of a liquid-liquid transition in supercooled water, which had a crucial role in cementing this hypothesis for the anomalies of liquid water. Furthermore, we also computed ice nucleation rates from first principles, a feat which was considered impossible until a few years ago, i.e., before the advent of machine learning. This work has been published in the journals Proceedings of the National Academy of Sciences and Physical Review Letters, and has been highlighted as a significant advance in the announcement of the 2024 Nobel Prize in Physics.

I plan to start a research line titled "Harnessing machine learning molecular simulation to unravel reactive crystallization mechanisms". Crystallization plays a pivotal role in a myriad of natural and industrial processes. In this project, I shall focus on reactive crystallization processes, i.e., the formation of crystals mediated by chemical reactions. Tracking the microscopic pathways of these reactive processes using experimental techniques is challenging, if not impossible, due to the small length scales and short time scales involved in the bond forming and breaking events. For this reason, there are many gaps in understanding and open questions about such mechanisms. I will tackle this problem using molecular dynamics simulations driven by machine learning (ML) interatomic potentials based on first-principles electronic-structure calculations. This is a revolutionary technique based on artificial intelligence which has already provided groundbreaking insights into many problems. The overarching aim of this new line of research is to leverage recent advances in machine-learning-assisted molecular dynamics simulations to shed light on the microscopic mechanisms of reactive crystallization. The project is organized into two work packages, one devoted to developing machine learning models for the potential energy surface and another aimed at understanding reactive crystallization in two systems: calcium carbonate precipitating from aqueous solution and the formation of the transition metal dihalide CoBr_2 from the vapor phase. This project will shed light on two poorly understood problems and pave the way for the study of other reactive crystallization processes.

Resumen del Currículum Vitae:

I am an expert in molecular simulation and my research is interdisciplinary spanning materials science, chemistry, condensed-matter physics, and the development of computational methods. I worked at top institutions in the USA and Switzerland, namely Princeton University (postdoc), EPFL (PhD with thesis distinction), and ETH Zurich (postdoc) for nine years. I have published a total of 32 peer-reviewed articles in prestigious journals (such as Phys. Rev. Lett., Nat. Commun., and Proc. Natl. Acad. Sci.), of which 6 as corresponding author, 13 without my PhD advisor, and 3 more are currently under review. My publications have been cited more than 2400 times and my current h-index is 21 (Google Scholar). I have delivered 21 invited presentations at world-renowned universities, international conferences, and research centers, such as Columbia University, the MRS Meeting in Boston, and ICTP in Trieste. In February 2024, I joined nanoGUNE in Spain as an Ikerbasque Research Fellow. As an independent researcher at nanoGUNE, I lead a team of young and highly motivated researchers including a postdoctoral researcher, a visiting PhD student, and a master's student.

I have obtained funding through two prestigious and competitive fellowships for my postdoctoral work, namely, the Early Postdoc Mobility fellowship from the Swiss National Science Foundation (€ 120,000 for 1.5 years) and the Ikerbasque Research Fellowship from the Basque Foundation for Science in Spain (€ 200,000 for 5 years). Furthermore, twice in 2024 I have been granted access as team leader to computational resources at the flagship supercomputer Marenostrum 5 of the Spanish Supercomputing Network, which are awarded through competitive calls. I have trained and mentored two master students, Roberto Menta (Princeton University, USA) and Pablo Peña (UPV/EHU, Spain), during their thesis work, and Mr. Menta is now a PhD student at the prestigious Scuola Normale Superiore di Pisa in Italy. I am currently mentoring a postdoctoral researcher, Dr. Wanqi Zhou, and a visiting PhD student from Ruhr University Bochum in Germany, Mr. Eslam Ibrahim. I am currently a guest editor for a special issue of The Journal of Chemical Physics in honour of my PhD supervisor Prof. Michele Parrinello. I have also evaluated (peer review) more than 60 manuscripts for journals, such as Science, Nature, Nature Physics, and Physical Review Letters, and project proposals for the Swiss National Supercomputing Center (CSCS), the Centre Européen de Calcul Atomique et Moléculaire (CECAM), and the Chilean National Fund for Scientific and Technological Development (FONDECYT). Lastly, I am a strong advocate for open science, and I maintain a full list of preprints on arXiv and repositories to reproduce my calculations on GitHub.



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Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: CAYADO LLOSA, PABLO
Referencia: RYC2024-050331-I
Correo Electrónico: pclvalles@gmail.com
Título: Comprehensive study of REBCO High-Temperature Superconductors for future energy applications: from the basic properties to new industrial solutions

Resumen de la Memoria:

My scientific career has been always in the field of Superconductivity in which I have already 12 years of experience. It all started in October 2011 when I began my PhD at ICMAB after completing my degree in physics at University of Oviedo in July of that year. My work during the PhD was mainly in the framework of the EUROTAPES, one of the most ambitious projects ever in the field of superconductivity with a budget of €20M. It was a European consortium of 20 partners, including research institutions and companies, and coordinated from ICMAB by my PhD supervisor Prof. Xavier Obradors. My research focused on finding new strategies to improve the superconducting properties of REBa₂Cu₃O₇ (REBCO) films prepared by chemical solution deposition (CSD). I followed different research lines to achieve this goal: preparing CSD REBCO nanocomposite films by incorporating nanoparticles (NPs) into their matrix and doing an exhaustive investigation of the oxygenation process in these REBCO films.

After my PhD, which I completed in March 2016, I moved to Germany where I started a stay as postdoctoral researcher at Karlsruhe Institute of Technology (KIT) in June 2016. This first postdoctoral experience elevated my research career, allowing me to work as a fully independent and self-led researcher pursuing my own research initiatives. In 2018 I prepared a proposal for extending a bilateral project with the company Deutsche Nanoschicht GmbH two more years. The proposal was accepted and I was able to achieve 470000 € to continue my research activities. The aim of this project was to develop new strategies and methods to enhance the superconducting properties of REBCO films and make them applicable to the industrial processes of our partner. In this period, I continued researching the same topics as during the PhD, but I also opened new lines of research like the use of statistical methods to improve the growth of REBCO films, which was a completely innovative research topic in the field of superconductivity, or the study of the nascent topic of High-Entropy REBCO films.

In early 2020, my contract at KIT was approaching its end and I sought new opportunities to continue my research career. I was then invited by Prof. Carmine Senatore, the head of the Applied Superconductivity group at the University of Geneva, to join a team made up of members from both the University of Geneva and Bruker Biospin AG to draft a proposal for a joint project. My participation in the preparation of the proposal was crucial to define the methodology, objectives and distribution of tasks of the project. Finally, the proposal was accepted and the project was financed with 858243 CHF. I started working at University of Geneva in September 2020 holding the role of co-principal investigator of this project. Here, I am working on developing new techniques for creating superconducting joints between commercial REBCO-based superconducting tapes, a process that is crucial for improving the resolution of Bruker Biospin AG's next-generation NMR magnets.

All this research work in different institutions is reflected in 35 publications, 20 as corresponding author and 17 as first author. Other 8 publications are currently either submitted or in preparation (6 as corresponding and first author). Apart from that, I have also written a patent which is currently being reviewed by EPO.

Resumen del Currículum Vitae:

My scientific career started in 2011 when I began my PhD at ICMAB joining the Superconducting Materials and Large-Scale Nanostructures group led by Prof. Teresa Puig. I obtained my PhD in 2016 with a thesis titled "Multifunctional nanostructured superconductors by chemical routes: towards high current conductors" and obtaining the qualification of excellent "cum laude".

In June 2016, I moved to KIT where I started a stay as postdoctoral researcher. There, I spent 4 years working in the Superconducting Materials group led by Prof. Dr. Bernhard Holzapfel. My research was focused on the development of new methods to improve the superconducting properties of REBa₂Cu₃O₇ films for their transfer to industrial processes. From 2018, I have worked as principal investigator in a joint project with them that had a budget of 470000 €.

In early 2020 I was invited to join the working group to draft a proposal for a joint project between UNIGE and Bruker Biospin AG. Our proposal was accepted and the project, with a budget of 858243 CHF, started in September 2020 when I joined UNIGE to work as Co-principal investigator of this project. The goal of the project required me to install my own laboratory and started my own research line.

I have been Principal Investigator in three projects and Co-Principal Investigator in another one, being able to obtain around 1270000 € to finance my own research activities. Moreover, I have been involved in several of the most important projects about superconductivity over the past decade, highlighting the EUROTAPES, one of the most ambitious in the field of superconductivity ever with a budget of €20M.

I am recognized for my cutting-edge research in the field of superconductivity that led to pioneering publications, most of them published already working as an autonomous and independent researcher. This is evident in my publication record that includes 20 papers as corresponding author. As an acknowledged expert in the field, I have been invited to contribute to two topical reviews that are currently submitted and I am the author of a book chapter. Furthermore, I am the main author of a patent, that nowadays is being evaluated by the EPO. Also, I have presented my work in multiple international conferences since 2013 and I have been awarded as the best oral presentation in one of them. Moreover, I have been invited to give five seminars in different institutions of Europe and US.

All the work in the last years has helped me to establish a reputation within the scientific community, as demonstrated by my participation as Guest Editor, Technical Editor, Book Editor, Member of Early Career Editorial Board and Program and Associate Editor, Topical Advisory Panel Member and Reviewer in several journals.

In the last three years at UNIGE, I have gained experience teaching in different languages and this served me to get the certification as Associated Professor by the ANECA. I have also served as supervisor of a bachelor's thesis and a master's thesis at KIT and I am currently supervising a PhD thesis.



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The journal "Superconductor Science and Technology" awarded me as "Outstanding Reviewer" in 2018 and 2023 and as "Reviewer of the Year" in 2019. Moreover, my commitment to scientific outreach led me to devise and found an association for scientific dissemination called "Villaviciosa ConCiencia" of which I am the president.



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Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: TAYYEBI, AHMAD
Referencia: RYC2024-049672-I
Correo Electrónico: ahmad.tayyebi@usc.es
Título: Unbiased Solar Photoelectrochemical Cell: Urea and Glyceric Acid Production by CO₂-Nitrate REduction and Glycerol Oxidation

Resumen de la Memoria:

The main objective of the proposed research (USC-CORE) is to develop a proof-of-concept unbiased tandem photoelectrochemical cell integrating highly efficient and stable photoelectrodes and catalytic/passivation layers, minimizing the use of critical raw materials to achieve efficient solar-driven urea production and high added-value chemicals from valorization of industrial waste (glycerol). Urea, a vital nitrogen-rich fertilizer, is energy-intensive to produce traditionally. Photoelectrochemical (PEC) C-N coupling reaction holds the promise of delivering green Urea Production with the only energy input of sunlight and using CO₂ and NO₃ as waste feedstock. In a PEC cell, the cathode reduces CO₂ and NO₃ to urea, while the anode typically oxidizes water via oxygen evolution reaction (OER). However, OER suffers from low photon-to-current efficiency and large overpotentials. Replacing OER with glycerol oxidation (GOR) reduces energy demand, lowers overpotentials, and enhances urea production efficiency, offering a valuable industrial alternative.

Thus, USC-CORE will establish a novel paradigm in PEC urea production by: i) utilizing selective and active electrocatalyst for C-N coupling reaction designed efficiently in a GDE cell, and ii) replacing water by glycerol, as electron donor, to enhance the kinetics of the anodic reaction, while providing significantly higher added-value product such glyceric acid (GA). The developed photoelectrodes will be integrated in a tandem PEC reactor, designed, modelled, fabricated, tested and validated at lab scale (area 10 cm²), targeting standalone operation at 100 mA·cm⁻² for 100 hours.

USC-CORE will go beyond the state-of-the-art by addressing the synthesis of selective and active catalytic site toward C-N coupling and long-term stability for waste to fuel conversion in aqueous solution. Indeed, USC-CORE approach will allow to “kill two birds with one stone”, beyond the urea production, the oxidation of glycerol at the photoanode will significantly decrease the energy input for cell operation, leading to chemical species with high economic and industrial interest, concomitantly reducing the overall urea production costs.

Scientific Objectives: 1.- Development of efficient and stable PEC system for selective urea production (FE, % > 90%) and for glycerol oxidation towards GA (FE, % > 70%), 2- Establish a roadmap towards up-scaling of the USC-CORE technology. Fabricate and test a lab-scale device with 10 cm² active size with unbiased operation at 100 mA·cm⁻² for 100 hours, 3- Full environmental, economic and social life cycle evaluation of USC-CORE technological.

To date, there have been scarce reports in literature about bias free urea production through C-N coupling reaction coupling to glycerol oxidation. The novelty is to incorporate the state-of-the-art atomistic understanding of the selective and efficient C-N coupling and glycerol oxidation electrocatalysts.

Impact: Traditional urea production methods (Bosch-Meiser process) consume approximately 2% of global energy use and emit ~500 million metric tons of CO₂, contributing significantly to climate change. Moreover, nitrate pollution from agricultural runoff and wastewater discharge accounts for over 245,000 tons of nitrate annually in the European Union alone. These issues highlight the urgent need for a sustainable alternative.

Resumen del Currículum Vitae:

I am currently a Marie Curie Postdoctoral Research Fellow at USC, with over eight years of postdoctoral experience following the completion of my PhD in 2016 at the Department of Energy Engineering, Sharif University of Technology. My expertise lies at the forefront of material chemistry and (photo)electrochemistry, with a strong focus on renewable fuel production. My overall scientific activity has led to 44 publications (6 as corresponding author, 13 as first author, 2 co-first author and 13 as second author), with a high proportion in Q1 and D1 (87 %) journals. 12 of these publications were achieved in the last 5 years, exclusively during my postdoctoral phase: including most prestigious journals (Nature Catalysis, Energy and Environment Science: Catalysis, Advanced Energy Materials, Chemical Engineering Journal, ACS Applied Materials, and Interfaces). Some of these published works have been highlighted in the form of 2 covers (Nature Catalysis and Advanced Energy Materials). Furthermore, I have published 42 publications during 2018-2024 with h-index 28, 1602 citations, and average citations per item 59.34 according to Scopus (ID 35775608900). In addition to my research accomplishments, I have shown strong leadership skills by co-supervising 8 Master's and 2 Bachelor's theses at different universities (e.x. Kyoto University, Japan; Ulsan National Institute of Science and Technology, Korea; Sharif University of Technology, Iran; University of Santiago de Compostela, Spain). During my career, I have given >15 oral and poster presentations in international conferences, including 1 invited lecture. To date, I have been contributing to regional, national, and European research projects (10 in total), with 4 actions funded as principal researcher. Since April 2024, I granted prestigious Marie Skłodowska-Curie Fellowship for developing a novel system zero-carbon conversion of waste to fuel. This project started at April 2024, under supervisión of Maria Gimenez Lopez in CIQUS. During this time, I have successfully developed a novel class of copper-based catalysts with exceptional selectivity and activity for the conversion of nitrate waste. In addition to this breakthrough, I have actively disseminated my findings by submitting three conference presentations and publishing a high-impact paper as both corresponding and first author in Energy & Environment Science: Catalysis. During last 8 months of starting this project, I have mentored 2 MSc students: Leo Keylmayer, Ersmus internship project, Tübingen University; and Silva Jaques João Pedro da: TFM student. Since December 2019, I hold prestigious Korean Research Fellowship from the National Research Foundation on water splitting and CO₂ valorization within Dr. Ji-Wook Jang's group. Unique heteroatom-doped inorganic nanosheets electrocatalysts have been developed with appreciable activity, tunable selectivity, and stability within this project (Nat. Catal.). I conceived and proposed this work with my supervisor Ji Wok Jang according to author contribution. During this period I started collaboration between several research groups in UNIST (Graduate School of Carbon Neutrality, UNIST) and other university in USA (Stanford University, USA). I received a two-year Fellowship from the Japan Society for the Promotion of Science (JSPS) at Kyoto University. Later, I joined the University of Ulsan as a Postdoctoral Researcher.



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Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: MORA BOZA, ANA
Referencia: RYC2024-049336-I
Correo Electrónico: amorboz@gmail.com
Título: Biomaterials-based Organoid Systems for Chronic Inflammatory Diseases

Resumen de la Memoria:

My scientific trajectory has focused on engineering biomaterials for cell and therapeutic delivery, as well as developing complex microphysiological systems (MPS) using natural and synthetic polymers. During my Ph.D., I worked on developing natural-derived polymeric matrices for regenerative medicine applications using 3D printing and microfluidics, gaining expertise in polymer processing and cell culture. After completing my Ph.D. in Materials Science and Engineering (2020, Universidad Carlos III de Madrid), I began my postdoctoral journey at Georgia Institute of Technology (Atlanta, USA). Over four years and after being awarded a GLOBAL Marie Skłodowska-Curie Postdoctoral Fellowship, I worked on engineering synthetic polymeric matrices to fabricate microgels and hydrogels for therapeutic delivery and organoid applications, respectively. This work involved culturing human induced pluripotent stem cells (iPSCs) and generating intestinal organoids, as well as performing advanced downstream analyses, including sequencing, flow cytometry, and spatial omics. Currently, I am finishing the return phase of my GLOBAL Marie Skłodowska-Curie Postdoctoral Fellowship at Cúram (University of Galway, Ireland) and leading my own independent research project funded by the University of Galway, which I gained as a Principal Investigator (Research Seed Fund Grant).

My future research will focus on engineering biomaterials-based organoid systems to study chronic inflammatory diseases, with a particular emphasis on biological variability. I aim to develop advanced intestinal organoid systems and MPS platforms that replicate the mucosal barrier microenvironment and its interactions with immune and microbiome systems. These systems will use cell-instructive hydrogels, combining synthetic and natural polymers, to mimic complex intestinal physiological conditions. Chronic inflammatory diseases, such as inflammatory bowel disease (IBD), are highly heterogeneous, influenced by sex, age, and hormonal status. Current preclinical models fail to capture this complexity. My work seeks to bridge this gap by engineering platforms that incorporate these variables, enabling personalized diagnostics and therapies. By investigating sex- and age-related differences, particularly the role of estrogen, I will explore how biological variability affects disease progression and therapeutic responses. This research is crucial for improving healthcare outcomes for women and the elderly, whose unique physiological factors are often overlooked in traditional biomedical research. To achieve these goals, I will employ cutting-edge bioengineering tools, including biomaterials, organoids, iPSCs, 3D culture systems, microfluidics, and organ-on-a-chip technologies. These next-generation in vitro models will not only advance personalized medicine but also reduce reliance on animal models, promoting ethical and sustainable research practices. By integrating biomaterials expertise, organ-on-a-chip systems, and international collaborations, my research will contribute to the advancement of personalized medicine and bioengineering, with the goal of improving healthcare for diverse populations and fostering scientific innovation. My research group will be integrated into the Departamento de Bioquímica Médica, Biología Molecular e Inmunología at the Universidad de Sevilla and CABIMER (Sevilla).

Resumen del Currículum Vitae:

I obtained my Ph.D. in Materials Science and Engineering in 2020 from Carlos III University (Madrid) and spent 4 years as a Marie Curie Postdoctoral Fellow at the Georgia Institute of Technology (Atlanta, USA). I am currently completing my GLOBAL Marie Skłodowska-Curie Postdoctoral Fellowship at CÚRAM (University of Galway, Ireland). Over the years, I have worked at 6 national and international institutions and secured competitive funding from prestigious Spanish, German, Irish, and European fellowships. My research impact has grown significantly, with a 50% increase in citations over the last year and an h-index rise from 5 to 9. To date, I count with 25 publications, including 16 as first author, comprising research articles, reviews, and book chapters.

Highlights:

- Education: Premio Extraordinario de Máster (2015), Premio Extraordinario de Doctorado (2020), and Julia Polak European Doctorate Award (2021).
- Research: 17 scientific papers (11 as first author), 1 preview article, 3 reviews, and 4 book chapters, with 75% of the work published in Open Access.
- Funding: Secured €486,252 in competitive grants, including a Postdoctoral Marie Skłodowska-Curie Fellowship and a Research Seed Grant as Principal Investigator.
- Dissemination: Presented at 5 national and 16 international conferences, invited panelist at 2 conferences, and recipient of multiple awards: Best Poster (SOCIEMAT 2017), Best Talk (SIBB 2018), and Best Talk (MPS World Summit 2024).
- Teaching and Mentoring: Taught BSc Biomedical Engineering at UC3M and Ph.D. Biomedical Engineering at Georgia Tech. Supervised 1 TFG, 1 high school student, 2 undergraduates, and 2 master's students.
- Academic Service: Chair of the 2025 Biomaterials and Tissue Engineering GRS, co-Chair of the Early Career Investigators Interest Group of iMPsS, Editorial Board member for In vitro Models journal, and Review Editor for Frontiers in Biomaterials Science.
- Honors: Postdoctoral Leadership and Innovation Fellowship (2023), Finalist for the Women Interactive Materials Award (2023), Postdoctoral Recognition Award Finalist (2021), La Residencia de Estudiantes Fellowship (2017-2019).

Career Overview

1. Early Academic Years (2014-2016): I began my research career with initiation fellowships, including Beca de Introducción a la Investigación, JAE Intro, and Beca de Colaboración.
2. Ph.D. (2016-2020): I was awarded La Caixa Foundation Fellowship to pursue my Ph.D. at ICTP-CSIC. I also secured fellowships for 2 international secondments in Germany and USA (DAAD, CIBER-BBN, DFG). My Ph.D. work resulted in 6 first-author papers, 2 co-authored book chapters, and a Spanish patent, disseminated at 11 conferences.



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3. Postdoctoral Period at Georgia Tech (2021-2024): I joined Georgia Tech for postdoctoral training under Prof. Andres J. Garcia, where I was awarded a GLOBAL Postdoctoral Marie Skłodowska-Curie Fellowship and led a research line within the "HOPE" program, funded by the Wellcome Leap Foundation. I published 8 papers (4 as first author), 1 preview article, 1 review as co-corresponding author, and 1 book chapter, presented at over 10 conferences worldwide, and filed a patent.

4. Postdoctoral period at University of Galway (2024-present): I moved to Ireland in October 2024 to finish my Postdoctoral Marie Skłodowska-Curie Fellowship and I received my first research grant as Principal Investigator.



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Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: SANGRONIZ AGUDO, LEIRE
Referencia: RYC2024-048734-I
Correo Electrónico: leire.sangroniz@ehu.eus
Título: Development of advanced sustainable atactic semicrystalline polymers

Resumen de la Memoria:

The research of Dr. Leire Sangroniz has focused on the development of sustainable and complex polymers systems with potential application in several areas including biomaterials, semiconductive polymers or upgrading recycled materials. For that she has acquired expertise in several research areas working in internationally recognized research groups. In this way she has built a multidisciplinary background which allows her to tackle the challenges of polymer science. Below her research areas are summarized.

1) Rheology of complex systems (2015-2021)

The candidate started her research career in the group of Prof. A. Santamaria and Prof. A.J. Muller studying the rheological properties of complex polymer systems. The candidate designed rheological experiments and analytical tools to establish correlations between the rheological parameters and morphology of the system. The contributions made by the candidate have been recognized internationally with several awards.

2) Melt memory effect (2017-2022). During her PhD, she started to work in a new research area that was underexplored: melt memory. When a polymer is not heated to temperatures high enough to remove the thermal history some self-nuclei can survive which act as nuclei accelerating the crystallization process. This is known as melt memory effect. The candidate used a novel approach to understand the nature of self-nuclei. After the PhD she has been developing this research area to unravel unanswered questions in the topic including the role of chemical structure.

3) Crystallization of polymers from an industrial point of view (2023-2024). Inspired by her interest to transfer the knowledge acquired in academia to industry, she moved as a postdoctoral fellow to the University of Genova (Italy) to work in polymer physics in collaboration with two leading polymer companies: Borealis and BASF. Considering that the performance of the final product depends on the crystallinity properties she has been unravelling the factors that affect the structure of polyolefin blends with Borealis. In addition, she has worked on the processing parameters that affect the crystalline phases and physical properties of polyurethanes with BASF.

4) Sustainable materials (2021-present). Considering the impact of plastic waste on the environment she started working on the development of sustainable polymers. For that she moved to the University of Minnesota to join the NSF Center for Sustainable Polymers. There she has developed monomers from renewable feedstock and has designed green chemistry routes to obtain sustainable polymers acquiring new tools, skills and knowledge. The research performed in this area has allowed the candidate to get financial support through the Diputación Foral de Gipuzkoa.

5) High performance atactic polymers (2024-present). In 2024 she returned to POLYMAT and based on her previous knowledge on sustainable materials she has got the Emakiker financial support as PI of a project. Hence, she has become a junior group leader. The research of the candidate is focused on understanding the reasons that allow to crystallize some atactic polymers to design high performance atactic sustainable materials able to replace the petroleum based materials currently used in the market.

Resumen del Currículum Vitae:

The candidate obtained her BSc in Chemistry (2014) and MSc in Chemistry and Polymers (2015) at the University of the Basque Country. She received the award to the best student in the MSc. She was awarded a FPU grant to carry out her PhD (Supervisors: A. Santamaria and A. J. Müller) at the University of the Basque Country and POLYMAT. The PhD allowed her to acquire the skills, tools and knowledge in polymer physics. Her PhD was focused on advanced rheology of complex systems. During that time she did an internship at Eindhoven TU (The Netherlands) to gain insight in the effect of real processing conditions on the final performance of polymers under the supervision of Prof. G. Peters. During her thesis she published 12 papers from her thesis, 10 as first author, including one from her internship in Eindhoven.

After presenting her PhD in 2019, she was awarded a postdoctoral fellowship in 1st position from the Basque Government to spend 2 years at the University of Minnesota. Driven by her interest to address the current challenges of the society she decided to acquire skills in the development of sustainable polymers. She joined the group of Prof. Marc A. Hillmyer which is a leading group in sustainable materials and she became part of the Center for Sustainable Materials. This postdoc allowed her to learn the techniques and tools to develop sustainable materials. It gave her the opportunity to expand her network and discuss her research with scientist from several universities and industrial companies that are part of CSP. She has published 4 papers, 3 as 1st author and corresponding author.

Then she moved to the University of Genoa (Italy) in January 2023 with Margarita Salas fellowship (ranking 2/98 candidates) to deepen on the control of the physical parameters involved in the crystalline properties of polymers. She worked closely with industry with a leading company in polymers (Borealis and BASF). She has published one work and one more is submitted.



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In 2024 she returned to POLYMAT as a junior group leader to develop her own research line and is in charge of supervising 2 PhD students and 1 master student. During this period she has obtained two projects as PI.

During her career she has obtained 8 individual competitive grants (>275000 €) which reflects the ability to secure financial support. In the last years she has gained 2 projects as Principal Investigator (PI) obtaining > 400000 € which proves her leadership. Her research has been recognized with several awards, including the international best PhD thesis in rheology given by the Spanish and Portuguese Rheology Societies. Overall, those awards reflect the outstanding research carried out in polymer physics.

She has published 33 papers in peer reviewed journals, as 1st author in 22 (66% of all publications). As senior researcher she has published 8 papers as corresponding author. This reflects the independence and leadership of the candidate. She has an H-Index of 17 and 1085 citations, including a high impact publication (IF 31.1). She has contributed with 12 orals and 18 posters in conferences. She has also been involved in outreach activities in order to promote the scientific career among young people and raise awareness in society.



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Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: SZYDLOWSKA, BEATA
Referencia: RYC2024-050718-I
Correo Electrónico: beata.m.szydlowska@gmail.com
Título: Printable 2D materials for bio- and environmental sensors.

Resumen de la Memoria:

Dr. Beata M. Szydlowska has forged a distinguished career at the intersection of nanomaterials, photonics, and biomedicine, with a focus on liquid-phase exfoliation (LPE) techniques and their applications in sensors, optoelectronics, and nanomedicine. Her research began during her Ph.D. at Trinity College Dublin, where she became a leading expert in LPE, contributing to a breakthrough publication on producing monolayer-enriched dispersions of liquid-exfoliated nanosheets. This publication, which has garnered 503 citations, was pivotal in advancing 2D materials research, particularly in controlling nanosheet size distribution.

Dr. Szydlowska's work expanded into nonlinear optics, where she led a study on the size-dependent optical properties of black phosphorus nanosheets, published in ACS Photonics. This research bridged fundamental science with industrial applications, supported by the ISLA project, and contributed to major publications in Nature Communications, ACS Nano, and 2D Materials. These efforts included mastering advanced characterization techniques such as Raman, PL, UV-Vis, and nonlinear optical spectroscopy. Her research then transitioned to applied science, where she focused on composite materials for optical and sensing applications. Notably, her work on WS₂-PMMA composite films marked a significant achievement in transitioning LPE-exfoliated materials from liquid to solid-state for optical devices. In 2020, she developed high-performance PtSe₂-based gas sensors using Langmuir-Blodgett deposition, laying the foundation for her 2022 Benjamin Walter Fellowship. This fellowship supported her research on Langmuir-Blodgett viral sensors for early disease detection, such as COVID-19.

Dr. Szydlowska's expertise in printable technologies for sensors led to her pioneering work on screen-printed electrochemical sensors for detecting viral variants, published in ACS Applied Materials and Interfaces. This research met CDC standards for sensitivity and selectivity, while offering scalable, low-cost manufacturing for public health applications. She also developed printable inks for 2D materials, enabling the creation of flexible, high-performance devices, as demonstrated in Small and 2D Materials. In 2023, Dr. Szydlowska was invited to contribute a comprehensive review on printable sensor technologies in Current Opinion in Solid State and Materials Science, further establishing her leadership in this emerging field.

Her recent research on biodegradable, radiopaque vascular scaffolds made from MoS₂ nanosheets, published in ACS Applied Materials and Interfaces, highlights her contributions to nanomedicine. This work, supported by an NIH grant and a patent filing, bridges nanomaterials with regenerative medicine. Dr. Szydlowska's innovations, including a biodegradable nanocomposite ink for 3D printing medical scaffolds, represent the cutting edge of her research trajectory, aimed at improving medical implant safety and efficacy, and advancing healthcare applications.

Resumen del Currículum Vitae:

Currently, I am a Marie Skłodowska IDEAL Curie Research Fellow at IMDEA Nanociencia. Receiving this prestigious and competitive fellowship in 2024 was an important moment in my career, allowing me to transition from Northwestern University in the USA to IMDEA Nanoscience in Spain, where I aim to establish myself as an independent researcher. At IMDEA, my research bridges the realms of 2D materials and Spin Crossover Metal-Organic Frameworks (MOF-SCO) at the nanoscale, focusing on their applications in printable nanoelectronics, such as environmental and biosensors.

As a young, well-rounded, and globally educated scientist, I am passionate about translating scientific discoveries into societal benefits and solving real-world problems. My scientific journey matured in 2013, when I started my Ph.D. at Trinity College Dublin (awarded in 2018), where I delved into the fascinating world of 2D materials, exploring their layer-dependent properties. This area has remained the cornerstone of my research, and I am committed to advancing it further in my independent research career.

My contributions to the field have been recognized through 35 publications in high-impact journals like Nature Communications, Advanced Materials, ACS Nano, and ACS Applied Materials and Interfaces, gathering over 1,800 citations (average 51 citations per paper) and a cumulative h-index of 17 and i10 index of 23. These include 29% of leading author publication (first, shared first or corresponding author). My innovative ideas have earned multiple fellowships, including the Trinity College Dublin Scholarship (2014), the Benjamin Walter Fellowship (2021, German Research Foundation (DFG), Germany/USA), and the Marie Skłodowska Curie IDEAL Fellowship (2024, EU commission/Spain). My profile was also highlighted by the 1Million STEM foundation and the Northwestern Postdoctoral Association (NUPA), reflecting my impact on the scientific community.

Furthermore, my work has been recognized with numerous awards for presentations and posters from institutions such as the University of Belfast, the Optical Society of America, and the European Commission. On top of that, I have been chosen by IOP as a European delegate to Mexico at the International Year of Light and Irish delegate to INC12 (International premier conference connecting industry and science) in Leuven, Belgium (sponsored by EU commission). I have also received the Intel Ireland Award for academic excellence, highlighting my commitment to pushing the boundaries of scientific knowledge.



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Turno General

Área Temática: Ciencias y tecnologías de materiales
Nombre: MENDIETA MORENO, JESÚS IGNACIO
Referencia: RYC2024-050010-I
Correo Electrónico: jmendi85@gmail.com
Título: Simulation of molecular processes in realistic conditions

Resumen de la Memoria:

My research focuses on simulating molecular systems under realistic conditions to understand nanoscale physics in biomolecular processes, novel materials, and experimental data interpretation. I aim to uncover how temperature and environmental factors influence the mechanical and electronic properties of molecules. This work is organized into three main areas: developing DFT and QM/MM computational tools, simulating biomolecular systems, and studying the behavior of molecules on surfaces.

Development of DFT and QM/MM codes:

I have worked on the Fireball/Amber QM/MM methodology, enhanced Fireball DFT, and created computational bases for simulating organic molecules. I also integrated Fireball with i-PI software to enable Path Integral Molecular Dynamics (PIMD). My future work will expand on these efforts, focusing on two main goals. First, I plan to integrate the QM/MM code developed during my PhD with i-PI to simulate complex systems and study nuclear quantum effects, such as zero-point energy and tunneling, in biological and material contexts. Second, I will develop a QM/MM interface to model the interaction of organic molecules with metal surfaces. This tool will simulate surface-induced effects like charge transfer and molecular level broadening, essential for understanding on-surface catalysis and quantum criticality. All developed tools will be freely accessible via GitHub.

Simulation of biomolecular systems:

My PhD research was centered on studying enzymatic reactions using QM/MM MD at physiological temperatures. This work elucidated reaction mechanisms at the atomic level, providing insights into diseases and aiding drug development. I also investigated the interactions of biomolecules, such as peptides, proteins, and DNA, with surfaces to support biosensor and material design. Moving forward, I aim to study bio-inspired materials in collaboration with experimental groups. By combining QM/MM with i-PI simulations, I will analyze proton transfer in confined systems, contributing to the development of advanced bio-inspired materials.

Study of molecules on surfaces:

I initiated a research line during my postdoctoral work with Prof. Jelinek, applying QM/MM methods to on-surface science. This research revealed the importance of temperature, surface strain, and adatoms in molecular reactivity. Key contributions include demonstrating how adatoms act as catalysts and exploring proton tunneling in molecular chains. Currently, I am also working in the study of photoinduced reactions that synthesize 2D and 1D structures on semiconductors. This green approach uses sunlight instead of thermal methods, promoting sustainable synthesis. Future work will involve creating a computational toolbox for on-surface chemistry, integrating Python-based AI with Fireball DFT to predict and control molecular self-assembly.

Resumen del Currículum Vitae:

I graduated in Physics from the Autonomous University of Madrid in 2010 and achieved a Master in Biophysics in 2011. I obtained my PhD from Autonomous University of Madrid with scientific research in the development of a Quantum Mechanics / Molecular Mechanics interface to simulated reactions in biomolecules and the application in biomolecular systems. The research of my scientific career has been focused on the use of Molecular Dynamics to understand the physical properties of molecules in different environments, from proteins in water to metal surfaces in vacuum. And using various software and approximations to understand molecular behaviours considering the temperature effects with free energy techniques. I'm also involved in the development and promotion of Fireball Density Functional Theory code and its use as open-source software in the GitHub platform (<https://github.com/fireball-QMD>). I'm one of the main developers and recently I have become part of the Fireball committee to organize the developments and make decisions of in which direction we want the code to evolve.

During the PhD I focused on the research of biomolecules and the different catalytic reactions inside a cell, with special emphasis in the effect of temperature and environment in the catalysis. Afterward, I moved to a postdoc position at the Institute of Physics of the Czech Academy of Science in Pavel Jelinek's group, where my research has extended to surface science, where the QM/MM interface developed during my PhD has also proven to be a fruitful tool to simulate chemical reactions in metal surfaces. This research is done in close collaboration with experimentalists to understand the effects of temperature and the environment on surface reactions. Another molecule-surface interaction that I have been studying in collaboration with Prof. Karl-Heinz Ernst's group (Empa lab, Zurich, Switzerland) is chiral self-assembly on metal surface. Also, during the last years, I have been interested in the effect of quantum nuclear movement and the use of Path Integral Molecular Dynamics technique to simulate effects such as zero-point energy and quantum tunnelling in molecules.

In January 2022, I returned to UAM as a researcher with a Maria Zambrano grant for attracting international talents, aiming to develop my independent research line, in Prof. José Ortega's group where I was working on bio-inspired materials, and I continued working in on-surface catalysis. In 2022 I was also awarded a 2 year Marie Skłodowska-Curie Action Postdoctoral Fellowship (MSCA PF) at Instituto de Ciencia de Materiales de Madrid (ICMM) from CSIC to join ESISNA group (Interdisciplinary studies based on nanoscopic system). I started the MSCA in September 2023 to perform a computational study of on-surface catalysis induced by light where I'm working in close collaboration with the experimental people.



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The main output of my research activity has been published in scientific articles. I have participated in 38 scientific articles that have been cited 827 times (data from Google scholar at 31/12 2024). In these articles, I have been 7 times the first author, 17 times the first theoretical author, and 1 time the corresponding author. I have participated in 22 international conferences and workshops with contributed talks in 12 of them. And participated in 6 projects, 4 of them international.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: AGUIRRE GUTIERREZ, JESUS
Referencia: RYC2024-049630-I
Correo Electrónico: jeaggu@gmail.com
Título: Understanding the resilience of tropical forests to climate change

Resumen de la Memoria:

I have made significant contributions to understanding how tropical forests adapt to climate change. His research combines field data, ecological theory, and advanced remote sensing techniques to map biodiversity and assess ecosystem functions. Key studies include:

- Analysis of the functional shifts in tropical forests, showing that their adaptations to climate change are insufficient, with functional changes reaching only 10% of the required levels for equilibrium.
- Development of innovative methods to map plant traits using remote sensing data, enabling the assessment of forest ecosystem services beyond carbon storage.

- Highlighting the ecological roles of tropical forests, advocating for broader conservation approaches that consider biodiversity and ecosystem functions rather than focusing solely on carbon sequestration.

- Investigation of drought impacts on tropical forests, revealing how long-term droughts drive taxonomic and functional homogeneity, reducing resilience in drier forests.

- Exploration of ecological vulnerabilities, such as bat-plant pollination interactions, demonstrating the cascading effects of biodiversity loss on critical ecosystem services.

My work is highly regarded, with publications in prestigious journals like Science, Nature, and Nature Communications. Many of my studies have received significant citations and widespread media coverage, contributing to global awareness of tropical forest dynamics under climate change.

Leadership and Independence:

I have established himself as a leader in ecological research. His trajectory includes:

- Prestigious fellowships such as the NWO-Rubicon Fellowship and the NERC Independent Research Fellowship, which allowed him to establish the Biodiversity and Ecological Remote Sensing Lab at the University of Oxford.

- Leadership roles in international networks like MONAFOR, ForestPlots, and the Global Forest Biodiversity Initiative, fostering collaborations across the Americas, Europe, Africa, and Asia.

- Mentorship of students and researchers from diverse backgrounds, with numerous mentees publishing peer-reviewed studies and receiving prestigious awards.

- Active roles in academic publishing, serving as an editor and reviewer for leading ecological journals.

I have also promoted open science, ensuring most of his 56 peer-reviewed publications are freely accessible.

Proposed Research:

The proposed research focuses on understanding the resilience of tropical forests to climate change by studying both above-ground (functional traits of trees) and below-ground (soil microbiota) factors. It seeks to answer key questions:

- How do tropical forests across different continents respond to extreme droughts, and what functional changes occur in their composition?
- Can forest resilience be mapped at a large scale using remote sensing techniques combined with data on soil microbiota and functional diversity?
- How do shifts in functional traits over time reflect forests' adaptation capacity, and do these shifts keep pace with climate change?

This research aims to fill critical gaps in understanding the mechanisms behind tropical forest resilience. By leveraging permanent vegetation plots across countries in the tropical Americas, Africa, and Asia, the study will analyse how forests respond to climatic extremes like El Niño.

Resumen del Currículum Vitae:

I am Jesús Aguirre Gutiérrez, a Titular Associate Professor and NERC Independent Research Fellow at the University of Oxford, where I lead the Biodiversity and Ecological Remote Sensing group. My research focuses on tropical forests, remote sensing, climate change, biodiversity, and functional diversity. Over the years, I have cultivated a multidisciplinary approach that integrates ecological theory, advanced remote sensing, and field-based data to address global challenges in biodiversity and ecosystem resilience.

Academic and Professional Journey:

I hold a PhD and MSc in tropical ecology from the University of Amsterdam, where I gained expertise in functional ecology, biodiversity, and ecological modeling. My academic career began with a Licentiate degree in Biology from the University of Guadalajara, Mexico. After completing my education, I held various prestigious positions, including:

- NERC Independent Research Fellow (2021-2026), allowing me to lead independent research projects at Oxford.
- Junior Research Fellow at Somerville College, Oxford (2021-2023).
- NWO-Rubicon Fellow (2017-2019), which supported my research on tropical forests' responses to climate change.
- Researcher and Co-Investigator roles at Oxford, enhancing my expertise in ecological remote sensing and large-scale biodiversity studies.

Recognitions and Mentorship:

I have been honored with awards like the Award of Excellence from Oxford's Social Sciences Division and recognition as a member of Mexico's National System of Researchers (SNI Level 1). Throughout my career, I have supervised students and researchers at various levels, fostering diversity and equality in my team. My mentorship has resulted in numerous publications by my students in peer-reviewed journals, prestigious awards like the Alfred Russel Wallace Best Dissertation Prize, and the success of researchers in global collaborations.

Leadership and Collaborations:



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I actively contribute to international research networks, such as MONAFOR, ForestPlots, and the Global Forest Biodiversity Initiative. These collaborations span Europe, the Americas, Africa, and Asia, enabling large-scale analyses of ecosystem dynamics. I am also the creator of the BioEO network, linking biodiversity data across multiple levels (pollinators, soil microbiota, trees, and remote sensing). As an editor and reviewer for top journals like Nature and Science, I advocate for open science and accessible research outputs.

Research Contributions:

My work has led to groundbreaking insights into tropical forest resilience, functional diversity, and ecosystem functioning. Notable achievements include:

- ② Mapping canopy functional traits using Sentinel-2 data, providing tools for global biodiversity monitoring.
- ② Identifying the vulnerability of tropical forests to climate change and extreme droughts, emphasizing the need for functional diversity in ecosystem resilience.
- ② Exploring broader ecological services of tropical forests beyond carbon storage, contributing to a nuanced understanding of their value.

Ongoing Projects:

Currently, my research addresses pressing ecological questions through initiatives like the NERC Independent Fellowship and collaborations with organizations like the FAO and Natural State. These projects integrate LiDAR and remote sensing technologies to analyze forest structure, biomass, and ecosystem functions across tropical and savanna landscapes.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: VAN WITTENBERGHE, SHARI
Referencia: RYC2024-050845-I
Correo Electrónico: Shari.Wittenberghe@uv.es
Título: Distinguished researcher in Imaging spectroscopy of photosynthesis
Resumen de la Memoria:

After receiving my Bioscience Engineering Master's degree at Ghent University (Belgium, 2009) I obtained my Bioscience Engineering PhD title at the University of Antwerp (Belgium, 2014) in the framework of the Earth Observation Research Programme "STEREO", funded by the Belgian Science Policy Office (BELSPO). During my PhD I collaborated with the Laboratory for Earth Observation (LEO) of the Universitat de València, using field spectroscopy and solar-induced fluorescence techniques to monitor the impact of air pollution.

After finishing my PhD, I worked one year for the Flemish Environment Agency (Flemish Government, Belgium) as researcher in the Department of Air Pollution. I moved to Spain in 2016 funded by a Horizon 2020 Marie Skłodowska Curie Actions "Individual Fellowship (European Commission) to continue my research at the Laboratory for Earth Observation. At LEO, I continued my specialization obtained during my PhD in the fields of remote sensing of vegetation and plant physiology. My main focus points since then have been on the early stress through proximal and remote spectroscopy techniques, exploring the monitoring of photosynthesis dynamics in support of the preparation of the European Space Agency (ESA)'s Fluorescence Explorer (FLEX) satellite mission, the first space mission dedicated to the study of terrestrial photosynthesis. Hereby I focussed on the physically-based signal processing using spectroradiometric set-ups both in the laboratory and the field.

In 2018 I obtained the APOSTD scholarship (Generalitat Valenciana), to go to the Optics of Photosynthesis Laboratory at the University of Helsinki (Finland). Meanwhile I continued working in projects together with industry partners in earth observation related to the future ESA's FLEX satellite mission, including as work package leader to develop algorithms for novel biophysical products retrieved from VIS-NIR imaging spectroscopy.

For the design of the new spectroscopy instrumentation I worked closely with companies such as Photon System Instruments (Brno, Czech Republic), a high-tech manufacturer of sophisticated, high-end instrumentation for research in the biological sciences. As the result of large infrastructure grant we installed an automated multisensory plant screening transect system at LEO, customized to the group's needs for combining imaging spectroscopy, thermal and pulse-amplitude-modulated fluorescence imaging.

In 2022 I obtained the ERC Starting Grant (Horizon Europe, European Commission) becoming a distinguished researcher at the Universitat de València and starting my own group with as central research line the remote detection and monitoring of photosynthesis-related parameters such as the controlled heat dissipation of vegetation. I have supervised 4 PhD theses (completed in 2022, 2021, 2023 and 2023) and I am currently supervising 3 PhD and 2 postdocs in this research line.

Resumen del Currículum Vitae:

Currently I am a distinguished researcher at the Universitat de València, member of Laboratory of Earth Observation and affiliated to the Department of Earth Physics and Thermodynamics.

I have published 50 A1 journal publications since 2011, including 10 first author publications, in the fields of earth science, remote sensing, plant physiology, and environmental sciences. My h-index in 21 in Scopus (1,534 citations) and 23 in Google Scholar (1,938 citations).

Since 2022 I run the PHOTOFUX research group (3 PhD and 2 postdocs) in the framework of the ERC Starting Grant, with focus on the interface of plant physiology and remote sensing. I have supervised 4 PhD theses (completed in 2022, 2021, 2023 and 2023) and I have been part of several international PhD evaluation committees.

I have been PI of several European projects (H2020, Horizon Europe), co-PI of a Spanish national project, and part of the scientific team of several projects obtained through national and international R+D+I programmes.

My research related to the scientific preparation activities for European Space Agency (ESA)'s Fluorescence Explorer (FLEX) satellite mission also led to the knowledge transfer to industry, collaborating with industrial partners for imaging and IT technology (i.e., Magellium Artal Group, France). As WP leader of the Level-2 C mission products I developed a spectral retrieval algorithm for the L2C products related to photosynthesis dynamics, applicable to the FLORIS imaging sensor on board FLEX.

Internationally I have collaborated with several scientific partners, including the University of Helsinki (one-year research stay in 2019-2020), the Finnish Meteorological Institute (Finland), the Global Change Research Institute of the Czech Academy of Sciences (Czech Republic), the University of California, Davis (USA), Max Planck Institute (Germany) and the Forschungszentrum Jülich (Germany).

Over the past 10 years I have also been actively involved in European collaboration networks through 3 COST Actions (ES1309 OPTIMISE, CA17134 SENSECO, CA22136 PANGEOS), in which I collaborated with scientists from more than 22 countries, participating in workshops, summer schools, and joint publications.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: MARCH MORLA, DAVID
Referencia: RYC2024-050674-I
Correo Electrónico: david.march@uv.es
Título: Integrating advanced technologies for sustainable marine ecosystem management
Resumen de la Memoria:

With over 18 years of experience in marine research and ecology, my research career has evolved in prestigious institutions recognized for their excellence in marine research and ecology. To date, I have worked at 10 institutions across four countries, gaining extensive experience in multi-cultural and interdisciplinary environments. This includes 37 months of research stays at world-leading international research centers, which have significantly enriched my scientific perspective and collaborations. Over my career, I have contributed to 24 R&D projects (11 internationally funded) and six contracts (two international), demonstrating my active engagement in impactful research initiatives at both national and international levels.

My research focuses on integrated approaches to address animal-human interactions, with a major interest in spatial ecology, movement analysis and marine spatial planning. Throughout my career, I have developed a deep expertise in ocean observing systems and new marine technologies for monitoring marine ecosystems.

My current research advances marine biodiversity observation systems and operational ecology to support adaptive marine resource management. By integrating robotics, artificial intelligence, computational ecology, and operational oceanography, I have developed cutting-edge methodologies to monitor marine biodiversity and assess human-induced pressures. Focused on the Mediterranean and Atlantic, my work addresses critical challenges such as marine megafauna bycatch and dynamic conservation strategies for vulnerable species. Supported by ongoing funding from projects like REDUCE and LIFE-OASIS, I have built a strong multidisciplinary team and established a solid foundation to tackle pressing marine conservation issues.

Resumen del Currículum Vitae:

Education and training I hold an MSc in Geographic Information Systems (University of Girona, 2008) and a PhD in marine ecology (2014) from the Mediterranean Institute for Advanced Studies (UIB-CSIC), funded by the FPI programme of the Spanish Government. I conducted several postdoctoral positions in top ranked research institutions funded by highly competitive programmes, including the Juan de la Cierva-Formación Fellowship (ICTS SOCIB, Spain, 2016-2018) and the prestigious Marie Skłodowska-Curie Individual Fellowship (University of Exeter, UK, 2019-2020). I worked as a Postdoctoral Researcher at the University of Barcelona (2021) before joining the University of Valencia in 2022 as a Distinguished Researcher, supported by the CIDEAGENT 2021 Excellence Program. I hold the I3 Certificate as an established researcher and created my own independent team at University of Valencia, the Spatial Marine Lab.

Research experience I have demonstrated leadership as Principal Investigator in 8 research projects, 2 contracts and 6 oceanographic campaigns, securing >2.5M in research funding over the past decade, including highly competitive calls such as Horizon Europe, LIFE, and Marie Skłodowska-Curie grants. I have participated in 24 R&D projects (11 internationally funded), provided scientific advice for 3 EU-funded projects, and reviewed articles for >15 journals (e.g., Nature Communications).

Scientific production I have published 50 peer-reviewed articles (14 as first/last author) and 5 book chapters, with >75% of publications independent of my PhD supervisor. My h-index is 25 (Google Scholar) with 1,986 citations, and I have published in leading journals (e.g., Nature Communications, Global Change Biology, Conservation Biology). I have presented at >70 conferences (10 invited talks) and received two best poster awards. I actively support Open Science and FAIR data principles by publishing in Open Access and sharing code/datasets in public repositories (e.g., GitHub).

Mentorship I have a growing track record of supervising >30 early career researchers from undergraduate to postdoc levels moving on to further employment in academia, conservation and consultancy. I supported them to attain competitive research grants (e.g., Save Our Seas), present their work in international conferences (including a best poster award) and publish in peer-reviewed publications. I have directly supervised 3 Postdocs, 1 Technician, 8 PhD (2 completed, 6 ongoing), 19 MSc, and 5 BSc students.

Teaching - Since 2021, I have taught official university courses at the University of Barcelona and the University of Valencia (316 hours certified, with an average student satisfaction of 4.6/5). My teaching includes undergraduate programs in Marine Sciences, Biology, and Biochemistry and Biomedical Sciences, as well as Master's programs in Biodiversity, delivered in Spanish, Catalan, and English.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: BADIA MORAGAS, ALBA
Referencia: RYC2024-050222-I
Correo Electrónico: alba.badia.moragas@gmail.com
Título: The role of biogenic emissions on air quality under a changing climate

Resumen de la Memoria:

I have been advancing research in the field of atmospheric chemistry modelling for more than 15 years, contributing to the development and evaluation of several chemical transport models from climate to urban scales. During my career, I have worked at different institutions: the Barcelona Supercomputing Center (BSC), the University of East Anglia, the Consejo Superior de Investigaciones Científicas (CSIC) and the Institut de Ciència i Tecnologia Ambientals (ICTA-UAB). My work has focused on advancing scientific understanding in three key areas:

- 1) Developing and evaluating the gas-phase chemistry module for a new air quality model
- 2) Investigating the role of marine emissions on air quality and climate.
- 3) Improving urban simulations to inform environmental urban planning.

During my scientific career at these institutions, I have contributed to the development of code for three atmospheric models (MONARCH, WRF-Chem, and CAM-Chem), which are freely available to the atmospheric science community.

Air pollution remains one of the most significant environmental health risks worldwide. Ozone concentrations tend to decline in over-polluted areas because ozone precursors (mainly anthropogenic NO_x) are declining. Thus, the air quality is reducing the sensitivity to anthropogenic emissions and is becoming more sensitive to biogenic emissions. Therefore, we can expect that the biosphere will play a dominant role in the regulation of pollution, about which there are only a few studies. After my experience with atmospheric models and biogenic emissions estimates, I became aware that there are large uncertainties and simplifications to model these surface natural processes. For instance, the eco-physiological responses to environmental factors such as the pollution stress in biogenic emissions processes are not included in the models. In addition, the role of vegetation and agriculture on the urban/rural environments is further complicated when we account for the various species-dependent emission of bVOCs, and the fact that these rates are affected by the pollutant concentration, temperature, boundary layer height and surface properties such as temperature and humidity. Therefore, contributions of the biosphere towards improving air quality are still too uncertain and not well characterised. My main objectives are to understand biogenic VOCs emissions by identifying the main sources of uncertainty in the current understanding of these chemical processes, analyse their temporal variations and speciation, study the distribution of biogenic emissions from regional to climate scales and understand the impact of future biogenic emissions on ozone and secondary organic aerosol sensitivity, atmospheric oxidation capacity using atmospheric models.

The research I am planning will allow me to expand on my current experience with land-atmosphere interactions by improving the representation of these chemical processes from global to regional-scale modeling.

This research is designed to address a significant gap in the tools available to policymakers who need to assess the role of the biosphere in regulating pollutants in a changing climate. As global temperatures rise, understanding the complex interactions between vegetation, soil, and atmospheric chemistry is essential to develop effective climate and environmental policies.

Resumen del Currículum Vitae:

I am a mathematician with over 15 years of experience in atmospheric science, working at various institutions in Spain and abroad, which has helped me build an extensive scientific network. My research quality and independence have recently been recognized with the R3 certification (established researcher) by the Agencia Estatal de Investigación (AEI). Recently, I joined the Earth Science Department at the BSC to study the role of the biogenic emissions on air pollution. I obtained my bachelor's degree in mathematics from the UAB (2008) and a MSc in Applied Mathematical Sciences from the Heriot-Watt University Edinburgh (2009). I hold a PhD in Environmental Engineering from the BSC-UPC and I had the opportunity to visit the Danish Meteorological Institute for the period of 3 months; during my PhD, I wrote a dissertation entitled Implementation, Development and Evaluation of the Gas-phase Chemistry within the Global/Regional NMMB/BSC Chemical Transport Model (now MONARCH) (2009-2014). My PhD studies were funded by the FPI-UPC grant. Before my current research position, I worked as a postdoctoral fellow at the UEA (in the UK) for 3 years in collaboration with the University of Colorado (in the US), that I visited for a period of 2 months, the CSIC for 2 years and, the ICTA-UAB for 5 years. I have published 27 peer-reviewed papers (10 as first or second author), all in Q1-ranking journals in atmospheric modelling. My research has an H-index of 16 with 818 citations (Scopus) and 994 (Google Scholar) and has been published in top journals like Nature Climate Change, Nature Partner Journal (npj) Urban Sustainability, Environmental Science & Technology, Science of The Total Environment, and National Science Review. I have also presented more than 40 contributions at international conferences and disseminate results at radio programs and other media.

Key milestones in my career: 1) develop model code for MONARCH (Badia et al., 2017), CAM-chem (Badia et al., 2021) and WRF-Chem air quality models (Badia et al., 2019, 2021 and 2023), 2) lead the participation of my previous research groups in several atmospheric modeling exercises (COST Action - in the context of AQMEII-II, the World Meteorological Organization (WMO) and the International Global Atmospheric Chemistry (IGAC)), 3) be the principal investigator (PI) of the European project Blue, Green: Adapting Schools to Climate Change (UIA03-264-GBG_AS2C, €230,000) focused on promoting the implementation of improvements for air quality and thermal regulation in schools, and lead the atmospheric modelling in a national Project with a postdoc and a PhD under my supervision: Towards a net-zero climate-resilient Ebre Delta (2023CLIMA00043, 330,750 € total), 4) lead the atmospheric modelling group in the ERC Consolidator URBAG at ICTA-UAB for 5 years (3 PhD students, 2 technicians and 2 postdocs), that include successfully secure the computational resources from Red Española de Supercomputación, and fundings for the PhD students (FPU and FI fellowships) and two postdocs.

To date, I have supervised 2 postdocs, 4 PhD students (2 ongoing) and 3 MSc final project, together with different institutions and universities: UEA (UK), the Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT) and the ICTA-UAB. I was affiliate professor at the Department of Mathematics at UAB between 2022-2024.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales

Nombre: NOORI, MD TABISH

Referencia: RYC2024-049008-I

Correo Electrónico: tnoori@ic.ac.uk

Título: Environmental Engineering

Resumen de la Memoria:

Research summary: PI's research is dedicated to advancing environmental biotechnology, focusing on bioremediation and renewable energy production from waste streams. With 66 publications in high-impact journals, 12 conferences, 9 book chapters, and an edited book, his work has gathered 2,858 citations and 36 h-index. His research has demonstrated translational impact, generating new knowledge in microbial electrochemical processes, addressing bottlenecks in microbial waste bioremediation and CO₂ mitigation, and transferring bioremediation technologies to industries. For example, his work on microbial fuel cells (MFCs) with low-cost catalysts has enhanced wastewater-to-energy technologies' economic viability and scalability, successfully leading to technology transfer for wastewater treatment and energy generation in rural India. His contributions to microbial electrosynthesis (MES) have integrated advanced catalysts, e.g., metal-organic frameworks (MOFs) and biohybrid electrodes, enabling efficient CO₂ reduction into high-value volatile fatty acids.

Additionally, PI has resolved challenges such as ammonia inhibition while achieving high energy generation in anaerobic digestion (AD) systems. This technology is transitioning to pilot-scale testing and potential commercialisation through SK Power, Korea. Furthermore, his current research focuses on an innovative landfill leachate treatment strategy, incorporating photosynthetic microbes and biodegradable plastic production. This approach not only addresses the challenges with leachate treatment but also contributes to the production of sustainable dyes and biodegradable plastics, creating economic opportunities.

Proposed research line: The research line, "Microbial Electrochemical Biogas Upgradation for High Circularity and Net Zero," focuses on integrating MES with AD to upgrade biogas by transforming CO₂ into CH₄ using electroactive microbes. This research integrates interdisciplinary fields, environmental biotechnology, chemical engineering, microbiology, and bioelectrochemistry, to address fundamental challenges such as microbial activity, system design, and process optimisation in MES-AD systems. The goal is to enhance CH₄ content (>90%) in biogas while reducing CO₂ emissions. The objectives and the impact of this research are as follows:

- ☐ Optimize Electrode Design and Materials for Enhanced Performance.
- ☐ Engineer Robust Microbial Consortia for Efficient CO₂ Conversion.
- ☐ Develop and implement innovative strategies to mitigate electrode biofouling and enhance material durability.
- ☐ Design and develop novel reactor configurations.
- ☐ Scale-Up and Pilot Testing of MES-AD Systems.

Impact: The MES-AD technology will reduce biogas upgrading costs by >70% compared to traditional technology and, thus, will save ~7.5 GWh annually in Spain and achieve 100% CO₂ emissions reduction from biogas plants, aligning with the EU's Net Zero targets. Disseminating findings through high-impact publications and training early-career researchers will expand Spain's scientific knowledge base and research capacity. Furthermore, establishing the spinoff "BioCircuit" will drive commercialisation, create jobs, and position Spain as a global leader in renewable energy innovations. This research bridges science, industry, and policy, delivering scalable solutions for critical environmental and energy challenge.

Resumen del Currículum Vitae:

Md Tabish Noori (the PI), a distinguished researcher in environmental biotechnology with extensive international mobility across the US, Europe, and Asia, over a decade of experience and an impressive publication record, placing him among the top 2% of scientists globally. The PI earned his PhD in Environmental Engineering from IIT Kharagpur, India, where he developed microbial fuel cell (MFC) technology for wastewater treatment and energy recovery. His international mobility includes working in India, the UK, Spain, and Korea, with funding >€800,000, including two Marie Curie fellowships and a research professor position.

The PI's research addresses critical societal challenges, e.g., wastewater treatment, and energy generation through novel environmental biotechnology approaches. For instance, his MFC technology improved sustainability in remote Indian communities through technology transfer via the National Thermal Power Cooperation of India. His hybrid dark fermentation anaerobic digestion system achieved >90% energy recovery in terms of biohydrogen and methane, which is nearing industrial patenting and potential commercialisation through SK Power, Korea. While his current focus on photosynthetic microbes aims to deliver low-cost landfill leachate treatment and sustainable dye production, catering to the €22 billion global market for dyes in cosmetics, creating jobs and fostering environmental impact. Besides research, the PI also actively participates in research dissemination through open access publications and conferences and is engaged in outreach activities including events like Researcher's Night and EU Green Deal, fostering collaboration with policymakers and industries.

The PI has a robust international collaboration with academicians, which gave him the opportunity to participate in joint publications and funding applications, thereby advancing his research ambitions and fostering growth. He also has partnerships with industries such as CyanoCapture, Aquature Ltd., and Eco Amet Solutions that facilitate technology transfer and R&D funding, further improving his research impact and translational outputs.

PI has co-supervised numerous students, many of whom have secured esteemed positions at institutions like Monash University and IITs. He fostered inclusive and innovative research environments, helping host labs develop new research lines and infrastructure. For instance, at Kyung Hee University,



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he established a materials development lab and trained students in cutting-edge technologies. At Imperial College, he introduced bioelectrochemical research for bioremediation, developed advanced laboratories, and contributed to interdisciplinary grant applications. His leadership extends to scientific review, editing, and evaluating proposals for UKRI, DST (India), and other bodies, alongside organising events and delivering impactful lectures.

The RyC fellowship will further empower the PI to achieve research independence, strengthen collaborations with Spanish scientists, and initiate novel research line. With his vast research network and team, he envisions establishing a spin-off, "BioCircuit," to commercialise environmental solutions, securing €5 million in funding within five years to enhance Spain's research infrastructure, train students, and generate jobs, thereby significantly contributing to the research



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: RUTHSATZ RUTHSATZ, KATHARINA
Referencia: RYC2024-048679-I
Correo Electrónico: katharinaruthsatz@gmail.com
Título: From Molecules to Populations: A Multi-Level Framework to Explore the Eco-Evolutionary Implications of Environmental Stress in a Changing World

Resumen de la Memoria:

My research focuses on understanding how global change impacts wildlife by influencing fitness-related traits, with particular interest on how ectothermic animals cope with environmental variation through phenotypic plasticity across life stages. By combining empirical, meta-analytical, and field-based approaches, I have notably contributed to advancing the knowledge on the underlying mechanisms of life-stage-specific responses to stressful environments and across life-stage effects of environmental variation.

My interest in the eco-evolutionary dynamics of phenotypic plasticity began during my Master's project and shaped my PhD research at the University of Hamburg, where I investigated the physiological causes and consequences of developmental plasticity. Graduating with great honors (magna cum laude), I received the PostDoc1st award for an outstanding doctoral project. This award provided me with a postdoctoral position and funding for research to dive deeper into life stage-specific responses to environmental stress. By shedding light on early life stages, I advanced a new research avenue in ecophysiology, marking the start of my independent career.

Following my postdoctoral position, I secured a Junior Research Group Leader position (Assistant Professorship equivalent, fixed-term) at the Technical University of Braunschweig and established my research group supported by a national research grant. This grant allowed me to study how multiple stressors, particularly thermal and pollution stress, interact to influence the expression of phenotypic plasticity and unravel sub-lethal effects on health and stress markers that may affect population persistence. This research offered key insights into mechanisms potentially driving the evolution of phenotypic plasticity in a changing world. With a second national research grant, I have started to explore the multi-level effects of stressors, such as microplastic pollution, using cutting-edge omics tools.

An 8-month funded research stay at Doñana Biological Station (EBD-CSIC) allowed me to develop novel ideas on endocrine mechanisms driving plastic responses to stress and their population-level implications. To further these ideas, I applied for and was awarded a Marie Skłodowska-Curie Actions (MSCA) Postdoctoral Fellowship. I am currently an MSCA researcher at EBD-CSIC.

Over the next years, I will develop novel approaches to understand the molecular and physiological machinery driving wildlife responses to global change and their eco-evolutionary implications. I will integrate empirical, comparative, meta-analytical, and modeling approaches to mechanistically explore how environmental disturbances influence animal health, life histories, population dynamics, and species distributions. My research will focus on three objectives: I) investigating multi-level effects of stress and their role in environmentally driven evolution; II) exploring how life-stage-specific adaptations shape resilience to stressors; and III) determining how individual stress scales up to population-level consequences. This interdisciplinary research will not only advance key fields such as ecology, evolution, and ecotoxicology but also generate novel data to inform robust projections of species and population vulnerabilities, providing critical insights for conservation strategies.

Resumen del Currículum Vitae:

In 12/2018, I completed my PhD (magna cum laude) at the University of Hamburg (GER), earning the PostDoc1st award, which provided me with a postdoctoral position and funding for developing my research. At this point of my career, I was already working independently. During this period, I secured two grants: a postdoctoral fellowship at the University of Massachusetts (USA) from the German Academic Exchange Service (postponed due to pandemic-related travel restrictions) and a first national research grant from the German Research Foundation (DFG). I successfully applied for a Junior Research Group Leader position equivalent to an Assistant Professorship (fixed-term) at the Technical University of Braunschweig (GER).

In 07/2020, I started as a Junior Research Group Leader at TU Braunschweig, establishing my group with the first national research grant, which included funding for research and a postdoc (joined in 2022). This grant also enabled me to expand my international experience with a funded 8-month research stay at the Doñana Biological Station, EBD-CSIC (ESP). In 2023 and 2024, two international PhD students conducted funded research stays in my lab. In 10/2023, I secured a second national research grant from the DFG, which included funding for a PhD student who joined my group in 05/2024. Due to the fixed-term nature of my position without a tenure-track option, I applied for and was awarded a Marie Skłodowska-Curie Actions (MSCA) Postdoctoral Fellowship to broaden my international experience and network.

In 12/2024, I began my current position at EBD-CSIC as an MSCA fellow. During this 24-month project, I will spend three months at Lund University (SE) for a knowledge-transfer project in late 2025.

To date, I have been awarded ~790,300€ in funding, including 296,599€ for research, and three travel fellowships (1,500€). I am involved in five international research projects funded for ~966,309€. I have published 27 publications, including a book chapter, with 409 citations and an h-index of 12 (Google Scholar). I am the first author on 19 of these publications (one co-first) and last author on four. I have secured 32 months of international research experience, inclusive of my past 8-months research stay at EBD-CSIC and my ongoing MSCA fellowship. I have collaborations with researchers from 22 countries and 51 institutions, including 73 co-authors. I have disseminated my research in talks at 15 international conferences (3 invited keynotes) and in 5 invited seminars. My outreach efforts include founding the AnatomyInsights© project, featuring a YouTube channel and an annual



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workshop at the University of Glasgow (UK), as well as sharing my work via social media, TV, and museum and school talks. I co-organize the weekly seminars at EBD-CSIC. I have over 12 years of academic teaching experience (avg. 65% of my contract time) and have supervised 25 undergraduate, 10 Master's, and 2 Erasmus+ students, many of whom have successfully advanced their careers (e.g. 3 PhD candidates, 10 permanent high school teachers). I currently supervise a PhD student funded by a grant I secured. I am an Associate Editor for 4 peer-reviewed journals (Conservation Physiology, Journal of Thermal Biology) and a reviewer for the Alexander von Humboldt and German Research Foundation. I have reviewed >50 manuscripts for 26 journals.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: AGIADI, KONSTANTINA
Referencia: RYC2024-049019-I
Correo Electrónico: kagiadi@gmail.com
Título: Geobiology: past climate↔connectivity↔marine ecosystem interactions

Resumen de la Memoria:

I am a geologist and paleontologist working on the interactions between past climate, connectivity and marine ecosystems. My research line can be split into four interrelated themes that have developed (sometimes overlapping) throughout my career: 1) Palaeoclimate impacts on marine ecosystems, 2) Otolith taphonomy, 3) Effects of past connectivity changes on marine ecosystems, and 4) Otolith-based biogeochemical proxies. I have been leading my own research line on the impact of climate and connectivity on past marine ecosystems since my PhD studies in Greece, and I moved to Austria to lead my own projects in 2020. Within the Ramón y Cajal contract, my goal is to push my research further towards addressing the connections between past climate↔marine ecosystem interactions and the biological carbon cycle.

Resumen del Currículum Vitae:

I am passionate about the marine environment and the impact of the movement of organisms on its evolution. I am a geologist and paleontologist working at the intersection between geosciences and biology (ecology) with the aim to build a research group at the Institut de Ciències del Mar (ICM-CSIC) specializing on past climate↔connectivity↔marine ecosystem interactions.

I am an expert on fish otoliths and my systematic palaeontology work (funded by three Greek grants and one grant from the Palaeontological Association) led to the discovery of 3 new fossil genera and 19 new species, the expansion of the stratigraphic and geographic range of many other species, and the first detection of two non-indigenous taxa on the Mediterranean coast of Israel. My contribution to this field has been recognized by my peers, who gave my name to a new fish species, *Odondebuena agiadiae*. Through high-resolution sampling, together with my students, I use otoliths to explore the role of climate and connectivity on the distribution, abundance, body size, metabolism and migration patterns of marine fishes in the geological past. I led two of the first studies ever published on otolith taphonomy that revealed that the death assemblages of pelagic and benthic fish otoliths, as well as molluscs have similar ranges of time-averaging, which means that we can safely use otolith records to reconstruct ancient food webs. In order to reconstruct the paleoclimatic and paleoceanographic conditions affecting past marine ecosystems, I regularly apply a diverse array of biogeochemical proxies and develop otolith-based proxies. Specifically, in my most recent work, I use the carbon and oxygen isotopic compositions of otoliths and foraminifera to determine the diel vertical migration patterns of mesopelagic fishes, which is a major component of the biological carbon pump. Furthermore, in the Austria-funded projects PALEOWEB and ReMarE, my students and I are modelling the ancient marine food web of the Eastern Mediterranean during glacial and interglacial periods gaining insights into the effect of climate and productivity regimes on the ecosystem structure. Additionally, my research on the Messinian Salinity Crisis (projects MEDSALC, QUANTMES and COST Action MedSalt funded by EU, German and Greek funds) has led to several publications over the last decade, including a first-authored paper published in *Science* on the impact of the Crisis on Mediterranean marine biodiversity.

I have (co-)supervised two PhD students (Danae Thivaoui and Isabella Leonhard) and seven master students, including a successfully completed master thesis on modelling Pleistocene glacial and interglacial pelagic food web. Currently, I am leading my own team researching the Late Miocene Mediterranean marine ecosystem crisis (ReMarE project), and I am Chair of COST Action CA23124 SaltAges (2024–2028), coordinating a network of >200 participants from over 30 countries.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: CANAL PIÑA, DAVID
Referencia: RYC2024-051438-I
Correo Electrónico: dav.canal.p@gmail.com
Título: Sexual selection and population responses in a changing and complex world

Resumen de la Memoria:

I am a behavioural and evolutionary biologist. Although my primary research focus has been on topics related to sexual selection, including mating strategies and evolution of sexually selected traits, I have recently expanded my research to investigate individual and population responses to environmental changes with a special focus on climate change. Over the years, I have also implemented my knowledge to tackle applied ecology and conservation issues.

I developed my undergraduate thesis at Uppsala University (Sweden, 2004). In 2006, I was awarded a pre-doctoral I3P grant from the Spanish National Research Council (CSIC) to develop my PhD with Dr Jaime Potti. I investigated the adaptiveness of different mating strategies (extra-pair paternity and social polygyny) and the impact of individual genetic diversity (based on neutral and adaptive markers) on fitness, which resulted in relevant publications (e.g., Behav. Ecol. Behav. Ecol. Sociobiol., PLOS One). During this period, I also developed a genotyping protocol for the Major Histocompatibility Complex (MHC) in birds (BMC Res. Notes), a challenging task at the time. In parallel, I conducted pioneering research on female ornamentation, investigating the genetic basis and evolutionary significance of an ornament expressed in both sexes (Heredity, J. Evol. Biol.). I also joined two 3-month stays each at the Research Institute of Hunting Resources (IREC, Spain; 2007) and the Centre for the Study and Conservation of Birds of Prey (CECARA), Argentina (2010), wherein I collaborated in a conservation project related to the endangered crowned eagle.

The postdoctoral positions I have joined have expanded my research into new evolutionary topics such as song evolution and the coevolution of parasites and hosts. I have also applied my expertise to address applied ecology and conservation issues, some of which have had a direct impact on policy, decision-making, and society. In this regard, I have worked closely with policymakers and stakeholders to reduce animal-vehicle collisions in the province of Seville and participate in a project that has launched an invasive mosquito monitoring program to control mosquito-borne diseases in Hungary. In total, I have spent 68 months (> 5 years) working in foreign institutions (Sweden, Argentina and Hungary), including two postdoctoral fellowships obtained through competitive calls at the Institute for Earth and Environmental Sciences of La Pampa (INCITAP-CONICET), Argentina (2018-2019: 18 months) and the Centre for Ecological Research (CER), Hungary (2019-2022: 38 months). In 2023, I obtained a highly competitive grant of [Attraction of Research Talent \(Community of Madrid\)](#) to incorporate into MNCN-CSIC where I lead a project that has allowed me to continue the research line on animal responses to environmental changes.

Resumen del Currículum Vitae:

Certificate of research excellence R3
Publications: 54 (10 more under review), 45 of them in Q1
Book chapters: 2
h-index: 22; h10= 39 (Google Scholar)
Citations: 1348 (Google Scholar)
Participation in projects: 18; 5 of them as PI
Participation in congresses: 44
Students supervised: 20; 8 Bachelor, 11 Master (+1 ongoing), 1 JAE Intro (+1 ongoing)
Post doc: 1
PhD students: 2 ongoing

I have more than 15 years of experience in the fields of evolutionary ecology/biology and conservation. In that time, I have become a well-trained biologist specialising in applying modern tools to address relevant questions about life-history, behavioural ecology, and conservation of natural populations.

During my career (PhD dissertation in 2012), I have joined several research groups and centres in four countries (Sweden, Spain, Argentina and Hungary), including several postdoctoral positions in Spain (2012-2017) and abroad (Argentina: 2018-2019; Hungary: 2019-ongoing). This has allowed me to integrate and transfer knowledge from/to both South American and European research groups, gain remarkable (inter)national experience and establish an exceptional network of collaborators

I have published 54 scientific articles (10 more under review) in SCI journals, 45 of them in Q1, which have received 1348 citations (Google Scholar; h-Index = 22, h10=39). In 25 of these publications, I was the first (18) or last (7) author. I have participated in 18 (inter)national research projects, all awarded in competitive calls, 6 of them funded by foreign entities and/or carried out only with foreign researchers. I was PI in 5 out of the 18 projects, summarising a total funding of ca. 391.000 euros as PI. These facts prove my leadership, independent thinking and fund acquisition capacity.

I committed to disseminating my research output and transferring my knowledge. Thus, I have made 44 contributions to (inter)national conferences and published two book chapters and several articles for the general public. My work has received attention from the media, including newspapers and radio interviews, in different countries (e.g., USA, Spain, Hungary). I have supervised 20 students (8 Bachelor's, 11 Master's, 1 JAE Intro; 2 more ongoing), one post doc and started to supervise 2 PhD students (2024). I have been a member of tribunals evaluating theses and Master's theses (2019-



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2024) and an Honorary Collaborator at the University of Cordoba (2020-2022). I have reviewed R&D projects for the European Union (Marie Skłodowska-Curie fellowships), Spanish National Research Plan and Polish Academy of Sciences and >50 papers in SCI journals and I am an associated editor in 3 SCI journals (IBIS, Animal Biodiversity and Conservation, El Hornero). See my web (<https://www.davidcanalresearch.com/>) for my full CV.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: MORENO RODENAS, ANTONIO MANUEL
Referencia: RYC2024-050485-I
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Título: Integración de sistemas avanzados de sensorizado e inteligencia artificial para el análisis de sistemas hidro-ambientales

Resumen de la Memoria:

Soy investigador en ingeniería hidráulica, gestión de recursos hídricos y ciencias ambientales, especializado en la integración de sistemas de inteligencia artificial (IA), visión por computador, teledetección y modelos numéricos para procesos acuáticos. Desde la obtención de mi doctorado en la Universidad Técnica de Delft (2019), he desarrollado investigaciones que combinan modelado físico y herramientas basadas en datos para analizar y optimizar sistemas hidroambientales críticos, adaptándolos a desafíos climáticos y tecnológicos actuales.

Mi línea de investigación abarca tres áreas clave:

1- Modelado y análisis de incertidumbres: Desarrollo de protocolos para acelerar simulaciones numéricas a gran escala, facilitando análisis probabilísticos esenciales para la gestión de inundaciones y la calidad del agua. Este enfoque permite diseñar estrategias para la gestión de infraestructuras y sistemas acuáticos críticos.

2- Monitorización ambiental con métodos ópticos: Implementación de sistemas basados en aprendizaje profundo y sensores ópticos para la monitorización de procesos como la acumulación de grasas en estaciones de bombeo o mediciones de la dinámica de macroplásticos en flujos turbulentos. Esta línea combina acceso a observaciones con sistemas en campo y en el laboratorio hidráulico que permiten describir físicas fundamentales de procesos acuáticos.

3- Aplicación de la teledetección a escala planetaria: Creación de algoritmos de aprendizaje automático para el procesamiento de datos de satélite con aplicaciones para la monitorización de erosión costera, mapear estructuras hidráulicas y analizar la dinámica de embalses, como en la plataforma Global Water Watch, que monitorea más de 70,000 embalses globales a tiempo quasi-real analizando datos satélite.

Estas líneas buscan enfrentar desafíos clave como el cambio climático, la escasez de agua y la adaptación a eventos extremos, con el objetivo de generar impacto científico y práctico en la gestión sostenible de los recursos hídricos en España y a nivel mundial. Mi trayectoria combina investigación aplicada, transferencia tecnológica y formación académica en los campos de la ingeniería hidráulica, la gestión del agua y las ciencias ambientales.

Resumen del Currículum Vitae:

Soy científico e ingeniero civil, especializado en hidráulica, gestión del agua, ciencia de datos y metrología. Tengo un título en Ingeniería de Caminos, Canales y Puertos por la Universidad Politécnica de Valencia, España. En 2014 defendí mi proyecto de fin de carrera con calificación de matrícula de honor, centrado en el desarrollo de métodos geoestadísticos para combinar datos de pluviómetros y radares meteorológicos. En 2014 obtuve una posición como investigador doctoral en la Universidad Tecnológica de Delft (Países Bajos) en el proyecto europeo QUICS (Marie Skłodowska-Curie ITN). En 2019 obtuve mi grado de doctor, con la calificación de Cum Laude (máxima distinción en el sistema Neerlandés), por investigaciones acerca de la cuantificación de incertidumbres en modelos de calidad del agua a gran escala. Desde entonces, trabajo como investigador permanente en Deltares (Países Bajos), un instituto de referencia internacional en investigación para el sector del agua y la geotecnia.

En Deltares (instituto de investigación de 850 empleados) soy el coordinador del programa de investigación de nuevas tecnologías (ciencia de datos e inteligencia artificial), donde defino líneas estratégicas y gestiono recursos de investigación. He trabajado en proyectos de investigación internacionales de financiación europea, como CoUDlabs (H2020 Infraia), nacionales (TKI, FATracker), y en proyectos de consultoría de alto nivel para instituciones como Google, la Agencia Espacial Europea, UNESCO-IHP y el Banco Mundial. Mis investigaciones se centran en la integración de modelos de aprendizaje profundo, teledetección, visión por computador y conocimientos hidráulicos para describir procesos hídricos en distintas escalas.

He sido coautor de 20 artículos científicos (índice $h=11$), dos bases de datos públicas y múltiples informes técnicos. Entre mis contribuciones más destacadas se encuentra el desarrollo de emuladores numéricos para modelos hidráulicos y de calidad del agua, sistemas ópticos para monitorizar procesos en tiempo real, y algoritmos de aprendizaje automático aplicados a datos satelitales. Estas soluciones han permitido avances en áreas críticas como la gestión de riesgos de inundaciones, la optimización de infraestructuras hidráulicas y el monitoreo de costas y embalses. Además de mi trabajo en investigación, he supervisado 9 tesis de máster, 4 internos y 1 investigador postdoctoral, contribuyendo a la formación de la próxima generación de expertos. También he impartido seminarios invitados en instituciones internacionales como Imperial College of London, IHE-Delft y TUDelft, y he coorganizado eventos como el European Junior Scientist Workshop EWSJ en metrología para sistemas acuáticos (ediciones 2022 y 2024), fomentando la educación de jóvenes científicos en aspectos como métodos experimentales, la cooperación y ética en ciencia.

En 2022 obtuve el premio de la innovación en aguas urbanas de Países Bajos (Rioned Innovatieprijs 2022) por trabajos relacionados con el desarrollo de un nuevo sistema de medida para la acumulación de capas flotantes en estaciones de bombeo de aguas residuales.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: DÍEZ VIVES, CRISTINA
Referencia: RYC2024-048180-I
Correo Electrónico: cristinadiezvives@gmail.com
Título: Microbial ecology and host-microbiome interactions of marine invertebrates

Resumen de la Memoria:

My research centres around the areas of microbial ecology and host-microbiome interactions of marine invertebrates, primarily using sponges as study organisms. I obtained my PhD in Oceanography (2013) from the Universidad de las Palmas de Gran Canaria, with a thesis project focused on the ecological distribution and abundance patterns of free-living microbial communities in the marine environment. Afterward, my research shifted towards host-microbiome systems, which became the focus of my upcoming post-doctoral periods.

After completing my PhD, I received a postdoctoral fellowship at the University of New South Wales (Sydney, Australia, 2014-2017), where I focused on the molecular aspects of host-symbiont interactions, particularly the expression of eukaryotic-like proteins by microbial symbionts, which are known to control host interactions. During this time, I became proficient in RNASeq, computational biology, comparative transcriptomics, and statistical analyses. I also analysed the metagenomes of symbionts cultured in the lab, identifying microbial functions linked to a sponge associated lifestyle. Beyond my primary research, I also contributed to several collaborative projects with applications in biomedical research and industry.

In 2018 I was awarded a Marie Skłodowska-Curie Fellowship to study how host genotype and geography influence intraspecific variation in microbiomes. The project, conducted at the Natural History Museum of London, UK (2018-2021), allowed me to merge the expertise of Dr Riesgo's lab in population genetics and phylogenetics with my own research on microbial community composition, dynamics and functionality.

In February 2021, I began a postdoctoral position at the Museo Nacional de Ciencias Naturales within the framework of a Gordon and Betty Moore Foundation project to study microbe symbiont specialization in freshwater sponges on a global scale. My tasks were to describe the microbiome community and functionality of several freshwater species and identify factors influencing microbial structure and variability.

Since October 2022, I have been the PI of a 'La Caixa' Junior Leader fellowship, leading a project focused on understanding the role of symbionts in host survival during gametogenesis, offspring development and fitness, and the selective transfer to the next generation. This project is allowing me to follow my own research line, organize sampling campaigns, and expand my own group by co-supervising two PhD students and recruiting two additional team members.

Throughout my research career, I have extensively characterized the microbiome composition of hundreds of sponge species and other invertebrates, delving into the temporal and spatial variation of their microbiome, microbial functionality, and functional redundancy. My work has revealed key proteins that mediate host-microbiome interactions, highlighted the critical role of symbionts in sponge disease, and challenged prevailing knowledge on vertical transmission of symbionts among other questions. Looking ahead, I aim to deepen my exploration of host-microbiome interactions, particularly in freshwater sponges and during host reproduction. A personal goal is to further develop my research and leadership skills within a stable environment, contributing to the establishment and growth of a research group dedicated to advancing these areas of study.

Resumen del Currículum Vitae:

I am currently the Principal Investigator of a 'La Caixa' Junior Leader Fellowship project at the National Centre for Biotechnology (CSIC, Madrid). My expertise spans molecular biology, microbial ecology, evolutionary biology and host-microbiome systems.

To date, I have published 29 peer-reviewed papers (15 as first or second author, and 2 as senior author), which have attracted 1,332 citations (h=17, i10=21, Google Scholar), and 2 articles under review. I contributed to eleven international and three national conferences as lead author in microbial ecology and animal symbiosis, including an invited talk at the prestigious Gordon Research Conferences in 2018. Some of my publications are in high-ranking journals such as Nature Ecology and Evolution, Nature Communications and the ISME Journal, and five of my papers have received over 100 citations each. My research career is characterized by great mobility, prioritizing the exchange of knowledge and collaboration with leading researchers in my area. I have worked abroad for a total of 66 months, including 36 months as a postdoc at the University of New South Wales (UNSW; Jan 2014 - Jan 2017) and 33 months at the Natural History Museum of London (NHM; May 2018 - Feb 2021). I also completed two international stays of three months each (Connecticut, USA, and Montevideo, Uruguay). Overall, I have worked in 10 research institutions worldwide and independently established collaborations with researchers located mostly in Australia, UK, USA, Canada and France.

Regarding my independence and leadership, I have secured over 500,000 € in competitive programs through four postdoctoral fellowships. Notably, I was awarded a Horizon 2020 MSCA Individual Fellowship in 2018 (195,454€) to join the NHM of London. In February 2022, I received an ASSEMBLE Plus mobility grant (5,400€), allowing me to collect specimens along the coast of Napoli, Italy. In July 2022, I obtained a postdoctoral position at Universidad de Alcalá (Spain), which I ultimately declined due to overlapping commitments. In October 2022, I began my current position as Principal Investigator of 'La Caixa' Junior Leader Fellowship program (305,100€) at the National Center for Biotechnology (CSIC, Madrid).

During my postdoctoral appointments, I have mentored and supervised two master's theses at University College London, two national master's theses from the Universidad Autónoma de Madrid (UAM), and two undergraduate students from the Universidad Complutense de Madrid (UCM). At present I am co-supervising two PhD students at UAM. In addition to mentoring, I have contributed to teaching courses at the NHM in London and the Master in Biodiversity at the UAM. I have also provided informal talks and training at invited universities and for my peers at UNSW, NHM and MNCN. I routinely engage in dissemination and outreach activities, participating in public events at museums, interviews on regional television channels, and sharing my research through websites and social media. I regularly review manuscripts for several scientific journals, including Nature Communications, Molecular Ecology, ISME Journal and PLoS ONE. I am a member of the Editorial Board of Frontiers in Marine Science, serve as an expert evaluator for national research projects under the Spanish State Research Agency, and I have been invited to participate in a PhD evaluation panel.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: MORÁN LÓPEZ, TERESA
Referencia: RYC2024-048721-I
Correo Electrónico: tmoranlopez@gmail.com
Título: Ecological interactions: from mutualisms to service provision in agroecosystems

Resumen de la Memoria:

I am an ecologist particularly interested in the functions sustained by plant-animal interactions; especially, mutualistic ones. Throughout the years I have focused on understanding how seed dispersal is modified by the environmental context, affecting the sustainability of plant populations and the diversity of communities. In both cases, it is key to infer where plants and animals can encounter, and how animals decide where to move and feed. In this sense, I have designed models and analytical tools that incorporate animal movement and traits to predict interaction assembly within communities. In this way, mutualisms can be evaluated in a dynamic and more realistic manner, improving our estimates of their fate in changing environments. Finally, since communities set the template in which interactions occur, I have recently become interested in community assembly processes.

In a similar way that mutualisms sustain ecological functions, trophic interactions can provide services to agroecosystems. Therefore, many aspects of the study of plant-animal mutualisms can be transferred to applied questions related the ecological intensification of crops. In recent years I have designed a joint species service-provision model that improves our estimates of services in new data, provides a better the regional contextualization of local management and facilitates the design of targeted actions. To test model performance, I have led a project that has gathered a comprehensive dataset about pest control in apple orchards (by bats and birds) in the Asturian region (>2,000 km²).

In the following years I will continue with these research lines, designing new-generation models that overcome flaws of current approaches. I will test them with comprehensive datasets at global and regional scales to gain a deeper understanding of the mechanisms by which animals drive ecosystem functions and to take the leap towards ecological forecasting. In the case of plant-animal mutualisms, I will design models that account for detectability of interactions during surveys to attain more accurate estimates of mutualism outcomes for rare (and often vulnerable) species. As an empirical proof-of-concept, I will evaluate how pollinators use floral bands in agroecosystems. In addition, by means of a global joint species frugivory model I will improve the accuracy invasion risk assessments of fleshy-fruited plants.

In the case of service provision to agroecosystems, I will extend the current version of the service-provision model to improve its accuracy in species-rich communities (e.g., pollinators) and in systems where animals can have positive and negative effects on the service (e.g., when intraguild predation is high). I will evaluate model performance with data of pest control and pollination. In systems with a good model performance, I will map services to quantify the effectiveness of ecological intensification practices and evaluate if actions aimed at promoting services also favor vulnerable species.

Resumen del Currículum Vitae:

I am an ecologist particularly interested in ecological functions that emerge from animal foraging behavior. In particular, mutualistic interactions and service provision to agroecosystems. To answer my research questions, I have combined theoretical and observational studies and worked in a variety of systems (from fragmented woodlands to tropical forests). When routine analyses are not suited to my study aims, I design and implement new models and analytical tools. In my career, I have pursued leadership, quality and inter-disciplinarity. I have published 34 articles in SCI journals, almost 90% of them have been published in Q1 journals. Some, in leading journals like Ecology letters, Methods in Ecology and Evolution or Nature Climate change. To develop my research career, I have been awarded with 12 competitive scholarships and led two research projects. In 2024 I obtained the R3 certificate (AEI, Spain).

During my PhD (developed at MNCN-CSIC), I combined field and modeling work to understand the recruitment bottlenecks of holm oaks (*Quercus ilex*) on fragmented landscapes and its consequences for the genetic diversity of its populations. I published 6 papers and obtained the Extraordinary PhD Award (Rey Juan Carlos University). During my first postdoc (2016-2020), I integrated the quantitative ecology group of INIBIOMA-CONCET (Argentina), where I focused on the link between frugivory and plant diversity. This stage of my career culminated with a permanent position as a CONICET researcher in 2020. In the next two years I focused on building statistical tools to improve our estimates of plant-animal interaction assembly and its functional consequences. Also, I obtained funds from a national competitive project (PICT-FonCyT) to understand how exotic fleshy-fruited species integrate in Patagonian forests. A PhD thesis, of which I am supervisor, is being developed within this project. In May 2022 I returned to Spain with a Juan de la Cierva Incorporación contract at the University of Oviedo and integrated the BESLAB group (<https://beslab.net/>), where I lead the ecological forecasting research line of the group. Since 2024 I am principal investigator of a project aimed to predict service provision to agroecosystems. In parallel to my personal lines, I have worked with researches with shared interests (e.g., community assembly) establishing an international network of co-authors (from 10 different countries).

In my career I have approached my work to the civil society and transfer my expertise on statistics to students. I contributed to a textbook, coordinated outreach activities (e.g., European Research night), designed games targeted to school students and funded a spin-off that provides data analyses services to companies. I have directed a post-graduate Statistical Ecology course, lectured workshops in international conferences and joined the teaching staff of the University of Oviedo, taking part on the courses of Ecology and Applied Ecology (Biology degree). Finally, I would like to emphasize my engagement with the peer review and scientific evaluation process. I am academic editor of Plos One and Journal of Animal Ecology and have been reviewer of 14 international journals. Also, I have been part of the jury, the supervision committee or acted as an external evaluator of five PhD thesis developed in four different universities.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: LADO GARRIDO, JULIO JOSÉ
Referencia: RYC2024-049081-I
Correo Electrónico: juliolado@gmail.com
Título: Exploring the Nexus: From Energy Storage Technologies to Environmental Electrochemistry Applications
Resumen de la Memoria:

Julio José Lado Garrido, JLG, is a Senior Assistant Researcher at the Electrochemical Processes Unit, ECPU, at IMDEA Energy, IME (Móstoles, SP). JLG started his PhD at IMDEA Water Institute under the supervision of Prof. Eloy García Calvo in collaboration with the Univ. of Wisconsin-Madison (USA) under the supervision of Prof. Marc A. Anderson (Different research stays amounting to 3.5 years). There, JLG studied the use of metal oxide coating carbon electrodes for electrochemical water treatments. During this period, he published 9 articles and collaborated on research projects with different companies (UR-Water and AquaMost) funded by US agencies (NSF and ONR). In 2014, he started his postdoctoral career in the group of Assist. Prof. Luis A.M. Ruotolo (Federal University of São Carlos, Brazil) with a CAPES fellowship to study the use of biowaste materials as precursors for preparing activated carbon electrodes for energy storage and environmental applications. He also participated in projects funded by FAPESP and CNPq. His work crystallized in 5 articles. In February 2017 he joined the ECPU in IME funded by Comunidad de Madrid, CAM, to develop a research line based on energy-efficient electrochemical processes for environmental applications. He also participated in projects with companies (DC-SOIAS, MINECO) and research institutions (IMDEA Materials). In the second half of his TALENTO, JLG studied electrochemical separation by charge-transfer materials for ion capture resulting on filling a European patent about injectable semi-solid electrodes for lithium capture in 2020. In 2021, he joined HYSOLCHEM, a 4-year European project aimed at developing a photo-electrochemical reactor for water treatment and CO₂ fixation. As key outcomes, JLG published 6 research articles and contributed to 17 international conference presentations. At the end of 2021, JLG was awarded with two grants: JIN funded by AEI, and Talento Senior by the CAM named SELECTVALUE (5 years). In 2022 JLG became a Senior Assistant Researcher in the ECPU at IME and initiated his Talento project to explore the potential of electrochemical faradaic ion pumping technologies for environmental applications. In 2023 JLG started its collaboration with the company FCC Aqualia through the REWAISE contract to fabricate the first CDI pilot plant built in Spain and deployed in a brackish water desalination plant in Denia. Moreover, the development of anodes for electro-oxidation led to filling a European patent and to participate in 2 synchrotron projects in collaboration with Diamond Light Source and Chalmers Univ. In this period, also a strong collaboration was established with the Univ. of Wageningen and the Federal Univ. of Ceará. In 2024, the NET4BAT project, in which JLG is a PI, was funded by AEI to use electrochemical technologies to enhance the sustainability of the entire battery manufacturing chain. As a result of this period, JLG published so far 5 articles and had 20 contributions to international conferences.

The research line proposed for the Ramón y Cajal program, PAIR-ETECH, focuses on pairing electrochemical processes to achieve efficient ion capture, contaminant removal, CO₂ fixation, and energy storage. By leveraging dual-function devices, this approach aims to provide innovative and sustainable solutions to pressing environmental and energy challenges.

Resumen del Currículum Vitae:

The C.V. of Julio J. Lado shows a significant multidisciplinary character, a strong publication record achieved working in several international environments (USA, Brazil, Italy, and UK), scientific independence, and funding ability.

The scientific production of JLG can be summarized in 33 scientific contributions, divided into 3 patents, 1 book chapter, and 29 published papers (19 as corresponding author, 10 as first author, 4 as last author) with high quality (20 in D1 and 8 in Q1, based on Scopus) in which 86% were international collaborations and 7 were published in Open Access.).

Moreover, he has 50 contributions to scientific congresses, 44 of them oral contributions and 2 invited presentations in symposiums, along with 4 invited talks in international institutions. All these contributions led to a h index of 19 (>1200 citations in Google; >990 in Scopus) and allowed JLG to obtain the R3 certificate with a 38/40.

JLG has also participated in 16 research projects (2 International, 4 European, 7 National, 2 Regional, and 1 Private) being PI in 5 research projects capturing over (> 925.000 €).

Regarding mentorship, JLG has supervised 3 Postdocs, 7 PhD, 12 MSc, and 11 Internships.

JLG has also dedicated a substantial effort to fostering international collaborations, resulting in impactful partnerships with prominent institutions and researchers. Key collaborations include:

- University of Wisconsin-Madison (USA, M.A. Anderson): 18 co-authored articles.
- Federal University of São Carlos (Brazil, Luis A. Ruotolo): 6 co-authored articles.
- University of Wageningen (Netherlands, Louis de Smet): Collaboration on the Mind the Gap project, yielding 1 article.
- University of Salerno (Italy, Vincenzo Naddeo): 1 co-authored article and 3 research stays.
- Federal University of Ceará (Brazil, Jessica Miranda): 1 co-authored article and 2 research stays.
- Diamond Light Source (UK, Santosh Kumar and Georg Held): Contributions to the HYSOLCHEM project, including 2 synchrotron beam times.
- Chalmers University of Technology (Sweden, Zhenyuan Xia): 1 synchrotron beam time.
- KU Leuven (Belgium, Bart Van der Bruggen): Collaboration on the HYSOLCHEM project and a PhD research stay.
- Zonguldak Bülent Ecevit University (Turkey, Ersin Aytaç): 1 co-authored article.

National collaborations have also played a crucial role, with notable partnerships including:

- Universidad de Burgos (Edgar Ventosa): 1 co-authored article and 1 patent.
- Universidad de Valencia/ICMOL (Gonzalo Abellán, 1 patent)
- Universidad de Barcelona (Ignacio Sirés): 1 co-authored article.
- Universidad del País Vasco (David Mecerreyes): 1 co-authored article.
- Universidad Complutense de Madrid (Mohamed Khayet): 1 co-authored article.



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Engagement with the private sector has further strengthened the impact of the research, with projects conducted in collaboration with companies such as GFM Fotovoltaica, Matteco, Polykey, Amersil, Apria Systems, FCC Aqualia, Aquamost, and URWater. These collaborations underscore the extensive network and interdisciplinary approach that underpin the research activities, enhancing both the scientific output and the practical applicability of the findings.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales

Nombre: BINKS, OLIVER

Referencia: RYC2024-050582-I

Correo Electrónico: OJBinks@gmail.com

Título: Forest ecophysioecologist

Resumen de la Memoria:

My research interests are on the effect that water has on forest ecosystems in terms of influencing the carbon balance, forest size (e.g., biomass), tree mortality, hydrological cycle, and the land-atmosphere energy balance. I have published papers on the stores and fluxes of water in leaves, forest canopies, whole trees, soil, the forest atmospheric boundary layer; and at scales ranging from plant cells to ecosystems. My research has followed a trajectory from small-scale leaf-level processes in tropical rainforests to increasingly larger scales and now encompasses a global perspective.

During my PhD I looked at the role of leaves in enabling rainforest trees to adapt to long-term drought. In subsequent analyses, my first postdoctoral position entailed addressing the hydraulic coupling between the rainforest canopy and the atmosphere in terms of leaf water uptake and canopy wetness. In my second postdoctoral position I set up two field sites in Australian tropical rainforest allowing me to investigate the full soil-plant-atmosphere pathway for forest water fluxes. I am now using global datasets to investigate water relations from forest-plot to biome to continent and global levels.

Working at these large spatial scales enables me to incorporate detailed hydraulic knowledge into larger scale vegetation and climate models. I currently have a postdoc who is an expert on satellite remote sensing and who is using the global vegetation water models developed by my group to calibrate and validate remote sensing data, leading the way to making microwave remote sensing a powerful tool for monitoring vegetation water status and health.

I am developing a project with colleagues at the German Aerospace Centre (DLR) investigating the electromagnetic properties of plant tissues. The same processes that influence how tightly water is bound to plant tissues, also influence the electric permittivity of the tissue. Thus, we are planning to use existing equipment to characterise the biophysics of water relations and electric permittivity, thereby strengthening the foundation of interpreting satellite microwave remote sensing data at large scales, and also our understanding of plant water relations at very small scales.

There are currently gaps between ecology, plant physiology and hydrology where each discipline has developed theory and models that overlap in scope, but remain to be joined up into a single unified framework linking vegetation with ecology and global processes such as the water cycle. My research aim is to continue filling in the gaps such that we have a single model that explains the behaviour of water from the smallest to largest scales. Such a unified framework will enable us to predict how vegetation communities will respond to climate change over the long term (e.g. decades to centuries), and how to use vegetation to influence hydrology and rainfall patterns from local to regional to global scales. My expertise in the physical processes explaining the behaviour of water at cell- to ecosystem-scales makes me ideally placed for building on this theory, and placing it in the centre of our understanding of vegetation-climate feedbacks.

Resumen del Currículum Vitae:

Since finishing my PhD in 2016, I have produced multiple publicly available datasets, an R script to standardise the interpretation of canopy wetness data, and 23 publications. 22 of the publications are in Q1 journals (including Nature [no. of papers: 1], Nature Climate Change [1], Global Change biology [5], New Phytologist [3]), and 9 are first-author publications. I have an H-Index of 15 and >1600 citations (Google Scholar). As principal investigator I have won grants of >£470k.

Currently I supervise one PhD student, a postdoctoral student, and manage a research technician. Previously I co-supervised three PhD students and three BSc Honours projects, all of whom obtained outstanding marks. I have contributed to several undergraduate and MSc programmes by giving tutorials, taking field trips and delivering lectures, including a series of MSc lectures called 'Tropical forests in a changing climate', for which I set and marked the exam questions. I have also actively engaged with non-science audiences, e.g., by providing content for information boards at Daintree Discovery Centre (an award-winning natural history attraction in Australia); giving talks to conservation groups; and teaching primary school kids about trees and the water cycle.

I am a subject editor of the journal Frontiers in Forests and Global Change and have served as an expert reviewer of >20 journals. I have also taken a lead role in organising symposia at annual meetings of the International Association for Ecology (INTECOL 2017) and the Association for Tropical Biology and Conservation (ATBC 2020).

During my PhD I worked on the world's longest running drought experiment in the tropics (Prof Meir, Univ. of Edinburgh) in the Brazilian Amazon. My work on the adaptive capacity of drought stressed trees resulted in new insights into leaf water relations, photosynthetic traits, and the discovery that Amazonian trees acquire water directly from the environment via their leaves – foliar water uptake (FWU). This hitherto little-known phenomenon formed the basis of my first postdoc at Australian National University. I went on to provide the first community-level estimates of the contribution of FWU to transpiration, and developed theory concerning FWU pathways.

In my previous postdoc I set up instrumentation in two remote, off-grid Australian tropical rainforest sites. This resulted in the most robust characterisation of stand-level forest hydraulic conductance to date and an assessment of the effects of atmospheric dryness on forest stature, biomass



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and species composition. Continuing my work in the Amazon, I published the first ever estimate of the duration and extent of canopy wetness in tropical rainforests, and developed the first multilayer physical and empirical prediction models for canopy wetness, with an associated methods paper.

Since moving to Spain in June 2022, I have won a Beatriu de Pinos fellowship grant and the la Caixa Postdoctoral Junior Leader Fellowship (from Dec 2023). This latter has enabled me to start my own research group and manage a research budget, providing freedom to generate my own research momentum. I have also become a part of the research network in CREA and am currently a named researcher on six research projects, including a transnational project funded by the European Biodiversity Partnership.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: LIEDTKE, HANS CHRISTOPH
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Correo Electrónico: christoph.liedtke@ebd.csic.es
Título: Evolution at different scales: from gene expression to lineage diversification

Resumen de la Memoria:

My research career has been steered by a resolute interest in evolutionary novelties and processes that generate biodiversity. I have approached this interest from different angles, bridging biogeography and systematics, with comparative phylogenetics, with transcriptomics and epigenetics. My work can largely be distilled into three research lines that look at trait and lineage evolution at different organizational scales: from macro evolutionary patterns, to molecular mechanisms. 1) Using phylogenetic comparative methods, I study fundamental, and at times contested concepts in the theory of evolution, including "Ecological Opportunity" driven diversification and adaptive radiations (Liedtke et al. 2016, Evolution), punctuated "saltations" in trait evolution (Liedtke et al. 2018 Nature Ecol. Evol.) and directionality, particularly the reversal of trait evolution (Liedtke et al. 2022, Nature Comm.). 2) The species is a fundamental unit of biodiversity. Yet we struggle to find a consensus on how to delimit lineages. For many biodiversity hotspots we lack a clear understanding of the true number of species present and questions remain as to why some geographic areas harbour more species than others. I have a keen interest in systematics and biogeography and my second research line is dedicated to better understanding the diversity of African amphibians, a largely understudied geographic group (Liedtke et al. 2021, Molec. Phylogenet. Evol.; Liedtke et al. 2023, Zool. J. Linn. Soc.). 3) Recent years have seen a paradigm shift in the way we think about the interplay of the environment and organismal development (phenotypic plasticity) for generating novel evolutionary features. Natural Selection acting on phenotypes is undisputed, yet we know relatively little about how genotype-by-environment interactions resulting in these phenotypes are regulated and inherited and their role in generating evolutionary novelty. My third line of research takes aim at better understanding how phenotypic plasticity is regulated at genomic level and how plasticity evolves. Specifically, I combine experimental ecology with genome/transcriptome-wide sequencing to characterize transcriptomic (Liedtke et al. 2019, G3; Liedtke et al. 2021, Mol. Ecol.; Liedtke et al. 2022, DNA Research) and epigenetic responses leading to plastically divergent developmental trajectories. Moving forward, I am particularly enthusiastic about bridging macroevolutionary divergences and their functional, genomic basis. This is one of the most exciting challenges in evolutionary biology today. With a strong background in macroevolution, experience in transcriptomic analyses and expanding understanding of mechanistic aspects of intra-specific trait variation, my research goal for a Ramon y Cajal is to incorporate mechanistic information into studying amphibian life history modularity at an interspecific level.

Resumen del Currículum Vitae:

I am a R3-certified (AEI) evolutionary biologist, currently undertaking an Emergia fellowship at the Biological Station of Doñana-CISC, in Seville. My work has made important contributions to our understanding of lineage diversification, trait evolution, genomics and developmental plasticity. I received my B.Sc. in the UK (Zoology, University College London), my M.Sc. in Sweden (Animal Ecology, Lund University) and my PhD in Switzerland (Zoology, University of Basel). Since then, I have conducted postdoctoral research stays in Switzerland and Spain (Biological Station of Doñana). I produce consistently high-quality research, having authored 38 peer-reviewed articles (H-index=13, citations=700; Google Scholar). As first author, I have published in journals including Nature Communications, Nature Ecology and Evolution, Scientific Reports, Molecular Ecology, Proceedings of the Royal Society B, Evolution and Biology Letters. I have consistently secured funding through 13 grants (8 as PI) and 4 postdoctoral fellowships. These were awarded by distinguished, international sources including the Swiss and Spanish government, National Geographic Society, British Ecological Society and IUCN.

My impact extends beyond citation metrics. 5 publications fall within the top 5% of yearly research outputs scored by Altmetric, and 4 more within the top 25%. On ResearchGate, 7 of my publications have interest scores >95%. I have disseminated my work at 19 international conferences in 9 different countries.

I am an active member of local and international scientific communities. I am a board member of the Amphibian Genomics Consortium and the Seville "omics" community (SevinOmics.org). I sit on the specimen collection access committee at the Biological Station of Doñana (2022-present) and held the position of Associate editor for the journal Herpetology Notes (2013-2022, handling 73 submissions).

I have accumulated teaching experience across multiple institutions. I currently teach a module in the Bioinformatics and Systems Biology Master program of the University of Sevilla (since 2022, 24 accredited hours). I have also taught a module for the Animal Experimentation Qualification course (EU certifications a, b and c) at the Biological Station of Doñana (7.5 accredited hours), and R and bioinformatics workshops for graduates and postgraduates at the University of Basel (2013), Biological Station of Doñana (2023), Autonomous University of Madrid (2023, 2024) and University of Dar es Salaam (Tanzania; 2024).

I have supervised the degree projects of 7 Master students (U. Basel: 2014; U. de Pablo Olavide: 2017, 2020, 2022, 2024; U. de Sevilla: 2020; U. College London: 2022) and 2 Bachelor students (2011, 2012; U. of Basel). These were meaningful projects that have contributed to 5 publications. I am currently co-supervising 3 PhD students, 1 enrolled at the University of Dar Es Salaam since 2021, and 2 enrolled at the University of Sevilla since 2022.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: Díez Díaz, Verónica
Referencia: RYC2024-048638-I
Correo Electrónico: diezdiaz.veronica@gmail.com
Título: Fossil Heritage Reimagined: Dinosaur Biomechanics, Digitisation, and Ethics in Palaeontology
Resumen de la Memoria:

Research Proposal:

My research builds on an interdisciplinary approach to understanding several aspects within palaeontology. This proposal leverages my extensive postdoctoral international experience (9.5 years) as Principal Investigator at the Museum für Naturkunde and the Humboldt Universität zu Berlin, my collaborations with institutions across Europe and North and South America, and my contributions to high-impact research published in journals such as *Cretaceous Research*, *Frontiers in Earth Science*, and *Nature Ecology & Evolution*.

The first pillar integrates systematic and paleobiogeographical studies of titanosaurian sauropods, drawing on my previous research into European and North African taxa (20 papers, 13 as first author). Collaborations with international teams have already provided key insights into titanosaurian dispersal and evolutionary patterns, and my ongoing network of colleagues from France, Romania, Spain and the UK will further enhance this work.

The second pillar focuses on sauropod biomechanics, a field where my pioneering work includes 3D reconstructions of the tail musculature of *Giraffatitan brancai* (Díez Díaz et al. 2020) and range of motion analyses (manuscript under review). These studies provided new insights into locomotion and behavioural patterns. Building on this expertise, I aim to expand these methodologies to other taxa, exploring how variations in axial skeleton biomechanics influenced ecological adaptations and evolutionary patterns. This work will be enriched by my collaborations with biomechanics experts at other national and international institutions.

The third pillar addresses the digitisation and ethical management of palaeontological collections, an area where I developed standardized protocols for 3D digitisation and data and metadata collection and management. My work in this field, highlighted by publications such as Díez Díaz et al. (2021), has advanced best practices for ensuring reproducibility, data accessibility, and open science. This research proposal will expand on these protocols, creating tools to optimize the long-term preservation and global accessibility of museum collections.

Impact and Relevance:

My main objective is to return to Spain and get funding thanks to national and international competitive calls, and thus form a strong group in the institution where I establish myself to continue my research lines. This research proposal will not only advance the understanding of sauropod evolution and biomechanics but will also address critical challenges in the digitisation and ethical stewardship of palaeontological collections, especially those with a controversial past. By integrating my research outputs and methodologies developed at leading institutions, my projects will establish Spain as a hub for cutting-edge dinosaur research and digitisation of collections strategies. It will strengthen ties between Spanish and international scientific communities, foster innovation in digitisation of natural history collections, and contribute to the sustainable preservation of palaeontological heritage. In addition, my knowledge and experience can contribute to the management and digitisation of archaeological and art collections, extending my proposal to the national network of museums, also helping to foster ethical dialogues concerning some of these collections.

Resumen del Currículum Vitae:

I am a palaeontologist whose career focuses on 3 interconnected areas: Late Cretaceous titanosaurian sauropods, dinosaur biomechanics, and digitisation of palaeontological collections, best practices and ethics. I obtained my PhD in Geology (2013, EHU). My position was funded by a FPI fellowship. After a short postdoctoral position in Spain, I moved to Berlin (2015), where I have been developing my own research lines as PI of 3 research projects, besides acquiring funding for 2 short-termed and collaborating in others as team member or external researcher (2 international and 5 national). I secured > €600k for those projects in which I was the PI, being funded by important research agencies, such as the Alexander von Humboldt Foundation (2015-2017), the Berliner Chancengleichheitsprogramm (2018-2021) and the Deutsche Forschungsgemeinschaft (2021-ongoing). I have carried out my research at the EHU in Bilbao and the Museum für Naturkunde and the Humboldt Universität, both in Berlin.

My network of recurrent collaborators is ca. 35 researchers, whose affiliations are located in Argentina, Belgium, China, France, Germany, Italy, Spain, Romania, the Netherlands, the UK, and the USA. I have 27 scientific publications (17 as first author, 2 as solo author) in JCR journals and 4 chapters in books (3 of them as first author). I have currently under review 3 manuscripts and 3 book chapters about dinosaur palaeontology (this one being a chapter within the 3rd Edition of *The Dinosauria*), digitisation and ethics. My h-index is 16, and my work has been cited 602 times (Scopus, January 2025). I have participated in scientific meetings since 2007, with 62 oral and poster presentations (36 as first author, and 26 as oral presentation). I have also been invited as keynote speaker in 3 scientific meetings.

I made significant contributions to understand the diversity and evolutionary history of titanosaurs in Europe and North Africa, leading groundbreaking research on their paleobiogeography and phylogenetics. My pioneering work on sauropod caudal biomechanics has provided new insights into their locomotion and behavioural ecology. Additionally, I have advanced the field of digitisation of natural history collections, developing standardized 3D digitisation protocols for the creation, quality assessment, and data and metadata collection and management, also advocating for open and ethical practices. Thanks to this, I was awarded the Digital Female Leader Award in Science in 2018.

I supervise 4 Msc and 1 Bch students within my team. I give lectures in masters from universities from Germany, Italy and Belgium, and I am an instructor in courses on photogrammetry and digitisation best practices worldwide. I am academic editor (2), referee for 39 JCR international journals (78 manuscripts) and evaluator of national and international funding calls (3). I am also the Ethics Officer of the European Association of Vertebrate Palaeontologists and the President of the Society of Spanish Scientists in Germany.

I participated in 14 outreach talks, 14 interviews for radio and science podcasts, 4 documentaries (e.g. *Walking With Dinosaurs* and for the European channel ARTE), and 2 innovative outreach programs. I contribute to ethical debates on colonial histories and the responsible management of paleontological collections, also stressing the role of women in science.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: PÉREZ GRANADOS, CRISTIAN
Referencia: RYC2024-048830-I
Correo Electrónico: perezgranadosc@hotmail.com
Título: Biodiversity monitoring using new technologies

Resumen de la Memoria:

My main research line is about the use of new technologies, mainly passive acoustic monitoring, and automated detection for biodiversity monitoring, which is a trending technique with huge potential for wildlife conservation due to its automated and non-invasive character. I have also large experience working with threatened birds, especially the Dupont's lark, and invasive species. The three research lines align with the idea of improving biodiversity conservation. During the fellowship I aim to continue working on the development of new methods for wildlife monitoring using novel technologies, mainly sound recorders but also drones and thermal cameras, topics on which I have worked during the last years. My main goal is to provide solutions and easy tools to managers for effective monitoring of threatened species and ecosystems monitoring. Therefore, I hope to contribute to expand the use of this technique for wildlife monitoring and biodiversity conservation. In this line, I will continue working within the Species Monitoring Specialist Group of the IUCN as active member. Likewise, I will also keep contributing to the study and conservation of the Dupont's lark and management of invasive species.

As specific studies to develop during the Fellowship I will use the Dupont's lark as study model to assess the impact of habitat fragmentation on threatened species and to assess the effectiveness of a new recording device. I aim to analyse the temporal changes on the genetic structure and cultural traits (e.g. vocalizations) of the species and to assess whether these changes are associated to habitat isolation. I will also evaluate how birds' vocalizations vary according to habitat fragmentation and population decline, by assessing the differences over time within a genetic vocalization, the call, and a learned vocalization, the song. To do this, I will re-visit 30 populations monitored two decades ago to assess their genetic and cultural evolution. From a methodological point of view I aim to provide the first assessment of a new version of AudioMoth (GPS integrated), which will allow for acoustic localisation of vocalizing wildlife. First, I aim to develop a workflow in R for acoustic estimation of wildlife abundance in terrestrial environments, which will facilitate the use of this technique for researchers and managers. In a second objective I am to assess the relative performance, of different approaches to estimate wildlife abundance from sound recordings in a setting with known population abundances. My previous experience on the proposed topic, the current dialogue and ensured budget with the "Generación de Conocimiento" project that I coordinate greatly improve the feasibility of achieving these objectives. Finally, I also aim to assess the impact of human activities on protected areas by recording the soundscapes, aiming to extent the use of sound recorders beyond species' monitoring, an aspect quite novel in the literature. The proposed objectives are somehow related to my prior experience but all of them are novel and will likely be of great interest for the scientific community and contribute to improve my future career and internationality.

Resumen del Currículum Vitae:

I got the Extraordinary Doctorate Award at Alicante University for a PhD about the threatened Dupont's Lark (*Chersophilus duponti*). My findings were transferred to managers and used as baseline for habitat management. I did my first postdoc at the Autonomous University of Madrid within a LIFE project, where I developed a new research line about how monitor birds using sound recorders. These studies had a great impact, since the utility of sound recorders for estimating wildlife density has been poorly assessed. I won two Brazilian post-doctoral competitive fellowships (CAPES), where I become an independent researcher and expert on analyzing Big Data. In the meantime I was part of the research team of an international project (Biodiversa). I have co-organized two international Workshops (> 30 researchers and managers from > 10 countries) aimed both to develop conservation strategies at European. Currently, I work as a Distinguished Researcher Beatriz Galindo at Alicante University, with the aim of improving the monitoring programmes of threatened species using novel technologies. Currently, I am author of 80 articles (h-index of 22) published in peer-reviewed journal, of which I am the unique, first, or senior author in 60 of them. I am also strongly devoted to transfer the knowledge generated to the public and managers. Indeed, I have published over 20 books or book chapters, 20 articles in popular magazines and developed two family games and a history for children. I have also participated in >40 scientific conferences, including plenary presentations and invited communications in international conferences, plus 35 lectures (11 as invited lecturer). My scientific career also includes work as Associate Editor for the journals of *Ardeola* and *Trends in Bird Science*. I have also worked as a reviewer for over 70 scientific publications and several I+D projects ("Generación de Conocimiento 2023" and "Parques Nacionales" call) and over 5 I+D projects or students proposals for the Dirección General de Política Universitaria e Investigación. As supervisor I have already supervised two PhD students, three MSc students and for Bachelor theses. My teaching experience started in 2011 (> 400 h in three universities, R3 and Contratado Doctor certifications). I have participated in more than fifteen research projects, including national and international ones (LIFE, Biodiversa, Biodiversa+), including the coordination as principal researcher of nine projects, including the coordination as PI1 of a project of the call "Proyectos de Generación de Conocimiento 2022". Owing to my international and collaborative career I was invited to be member of the Species Monitoring Specialist Group of the International Union for Conservation of Nature. During the last year, I awarded with the "Francisco Bernis 2024" award, by an international committee, granted by the Spanish Society of Ornithology as the young Spanish Researcher with better contributions in the last two years, and included in the Stanford/Elsevier List of 2024 as a top cited author (top 2% in Ornithology). Currently, I am associate researcher at the Federal University of Mato Grosso (Brazil) and in February 2025 I will start a new position at Centre de Ciència i Tecnologia Forestal de Catalunya to assess and promote the use of new technologies for biodiversity monitoring.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: FEINBERG, ARYEH
Referencia: RYC2024-049848-I
Correo Electrónico: afeinberg@iqf.csic.es
Título: Anthropogenic and global change impacts on the atmospheric mercury cycle
Resumen de la Memoria:

My research focuses on the atmospheric cycles of trace elements and their impacts on climate, ecosystems, and human health. During my PhD at ETH Zurich, I produced the first-ever atmospheric selenium model, in order to study the impact of atmospheric deposition of this micronutrient on agriculture and nutrition. By creating this model, I was able to answer unresolved questions about the atmospheric lifetime, emissions, and transport of selenium. I published future projections of sulfur and selenium deposition, showing declines in key agricultural areas that could lead to elevated risks for nutrient deficiencies. During my postdoc at MIT, I broadened my scope to study the drivers of atmospheric mercury pollution. I investigated the role of vegetation as a sink of atmospheric mercury and improved the capability of models to represent this sink. These improvements enabled novel work into how land use change (e.g., deforestation and reforestation) affects the flows of mercury in the environment. This research resulted in the first estimate of the global emissions of mercury from deforestation, highlighting an overlooked source of anthropogenic mercury. I analyzed trends in atmospheric mercury observations, identifying a decline likely driven by anthropogenic emissions. I am currently working at IQF-CSIC as a Marie Skłodowska-Curie Actions Postdoctoral Fellow (MSCA-PF), where I am researching the changing chemical processes that impact the atmospheric transport and deposition of mercury.

I am particularly interested in developing and applying data science techniques to tackle environmental questions. In my PhD, I initiated a collaboration with uncertainty quantification experts to conduct global sensitivity analyses on the selenium model. We identified that constraining selenium emissions should be prioritized over refining measurements of selenium rate constants; our corresponding publication was selected as a highlight article by EGU. I have since been invited to join international projects to apply global sensitivity analysis, model emulation, and Bayesian inference techniques to other atmospheric chemistry problems (e.g., ozone and aerosol chemistry). I also applied advanced time series analysis methods to identify the anthropogenic and natural drivers of recent atmospheric mercury trends. My work has particular relevance for informing global policy efforts to address mercury pollution, including the Minamata Convention on Mercury. For that reason, I play a leading role in an international multi-model intercomparison study of mercury cycling to aid in global policy assessments.

My experiences working as a researcher in four countries (Canada, US, Switzerland, Spain) and between multiple fields (atmospheric chemistry, biogeochemistry, data science) will be an asset for me in building my future research group. In the future, I plan to develop new models to track mercury sources using available measurements, enabling a new way to validate emissions estimates. I will also investigate how the atmospheric redox chemistry of mercury varies with anthropogenic emissions and climate, revealing how the atmospheric cycling of mercury changes in the past and future. The planned projects will provide new insights into the drivers of past mercury trends, in order to improve future predictions of pollution.

Resumen del Currículum Vitae:

During my Chemistry BSc at McGill University (Canada, 2014), I became interested in atmospheric chemistry due to its importance for climate and health. I moved to ETH Zurich for my MSc and PhD studies to pursue my interest in chemistry-climate modeling. Under the supervision of Prof. Thomas Peter, for my MSc thesis I studied the application of stable isotope tracers to constrain the fluxes of methane, which was awarded the ETH medal for top thesis in the Earth Science department. My PhD work (2020), jointly supervised by Prof. Thomas Peter and Prof. Lenny Winkel, was a highly interdisciplinary project investigating the atmospheric cycling of the trace element selenium. My PhD thesis was recognized for its novelty and advances in understanding the evolution of the selenium cycle, and was awarded the ETH medal and the ACP Award from the Swiss Academy of Sciences. I trained leadership abilities during the PhD stage by participating in collaborations independently from my advisors, publishing as the corresponding author, and supervising student theses on selenium. In 2021, I moved to the Institute for Data, Systems, and Society (IDSS) at MIT to work on global mercury cycling, hosted by Prof. Noelle Selin. I became active in the science-policy interface at MIT. For example, I was appointed to the international roster of scientific experts supporting the effectiveness evaluation of the Minamata Convention on Mercury. In 2024, I joined the group of Prof. Alfonso Saiz-Lopez at IQF-CSIC as a MSCA postdoc fellow to study uncertainties in the atmospheric chemistry of mercury.

As an early career scientist (5 years post-PhD), I have demonstrated my ability to acquire funding (~300.000 EUR), having secured fellowships for my postdoc at IQF-CSIC (MSCA-PF from Horizon Europe), my postdoc at MIT (Early Postdoc.Mobility fellowship from Swiss National Science Foundation), and my MSc research (Excellence Scholarship from ETH, Moyse Scholarship from McGill). I have published 2 book chapters and 26 peer-reviewed articles (9 as first-author, 8 corresponding author, 2 in PNAS and Science Advances). I have 900 citations and an h-index of 14 (Google Scholar). I presented more than 30 times at conferences and seminars, including invited seminars in companies (Chevron) and top universities (e.g., Harvard University, University of Toronto). In 2024, I was selected to give a plenary presentation in the Next Generation in Mercury Session at the International Conference on Mercury as a Global Pollutant (ICMGP). I have co-convoked and chaired sessions at EGU, ICMGP, and the Goldschmidt Conference. I was selected for the Atmospheric Chemistry Colloquium for Emerging Senior Scientists (ACCESS) XVI in 2021, a prestigious networking and training opportunity for 25 early career scientists.

I am currently co-supervising 2 PhD students from MIT and I have co-supervised 3 student theses (1 BSc, 2 MSc) at ETH and MIT, who received excellent evaluations of their work. I have been a teaching assistant for 6 semesters at ETH and McGill, and I completed the intensive Kaufman Teaching Certificate Program at MIT to learn and apply new teaching strategies. I have continuing collaborations with international scientists from many institutions, due to my work developing community atmospheric chemistry models (GEOS-Chem and CESM) and my involvement in the mercury research community.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: MARTÍNEZ RICART, AURORA
Referencia: RYC2024-050649-I
Correo Electrónico: auroramricart@gmail.com
Título: Global change in coastal marine ecosystems

Resumen de la Memoria:

I am a marine scientist studying global change in coastal ecosystems. My research connects the disciplines of ecology and biogeochemistry in the coastal marine realm to understand (1) how natural ecosystems are impacted by climate change, environmental change, and other anthropogenic activities, and (2) how natural ecosystems can help mitigate and adapt to climate change as well as serve as climate change refugia.

To this end, I study marine macrophyte foundation species, such as seagrasses and macroalgal beds, due to their importance as primary producers in coastal areas worldwide, their high primary productivity and carbon sequestration, and because these ecosystems are great models to answer general ecological questions due to the analogies with other marine and terrestrial habitats.

My general approach consists of developing manipulative field and lab experiments in combination with observational field studies. Towards that purpose, I draw on techniques that span ecology, ecophysiology, biogeochemistry, and oceanography. I do basic research driven by hypothesis testing, and part of my research has also a strong applied component.

Within these main lines, I develop research in:

COASTAL / OCEAN ACIDIFICATION: My research addresses the impacts of coastal and ocean acidification in marine ecosystems and finds potential solutions. Thus, I study the influence that marine macrophytes exert in seawater carbonate chemistry and how this may translate to increased ecosystem resilience. In particular, I seek to understand if seagrass meadows and macroalgal beds (including kelp forests and seaweed farms) can function as chemical refugia for organisms affected by seawater acidification and serve as natural tools to help to mitigate its effects in coastal areas.

HABITAT LOSS THROUGH THE LENS OF SEASCAPE ECOLOGY: My PhD work focused in advancing the conceptual framework of this novel discipline. I looked at how seagrass ecosystems spatial configuration and seagrass habitat fragmentation and patchiness affected main ecological processes within the habitat: 1) Nutrient transfer and trophic interactions; 2) Blue carbon storage and burial in seagrass sediments; 3) Community structure effects on associated faunal assemblages. This approach, as well as the discipline of community ecology, are largely present in my current research, especially in the study of species interactions and habitat interactions at multiple scales and their effects on ecosystem resilience.

COASTAL CARBON CYCLE / BLUE CARBON: My work focuses on the study of the coastal carbon cycle and the role of blue carbon habitats (vegetated marine ecosystems including seagrasses, saltmarshes, mangroves, and lately macroalgae) in carbon sequestration and climate change mitigation. My research informs conservation and management actions as well as Ocean-Carbon Dioxide Removal (CDR) strategies.

Resumen del Currículum Vitae:

I hold a degree in Biology (2010) by the University of Valencia-Spain, a Master (2011) and PhD in Ecology (2016) by the University of Barcelona-Spain, short research stays in Australia, Mexico and Portugal as a PhD student or undergrad student, and 5 years of Postdoctoral research in the United States, at the University of California Davis and the Bigelow Laboratory for Ocean Sciences.

I landed in 2022 at the Institut de Ciències del Mar (ICM-CSIC) with a Marie Skłodowska-Curie Action Individual Fellowship (MSCA IF EF-ST) where I have now initiated a small research group thanks to a Junior Leader grant from La Caixa Foundation.

Throughout my career, I have been awarded several individual grants by Spanish and European funding research agencies at the PhD level (FPI, COST Short Term Scientific Mission, global mobility grants) and at the Postdoctoral level (MSCA IF EF-ST, Beatriu de Pinós which was rejected in favor of the Junior Leader). I am certified as R3 Established Researcher and was awarded the Consolidación Investigadora, both in 2023.

I had a leadership role as Principal Investigator (PI) in 5 research projects, one of which is still ongoing. Along my career I have also been a researcher in 20 research projects and contracts, granted by highly competitive R&D Programs from different granting agencies.

I am author of 32 articles (14 as first author or senior author, 24 without PhD supervisors) published in peer-reviewed SCI journals, 1 book chapter, and 8 technical reports focused on coastal environment management from contracts with external institutions. My publications have been cited +1140 times, H=15 (Google Scholar), +780 times, H=13 (Scopus). I have participated in 53 international conferences, and I am 1st author in 19 of them (1 invited talk, 13 orals, 5 posters). Further, I have been invited to give scientific seminars in 16 research institutions around the globe.

Due to my expertise, I have been invited as an expert scientific advisor by different research and policy institutions in Spain, Scotland, Australia, US and also United Nations. These invitations translated in workshops to develop policy and novel research frameworks, or in being a member of reviewer committees for project proposals in international calls.



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I have developed teaching assistant activities and have also been invited to give guest lectures (University of Barcelona, and University of California, Davis). I have 2 ongoing PhD students and have mentored 7 masters² and +20 undergraduate students and interns. Some of those students² works have been presented at international conferences and published in scientific journals.

I am an Associate Editor in the Scientia Marina journal and an active reviewer for other scientific journals (+20). I am heavily committed to STEM outreach activities. I have participated in research programs for schools, and have extensive experience in science communication to the general public. My work has been highlighted in different media outlets worldwide (radio, magazines and newspapers) including: Science, Forbes, Los Angeles Times, San Francisco Chronicle, and Scientific American. The links can be found in my website www.auroramricart.com.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: MARTIN, PHILIP
Referencia: RYC2024-050060-I
Correo Electrónico: phil.martin.research@gmail.com
Título: Improving evidence-based approaches to inform forest conservation and management
Resumen de la Memoria:

Since the start of my research career, I have been committed to building a robust evidence base to guide biodiversity conservation. During my PhD at the UK Centre for Ecology and Hydrology, I designed and led projects to produce the first pan-tropical estimates of forest recovery after deforestation and the first meta-analysis of the impacts of Reduced Impact Logging. These studies shaped ongoing research, including mentoring a PhD student and supervising a master's project, which both resulted in papers.

To deepen my understanding of forest resilience, I joined Bournemouth University as a postdoctoral researcher. I combined small-scale field studies with mechanistic models, producing landscape-level predictions of forest dieback impacts for the New Forest national park, UK producing four publications. Recognizing inefficiencies in collaboration, I introduced GitHub workflows to improve transparency and efficiency.

At the University of Cambridge, I worked as a postdoc on the Conservation Evidence and BioRISC projects, strengthening my knowledge of conservation management. In this post I had a number of responsibilities, such as co-PI on PhD project on geographic and methodological biases in conservation, development a tool using Natural Language Processing that reduced time needed for evidence synthesis, and production of conservation decision support tools. Here I collaborated with world-leading researchers on projects including one published in Science on forest restoration impacts on ecosystem services.

In 2021, I joined the Basque Centre for Climate Change (BC3, Spain) as a postdoctoral researcher in the Horizon 2020 project, Holisoils. I led a global meta-analysis on the impacts of precipitation change on soil invertebrates - one of the most methodologically robust syntheses in soil ecology. I introduced interdisciplinary methodologies, like umbrella reviews, to synthesize evidence on forest management impacts. This approach offers transformative potential for scaling up synthesis in ecology. My collaborations at BC3 have so far resulted in publications in Global Change Biology and Nature Ecology and Evolution.

In 2024, I began my Ikerbasque Fellowship at BC3, focusing on forest management and restoration. I have quickly secured funding for a PhD student and an international working group funded by BES. Currently, I lead three projects addressing biases in forest restoration, quantifying the impacts of climate-smart forestry, and bridging research and practice in forest policy.

The coming decades will be a critical for forests, which face escalating climate disturbances whilst being relied on to mitigate the climate and biodiversity crises. My planned research line will tackle these problems, leveraging my expertise in evidence synthesis to assess the impacts of forest management practices on key societal priorities such as biodiversity, carbon storage, and timber production. My work will focus on three main strands: identifying policy priorities through systematic searches and horizon scanning, quantifying the impacts of forestry practices via umbrella reviews and systematic reviews, and developing an interactive decision-making tool to guide forest management by making trade-offs explicit. This research will contribute to the national implementation of the EU forest strategy and shape the future direction of applied forest ecology.

Resumen del Currículum Vitae:

With 12 years' experience in applied ecological research, I have a substantial publishing record, publishing 49 peer-reviewed articles, 14 of which I was first or senior author, and 3 books. My work has been cited >3200 times according to Google Scholar (H-index is 27) and has informed policy documents by IPBES, FAO, and other international organizations, demonstrating its tangible impact on science and decision-making.

My research is interdisciplinary, focusing on the impacts of global change on biodiversity and identifying solutions to biodiversity conservation problems. My work has increasingly focused on forests with the aim of providing a robust evidence-base to guide management. I have worked at four research centres in two countries giving me experience of working on a broad range of ecosystems including temperate, tropical, and Mediterranean forests. Throughout my career, I have demonstrated leadership and independence by securing funding (~450,000 € in total), leading projects, mentoring early-career researchers, and driving methodological innovation in applied forest ecology and evidence synthesis.

I am passionate about fostering the next generation of researchers and contributing to the scientific community. I have supervised, co-supervised, or mentored 4 PhD students, 6 masters students, and 2 undergraduate students leading to 8 peer-reviewed publications. I have taught students ranging from undergraduate to PhD level on topics including Wildlife Conservation and evidence synthesis methods. I am Associate Editor at the Journal of Applied Ecology where I am currently organising a Special Feature on Evidence-Based Conservation.

In September 2024, I began my Ikerbasque fellowship at the Basque Centre for Climate Change, where I am establishing a research focused on forest management and restoration. Within four months, I have secured funding for two projects, allowing me to hire my first PhD student, who started in December 2024. I am currently the PI of three projects: (i) Forest-Bridge (Ikerbasque fellowship), which aims to close the research-practice gap in forest management and policy (ii) the PhD project 'Quantifying the environmental and economic impact of climate-smart forestry' (Ikertalent, Basque Government) and (iii) the BES-funded working group 'Identifying, quantifying, and accounting for biases in forest restoration'.

In summary, through innovative research, interdisciplinary collaboration, and effective leadership, I have advanced knowledge in applied forest ecology and evidence synthesis. I am building a dynamic research group addressing critical challenges in forest management and restoration, ensuring my work has a tangible impact on science and society.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: VILLA, ANDREA
Referencia: RYC2024-048550-I
Correo Electrónico: andrewjayhouse@gmail.com
Título: Paleoherpetology and comparative osteology of amphibians and reptiles

Resumen de la Memoria:

My research is focused on amphibians and reptiles, with a particular interest in their fossil record, evolutionary dynamics, and comparative osteology (both of extinct and extant species). My current research activities cover three main macroareas: 1) the paleobiodiversity of Cenozoic herpetofaunas in Eurasia and Africa; 2) the comparative osteology of amphibians and reptiles; and 3) the taxonomy, diversity, and functional morphology of rhynchocephalian reptiles in Europe. Outputs of the first research line include the characterization of a number of paleoherpetofaunas from Eurasia and Africa, with their paleoclimatological and paleoenvironmental significance, and the description of five new species of amphibians and squamate reptiles. In 2019, I also published an updated overview of the Neogene and Quaternary fossil record of lizards in Europe. The second line developed in parallel, leading to the osteological description of several taxa. One of the most significant results is the publication of an extensive comparative osteological atlas of the skull bones of extant European lizards, provided with detailed diagnostic keys. This interest in amphibian and reptilian osteology further led to the development of an overview project summarizing all available published information about this topic, which I am co-coordinating. The project is still ongoing, with the collaboration of an international team of paleo- and neoherpetologists. The third research line resulted in the description of a new species of Jurassic rhynchocephalian and a new specimen of marine rhynchocephalian from Europe. In the next years, I plan to further expand on these three research lines. First, by studying additional Cenozoic palaeoherpetological assemblages, in particular from the three northern Mediterranean (Iberian, Apennine, and Balkan) peninsulae, Central Europe, and central Asia. For the second research line, I plan to start applying 2D and 3D geometric morphometrics to better understand the intra- and interspecific variation in the skeletal elements of amphibians and reptiles, and potentially use this information to better identify fossils. The research line on rhynchocephalians will also be further developed, in collaboration with the Mesozoic working group of the Bayerische Staatssammlung für Paläontologie und Geologie in Munich. In addition, I also plan to open two new research lines: a first one on the applications of network analysis in paleontology and herpetology, and a second one on the mutual influence between paleontology and popular culture.

Resumen del Currículum Vitae:

I obtained my PhD with honors in Earth Sciences (Università degli Studi di Torino), with a project on the Neogene and Quaternary paleodiversity of European lizards. During my PhD, I performed brief stays in foreign institutions through two Synthesys grants (museums in Paris and Vienna) and an Erasmus Traineeship grant (Institut Català de Paleontologia Miquel Crusafont, ICP). My PhD project was awarded the "Prof. Francesco Barbieri" award for herpetological studies by the Societas Herpetologica Italica. In 2018, I was hired by the Martin-Luther-Universität Halle-Wittenberg to study the fossil lizards from the renowned Geiseltal site. In 2019, I was awarded a Humboldt Research Fellowship to join the Bayerische Staatssammlung für Paläontologie und Geologie (BSPG), in Munich. Since 2021 I work as a postdoctoral researcher at the ICP, funded by a Juan de la Cierva-formación and a Beatriu de Pinós grants. In 2021, I obtained the Italian National scientific qualification to the role of associate professor. I participated in fieldwork in Europe and Africa, and took part in several research projects, even leading my own ones as a PI in two cases. I am currently collaborating with an extensive network of scholars from all continents.

My scientific production includes 55 papers in SCI journals (23 in open access), 3 papers in non-indexed journals, 3 book chapters, and 3 conference proceedings (as editor). I coauthored 64 contributions presented in national and international meetings. I acted as reviewer for 32 scientific journals, for a NERC (UK) and two OPUS (Poland) funding proposals, and I am assistant editor for Acta Herpetologica. I gave classes for the Natural Sciences bachelor at the university of Torino (2016) and for the Master in Paleobiology and Fossil Record coorganized by the ICP (since 2022), and was invited as guest lecturer by universities in Belgium and Italy. I supervised 29 theses (bachelor and master) and am currently supervising one PhD student enrolled at the Università degli Studi di Torino. I further mentored two Erasmus students at the ICP. In 2023, I acted as substitute committee member for a PhD defence in the Geology PhD course of the Universitat Autònoma de Barcelona. From 2014 to 2021, I coorganized the annual roundtable of the Palaeontologist in Progress (PaiP), the group dedicated to paleontology students and early-career researchers within the Società Paleontologica Italiana (SPI), further acting as spokesperson for the group from 2019 to 2021. PaiP activities helped numerous young paleontologists in Italy to expand their academic network. I also coorganized the 2021 PaiP/SPI paleoart virtual exhibition. I participated in the organization of two congresses and as part of 11 scientific committees. I regularly contributed as a guest speaker to Scientificast, the first Italian scientific podcast, from 2016 to 2019, and coordinated the "Fossili Regionali" project, an outreach initiative meant to involve the public to select a representative fossil for each Italian region. I acted as treasurer for the SPI (2016-2018) and was a board member of the European Association of Vertebrate Palaeontologists (2021-2024).



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Turno General

Área Temática: Ciencias y tecnologías medioambientales

Nombre: SENDRA VEGA, MARTA

Referencia: RYC2024-049212-I

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Título: Biological interactions at nanoscale level

Resumen de la Memoria:

I have always been interested in human and environmental health, fascinated by the processes that take place in the human body and the impact of the environment on humans, especially at the nanoscale, with a focus on understanding the interactions of nanomaterials (<100 nm) with organisms, tissues, cells and molecules. Throughout my scientific career, I have focused on investigating the effects of oxide nanomaterials and other nanoparticles across a range of biological systems, including bacteria, microalgae, bivalves (clams and mussels), zebrafish (as a model organism), and human cell lines. My research encompasses interactions of nanoparticles with biological fluids, cells, and membranes. I have also explored the mechanisms of endocytic uptake of nanoparticles and their subsequent impacts at cellular and molecular levels.

During my postdoctoral studies, I refined my research trajectory with a clear focus on achieving scientific excellence through Predictive Science. This approach emphasizes the development of tools that enable us to anticipate and predict the potential consequences of environmental exposures, ultimately guiding us to mitigate future risks.

To advance Predictive Science, my research integrates two pivotal areas:

1. Alternative in vitro models: These models provide a reliable substitute for in vivo models, aligning with the 3Rs principles (Replacement, Reduction, and Refinement) to efficiently screen chemicals to which we are exposed.

2. Omics technologies: These cutting-edge tools enable the mapping of Adverse Outcome Pathways (AOPs), facilitating early prediction of toxicological effects and offering insights into the molecular mechanisms underlying adverse biological responses

In pursuit of these goals, I have employed alternative in vitro models including mussel hemocytes and in vitro 3D models of immortalized human cell lines. Additionally, I have integrated RNA-seq analysis to predict the biological processes, cellular components, molecular functions, and KEGG pathways affected by environmental pollutants.

This multidisciplinary approach not only strengthens our capacity to predict adverse outcomes but also positions my research at the forefront of environmental toxicology and nanotechnology. By providing critical insights, it contributes to scientific innovation and supports informed decision-making by industry, regulatory bodies, and scientific advancement.

I aspire to become a leading scientist and establish a team research recognized globally as a reference in predictive toxicology. Achieving this requires learning from top experts in the field and integrating cutting-edge methodologies.

Resumen del Currículum Vitae:

I completed my academic studies in 2010 at the Faculty of Science, University of Granada (Spain). I obtained two MSc degree – one in Oceanography from Cádiz University in 2011 and another in Biomedicine in 2017. In 2014, I pursued doctoral studies within the Ecotoxicology, Ecophysiology and Biodiversity of Aquatic Systems group at ICMAN-CSIC. I successfully defended my PhD thesis entitled “Metallic nanoparticles (TiO₂, CeO₂ and Ag) behaviour, bioavailability, ecotoxicity and bioaccumulation in freshwater and marine organisms” on 26 of June of 2017. During my PhD and subsequent postdoctoral research, I have actively integrated principles and methodologies from various toxicological fields

Recently, as leader of the task 4.2 (164,000 €) of CONVERT2GREEN (European project), I have carried out an upgrade in the facilities of toxicology Lab. The new fundings and equipment’s has allowed me to develop new 3D dynamic lung, liver, and brain in vitro with the same expressed genes than human organs validated by RNA-seq analysis. This new upgrade has allowed me to create a new research line; “3D in vitro models”; and the supervision of a PhD student; Julia Rodriguez Vinagre (contract awarded by the Junta of Castilla y León). The upgrades in the Lab and the implementation of SSbD framework have been key to be incorporated in: i) new financed projects of the last European calls such as SUNRISE on which I am leading some of the tasks in the WP2 and SAFARI; as well as regional call such as NADESforNature, and ii) ongoing European projects such as FreeMe and CONVERT2GREEN which I am leader of the WP2 and task 4.2 respectively, and in projects on which I am collaborating such as NEFERTIT, DIAGONAL and SURFBIO. In the past, during my postdoctoral stage in ICMAN and IIM-CSIC, I got funding as principal investigator for two projects (14,000 €) from public calls. During the projects, I was supervisor of four Degree students (three at the University of Cádiz, Siena, and Vigo) and three Master students (Cádiz, Católica de Valencia, and Burgos University). My scientific production and leadership are supported by 43 publications (38 articles and 4-chapter books), being first author of 25 of them (all of them Q1). My contributions show 1654 cites and H index of 20.

My internationalization has extended to more than 9 European countries for CONVERT2GREEN, 5 for FreeMe, 10 for NEFERTITI, 14 for DIAGONAL, 5 for SURFBIO, 8 for SAFARI and 9 countries for SUNRISE project. The internationalization is plausible in the interaction with the partners in the WPs. I have written scientific works with 26 international institutions from 13 different countries and more than 98 co-authors. Due to my international activity, I got two awards for the best oral presentation in two international congresses. In relation to my mobility and internationalization i) in the pre-doctoral stage, I did several stages in Greece (6 months), Portugal (7 months; 1 paper) and USA (4 months; 1 paper), and ii) in the post-doctoral stage in IIM-CSIC in Vigo (2.5 years; 7 papers), UPV/EHU (3 months), NIB in Slovenia (7 months; 1 paper published and other in preparation) and ICCRAM in Burgos (2 years; 5 papers). The work published from my stay in Slovenia took part of the PARC and CutCancer European project.

As reference in my area of expertise, I have been chairman of a session of the SETAC most important international congress in toxicology.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: OTTAVIANI, GIANLUIGI
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Título: Plant functional ecologist and biogeographer

Resumen de la Memoria:

My research revolves around 1) functional island biogeography, and 2) functional ecology of plants. I use trait-based approaches as main tool examine fundamental strategies shaping plant species' local persistence and distribution, how they may respond to changes in environmental conditions. Therefore, my research has implications for, and implementations in applied ecology (conservation, ecosystem functioning). My research lies on strong conceptual footings (highlighted by >10 opinion/forum/perspective/viewpoint/review papers), then testing formulated hypotheses in proof-of-concept research articles published top-ranked journals in plant science, ecology, biogeography. I work at different scales, from finer/local to coarser/regional.

Research line 1: I recently worked in the emerging field of functional island biogeography, which I significantly contributed to open and shape thanks to a dedicated project I got funded by the Czech Science Foundation (~310K EUR) assessed as Excellent at its completion. Together with the lab I formed and led (3 PostDocs, 2 technicians), and with the extended research network I established, we produced high-quality research. We provided conceptual frameworks to test longstanding questions in island biogeography using tailored trait-based approaches. We tested some of those hypotheses, e.g. showing how island plant species tend to have better abilities to persist locally with increasing insularity. These findings are also relevant for management because insular floras have high conservation values, and we found island specialist species may delay/offset local extinction risk by adjusting their functional strategies promoting their local persistence likelihood.

Research line 2: Since my PhD, I developed a keen interest in plant functional ecology. This further reinforced and expanded during my PostDoc to these days, aiming at consistently publishing high-quality research. I explore several topics relevant to trait-based plant functional ecology, e.g. whether different traits and functions (above- and belowground) co-vary forming integrated plant strategies. Or, how plant functional traits respond to changes in environmental conditions (e.g. along aridity or resource availability gradients) at the intra- and inter-species, assemblage levels. Also, changes in management regimes may affect some ecosystem functions, such as biomass allocation to specific organs (e.g. belowground rhizomes) playing other key roles in e.g. carbon stock.

My independence and leadership skills are also reflected in my publication record. I published 46 scientific papers: in 20 articles I served as first or co-leading author, 12 as senior or corresponding author, and I have published 37 scientific papers without my PhD supervisors. I co-supervise 3 students (1 PhD, 2 Master), and advised early-career colleagues when wrapping up their PhD thesis. I organized and kept block of lectures for students of different levels focused on trait-based plant ecology (University of Camerino, Italy; Masaryk University, Czechia), and I was invited as keynote speaker at 2 scientific conferences (1 national, 1 international). I am in the process of submitting an ERC Consolidator Grant (2025 call), further expanding and combining my two main research lines, which I plan to keep pursuing and developing in the next steps of my career.

Resumen del Currículum Vitae:

I am a plant functional ecologist and biogeographer using trait-based approaches to better understand what shapes species' local persistence and distribution, especially in insular systems. My research is rooted in strong conceptual footings, then testing hypotheses formulated in the conceptual work in proof-of-concept research articles. I work at different organizational levels and spatial scales. I have strong management and networking skills. For my PhD (University of Western Australia, Perth), I examined whether plant species specialized/endemic to refugia in southwestern Australia carry a signature of their unique eco-evolutionary history in their trait patterns. I largely contributed to developing a conceptual framework integrating trait and phylogenetic information to provide testable hypotheses aimed at better understanding how refugia' priority elements in conservation' operate eco-evolutionarily. We then tested some of these hypotheses, finding support for our expectations. I was supervised by world-leaders in biogeography, vegetation science, and plant functional ecology (Prof Mucina L., Prof Keppel G., Prof Laliberté E.). Overall, 7 publications stemmed from the PhD.

During a two-years PostDoc position with Prof Klimesova J. (Institute of Botany, Trebon, Czechia), I had two main research objectives that were successfully achieved: 1) to provide standardized protocols for collecting some neglected functional traits in plant ecology (e.g. related to clonality), and 2) to study relationships between aboveground and belowground plant biomass, organs, traits, functions. I was actively involved in i) creating and managing the international research network and workflow, ii) field-data collection, iii) data analysis, and especially iv) leading manuscripts' drafting and revisions. Overall, we published 11 manuscripts in high-ranked journals.

My career as researcher started with a project funded by the Czech Science Foundation (assigned on a competitive selection; January 2019-June 2022; total amount of funding: ~310K EUR) serving as PI. I established and led the team composed of 3 PostDocs, and 2 lab and field technicians, and developed a set of essential leadership and project management skills. I also created an extended research network of world-leaders and early-career researchers in plant ecology and (island) biogeography' the core components of functional island biogeography, an emerging field that I have contributed to open and shape both conceptually and empirically. The project was successfully completed and evaluated as Excellent' results were published in 7 manuscripts in top botanical, ecological, biogeographic journals. I currently work at the National Research Council, Italy, following up with the research lines exposed above; also, the project I am involved in deals with post-fire plant strategies in Mediterranean ecosystems.

My research is published in top-ranked journals, e.g. Trends in Plant Science, Trends in Ecology & Evolution, Global Ecology and Biogeography, Ecography, Diversity and Distribution, Functional Ecology. I was invited to give talks at ~20 research institutions worldwide, including at Sorbonne University (Paris) and University of Oxford, and as keynote speaker at scientific conferences. I serve as peer reviewer for 32 scientific journals (e.g. Nature, Trends in Ecology & Evolution).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: IZQUIERDO VERDIGUIER, EMMA
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Título: Machine Learning for Monitoring and Understanding phenology dynamics and their impacts to climate change

Resumen de la Memoria:

Mi trayectoria científica se centra en el uso de técnicas avanzadas de aprendizaje automático y percepción remota para el monitoreo de ecosistemas y el análisis del impacto del cambio climático. Durante mi carrera, he liderado y participado en múltiples proyectos internacionales de investigación, integrando modelos de aprendizaje de máquina, computación en la nube y datos de observación de la Tierra para abordar desafíos ambientales a escala global. He trabajado como investigadora postdoctoral en el Laboratorio de Procesado de Imágenes de la Universidad de Valencia, donde lideré un proyecto innovador que exploraba relaciones espacio-temporales entre variables climáticas esenciales y la fenología de la vegetación mediante enfoques no paramétricos y computación en la nube. Actualmente, soy científica senior en la Universidad de Recursos Naturales y Ciencias de la Vida (BOKU), Viena, donde dirijo proyectos de alto impacto, incluyendo el desarrollo de herramientas de IA para el análisis de la calidad del suelo y la productividad agrícola.

Mi línea de investigación integra modelos avanzados de aprendizaje automático y computación en la nube para el monitoreo de la dinámica de los ecosistemas, con énfasis en el desarrollo de metodologías escalables y explicables. Entre los objetivos de mi trabajo destacan: (1) el desarrollo de herramientas de IA para analizar tendencias fenológicas y climáticas, (2) la mejora de la integración de datos multi-fuente para un monitoreo robusto de los ecosistemas, y (3) la creación de modelos escalables para predicciones ambientales a escala global. Mi experiencia combina investigación teórica y aplicada, abarcando desde la generación de métricas fenológicas de alta resolución hasta la implementación de algoritmos en plataformas como Google Earth Engine, proporcionando soluciones accesibles y reproducibles para la comunidad científica y usuarios finales.

A lo largo de mi carrera, he mostrado liderazgo e independencia, gestionando equipos multidisciplinarios, supervisando a estudiantes de máster y doctorado, y contribuyendo a la transferencia de conocimiento a través de talleres y formación en técnicas avanzadas. Además, he promovido la ciencia abierta mediante la publicación de bases de datos y herramientas en repositorios FAIR y catálogos comunitarios. Mi investigación no solo aborda preguntas científicas fundamentales, sino que también contribuye a estrategias de resiliencia climática, consolidando un enfoque innovador y globalmente aplicable en el análisis de ecosistemas.

Resumen del Currículum Vitae:

Soy doctora por la Universidad de Valencia, donde trabajé en el grupo de Procesado de Señal e Imagen (ISP/IPL) en el proyecto EODIX, desarrollando metodologías avanzadas para la calibración de datos ópticos y extracción de información. Durante mi doctorado, realicé estancias en instituciones internacionales como la Universidad de Trento (Italia), la Universidad Carlos III (España) y la Universidad del Ártico (Noruega), que resultaron en publicaciones en revistas de alto impacto y reconocimientos como el segundo premio en el concurso de artículos estudiantiles del congreso IGARSS 2012.

Posteriormente, como investigadora postdoctoral en el ITC de la Universidad de Twente (Países Bajos), colaboré en proyectos centrados en el análisis espacio-temporal de variables climáticas y métricas fenológicas a escalas continentales, utilizando enfoques innovadores basados en computación en la nube. Desde 2018, trabajo en la Universidad de Recursos Naturales y Ciencias de la Vida (BOKU), Viena, donde he contribuido a proyectos europeos e internacionales relacionados con observación de la Tierra y soluciones climáticas. Actualmente, soy científica senior y lidero proyectos como Explainable Machine Learning for Soil Quality Analysis, financiado por el gobierno federal de Austria, y BenchFlux, financiado por Google, donde desarrollo herramientas de inteligencia artificial para aplicaciones en sostenibilidad y agricultura.

Mi actividad investigadora se ve reflejada en más de 50 publicaciones, incluyendo revistas de primer cuartil, y en el desarrollo de herramientas accesibles para la comunidad científica, como algoritmos implementados en Google Earth Engine y bases de datos publicadas en repositorios FAIR. He supervisado a estudiantes de máster y doctorado, promoviendo su formación en técnicas avanzadas de percepción remota y aprendizaje automático. Asimismo, he participado en iniciativas de formación internacional, como un proyecto Erasmus+ CBHE orientado a Etiopía. Actualmente, coordino la propuesta para un futuro proyecto Erasmus+ con un consorcio internacionales de 13 socios para fortalecer la educación en geomática y computación en la nube en Asia.

Entre mis reconocimientos destacan el premio MDPI Remote Sensing Travel Award (2018) y mi designación como Google Developer Expert (desde el año 2022). Mi trayectoria combina liderazgo, independencia y un enfoque interdisciplinario, con un compromiso con la ciencia abierta, la innovación tecnológica y la formación de futuras generaciones de investigadores.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: GARCIA PORTA, JOAN
Referencia: RYC2024-050890-I
Correo Electrónico: jgarciaporta@gmail.com
Título: Ecology, Evolution and Diversification in Novel Environments

Resumen de la Memoria:

I am an evolutionary ecologist interested in how organisms persist, adapt, and diversify in novel environments. My research combines molecular phylogenetics, morphometrics, spatial ecology, and statistical modeling, working across various organism groups.

I graduated in Biology from the Autonomous University of Barcelona in 2007, and after a year working at the Free University of Brussels, I obtained my MSc and PhD at the Institute of Evolutionary Biology of Barcelona. My PhD dissertation won the Extraordinary PhD Award. I continued my work at the Institute of Evolutionary Biology under a CSIC research contract until 2016, when I moved to the University of New South Wales with funding from the Australian Endeavour Program. That same year, I returned to Spain under the Juan de la Cierva fellowship to work at CREA until August 2018. From 2018 to 2021, I was a postdoctoral research associate at Washington University in St. Louis. In 2022, I returned to Spain with a Beatriu de Pinós Fellowship at the University of Barcelona and in 2023, I began leading my own research group at Universidad Complutense de Madrid, funded by the Atracción de Talento Investigador, modalidad 1ª program. I also conducted short-term research stays at institutions like the Field Museum of Natural History (USA) and the Natural History Museum (UK), accumulating over 5 years of international research experience.

My research has been successful in securing over €600,000 in funding, including fellowships and research projects. I have written or co-written 9 successful research proposals, including the Spanish plan nacional. I am recognized as an Established Researcher (R3) by the Spanish Research Agency and have built collaborative ties with national and international groups, particularly in Australia, Germany, and the USA.

I have published 42 research papers, 35 in SCI journals (22 in Q1 journals), with notable articles in journals such as Nature Communications, Ecology Letters, and Molecular Phylogenetics and Evolution. These publications average 165 citations annually over the last five years, with an H-index of 20 or 18 depending on the database. I am the first author of my two most-cited papers, and two of my studies have received awards at international conferences. Additionally, I have co-authored two book chapters, and all my publications are available publicly.

Teaching and mentoring are core to my career. I have supervised 5 Master students and 3 graduate students from universities in Europe and the USA. I have taught at the University of Barcelona, Autonomous University of Barcelona, and Universidad Complutense de Madrid. In outreach, I have participated in courses, talks, and blogs aimed at the general public. My work has garnered media attention, with coverage in CNN, National Geographic, Radio Canada, El País, El Mundo, and La Vanguardia.

Resumen del Currículum Vitae:

I am an evolutionary ecologist investigating the processes that drive persistence, adaptation, and diversification of organisms in novel environments. My research is highly question-driven and integrates molecular phylogenetics, morphometrics, spatial ecology, and statistical modeling across a wide range of taxa, including reptiles, birds, and plants. My work focuses on three main research themes: (1) Adaptation to Climate and Climate Change, (2) Global Expansion and Diversification and (3) Adaptation and Diversification in Insular Systems. Below I outline my main contributions and future research in each of these research lines.

Adaptation and Diversification in Insular Systems

Theory predicts that in insular environments, ecological opportunity frequently leads to rapid phenotypic and species diversification (also known as adaptive radiations).

My research in multiple island systems confirms these theoretical predictions but also reveals significant variation in diversification patterns, even among closely related groups. Moreover, my findings highlight that rapid speciation and rapid phenotypic diversification are not always coupled during adaptive radiations. One of my ongoing goals is to understand why this decoupling occurs and to refine the standard theory of adaptive radiations by integrating empirical cases that diverge from it.

Global Expansion and Diversification

Why do some groups expand and diversify globally, while others remain geographically restricted? My research identifies the role of range-expansion phenotypes traits that enhance dispersal and persistence in novel environments as critical to answering this question.

For instance, our studies on crows demonstrate that cognitive traits are pivotal for adapting to a wide diversity of planetary environments. This adaptability exposes populations to novel selective regimes, driving adaptive diversification. Paradoxically, my own research suggests that cognition may buffer selective pressures, potentially reducing diversification rates. Resolving this apparent paradox how cognition can both enhance and limit the action of natural selection is a key focus of my future research. I plan to address this using eco-evolutionary modeling approaches and investigating genomic adaptation signals across different temporal scales.

Adaptation to Climate and Climate Change

My research shows that global climate heterogeneity fosters local adaptation and evolutionary diversification in some taxa. Conversely, exposure to extreme environments, such as arid regions, often imposes stabilizing selection, which can constrain morphological disparity. One of my goals is to further explore the evolutionary consequences of colonizing arid regions. On one hand, arid-specialized species may experience strong stabilizing selection on phenotypes, which limits diversification. However, on the other, reduced competition and niche vacancies in these regions may simultaneously promote diversifying selection. By leveraging comprehensive morphological datasets and phylogenetic modeling, I aim to test whether



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arid taxa experience accelerated or decelerated diversification dynamics compared to non-arid groups. This work will illuminate the interplay between climate, adaptation, and diversification, offering new insights into evolutionary responses to environmental extremes.



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Área Temática: Ciencias y tecnologías medioambientales
Nombre: LOPEZ ACOSTA, MARIA
Referencia: RYC2024-050991-I
Correo Electrónico: marialopezacosta@gmail.com
Título: Unravelling the role of benthic organisms in the marine silicon cycle

Resumen de la Memoria:

I am a marine biogeochemist and ecologist interested in the role of benthic organisms in biogeochemical cycling, particularly the ocean silicon cycle, with a strong multidisciplinary background in biology, ecology, biogeochemistry, and oceanography that I gained throughout my career in Spain and internationally. While pelagic silicifiers have been extensively studied, benthic silicifiers remain largely overlooked, particularly regarding their contribution to biogeochemical cycles and benthic-pelagic coupling. My research aims to quantify the contribution of these organisms to marine biogeochemistry, advancing our understanding of their interplay with other nutrients and silicon sources to improve biogeochemical budgets in the ocean.

Among the main achievements of my career (PhD defense in Sept. 2018), I would like to highlight the following:

- 1) a high-end research publication record: 17 peer-reviewed publications (16 papers + 1 book chapter), 15/17 in Q1, 6 as 1st author, 6 as 2nd author, 1 as last/lead author.
- 2) my capacity to secure funding as an independent scientist: 5 projects as (co)PI (267k€) + 2 competitive postdoctoral fellowships (231k€).
- 3) my capacity to lead and open pioneering research lines with novel techniques and methodologies: new line on benthic silicon biogeochemistry in the leading group of marine silicon biogeochemistry in LEMAR-France; invitation to be part of Ifremer's working group for developing a resident Automated Underwater Vehicle for deep-sea monitoring.
- 4) contribution to cutting-edge research projects: participation in 14 research projects funded by Spain, France, Portugal and EU Commission (>12M€), my research being main milestones in projects such as H2020-SponGES or MINECO-PBS.
- 5) a high international mobility in prestigious and leading research groups: 2.5 years as a postdoc in France + ~1 year as PhD researcher abroad in 3 institutions (LEMAR-France, DFO-Canada, UiB-Norway)
- 6) a strong and global collaborative network: 63 co-authors from 16 countries; member of SILICAMICS, the international consortium for the study of marine silicon biogeochemistry and silicifiers; member of the SponGES legacy consortium, which groups leading scientists in sponge and deep-sea ecology; former member of OYSTER, the working group of early career researchers of EuroMarine to support and provide skills development and networking opportunities for early career researchers within European marine research.
- 7) my teaching and mentoring commitment to train the next generation of marine scientists: supervisor of 4 BSc & 5 MSc students; responsible for the e-course on "Siliceous Sponges" of the international Silica School; invited lecture at the MSc of Marine Biology of the University of Brest in France.
- 8) an outstanding record in outreach and transfer of scientific knowledge to the general public: co-founder of a non-profit organization for marine science communication, >15 contributions to outreach events, >15 press releases in TV, radio and newspapers, and 2 outreach papers in Frontiers for Young Minds.

These achievements prove my ability to conduct high-impact research, secure competitive funding and lead innovative research lines, positioning me as an independent and influential researcher in marine benthic biogeochemistry and ecology.

Resumen del Currículum Vitae:

With a BSc in Biology (2010, UCM) and a MSc in Marine Sciences (2011, UB), in 2014 I was awarded a competitive FPI fellowship from the Spanish Ministry of Science to pursue my PhD in marine biogeochemistry and ecology, which I completed in 2018 (Excellent Cum Laude; University of Barcelona). Already during my PhD, I showed strong international mobility, spending ~1 year in 3 international institutions (LEMAR, France; DFO, Canada; UiB, Norway). My postdoctoral career is also marked by a high level of internationalization: I did my first postdoc in the European H2020 SponGES project and I worked 2.5 years at LEMAR (France) during my second postdoc. My internationalization is also evidenced by my wide collaborative network from >10 countries and 63 co-authors from 16 countries. I have participated in 4 (73 days) oceanographic cruises and I have >300 scientific dives in the North Atlantic Ocean and Mediterranean Sea.

I have published 17 peer-reviewed publications (GS: H=10, 504 citations; Scopus: H=9, 381 citations) in top-ranked journals of Oceanography (e.g., Limnology & Oceanography), Geosciences (e.g., Nature Geoscience, Biogeosciences) and Multidisciplinary Sciences (e.g., Science Advances), including 6 as 1st author, 6 as 2nd author, 1 as last/lead author (14/17 with ≤8 authors). I have presented my research 28 times at international conferences (15 oral communications and 13 posters, including 1 best poster award) and in 11 invited seminars in France (7), Spain (3) and Portugal (1). I have hosted 3 sessions at international conferences and served on organizing and scientific committees for 4 others.

My communication goes far beyond academia, with participation in >15 national and international outreach festivals (e.g., 11F, Pint of Sciences, European Researchers' Night, Fête de la Science), co-founder of a non-profit organization for communication of marine sciences (Makara divulga) and publication of 2 outreach papers in Frontiers for Young Minds. My research has also received attention by the general media as evidenced by >15 press releases in national (e.g., La Vanguardia) and international (e.g., Le Monde) newspapers, 3 interviews in radio, 3 in podcasts and 1 in TV shows.

I have secured >590k€ in research projects as PI/co-PI (267k€), pre- (84k€) and postdoctoral fellowships (231k€), and travel and collaboration grants (11k€). I have participated in 14 research projects funded by Spain, France, Portugal and the EU Commission (>12M€). Since 2020, I have been



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responsible for the e-course on “Siliceous Sponges” of the international Silica School. I was also invited to teach an MSc lecture on Scientific Communication at the University of Brest (France). I have supervised 4 BSc and 5 MSc during their training in Spanish and French institutions and gave professional orientation for BSc and MSc students at Campus Natura (2019-2020). I belong to the international consortium SILICAMICS since its foundation in 2015 for the study of marine silicon biogeochemistry, and I was an elected member of the working group of early career researchers of EuroMarine (OYSTER) in 2019-2023, being communication officer in 2020 and co-chair in 2021. Additionally, I am a reviewer for Q1 journals (e.g., Chemosphere, Frontiers in Marine Science, PCI journals) and for individual fellowships and grant proposals of Fullbright and EuroMarine.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales

Nombre: PORTNOV, ALEXEY

Referencia: RYC2024-049732-I

Correo Electrónico: portnovalexey@gmail.com

Título: Marine geology and geophysics

Resumen de la Memoria:

As an independent researcher, I focus on methane-bearing systems in two regions – the Arctic, where they are sensitive to modern and past climate change, and the northern Gulf of Mexico, where we study methane hydrate as a future energy resource. In the Arctic, positive feedback to climate warming is by far the most significant reason driving studies of temperature-dependent shallow gas hydrate reservoirs. My research here showed that significant amount of methane emissions in the Arctic is controlled by thawing permafrost and glacial dynamics, modulating stability of gas hydrate (Portnov et al., 2013; Portnov et al., 2014; Portnov et al., 2016; Portnov et al., 2018, Serov et al., 2017; Waage et al., 2019). On the contrary, Gulf of Mexico is a favorable region for investigating gas hydrate as an unconventional future energy resource, and, in turn, understanding the carbon sequestered in depositional systems that are not as climate sensitive as in the Arctic. Our research showed that transport and deposition of clastic sediments (e.g. through submarine channel systems and turbidity currents) coupled with salt tectonics is critical for both, formation and break-up of sand-dominated methane and hydrate accumulations (Portnov et al., 2019; Portnov et al., 2020a; Portnov et al., 2020b; Portnov et al., 2021; Portnov et al., 2022).

In 2022, I developed the evolutionary basin model for our upcoming hydrate drilling site in the Gulf of Mexico. I explored the mechanisms driving overpressure and low temperature as a function of sedimentation rate in respect to gas hydrate stability. Our coupled hydraulic and heat flow numerical model shows that in rapidly formed basins, the thickness of the methane hydrate stability can at least double relative to its equilibrium depth due to both low temperatures and elevated pressures. This is an important result because under rapid burial, microbial methane can be hydrate-trapped within a significantly wider depth interval (Portnov, 2023 in review).

Research Trajectory

My most recent research, which I am developing in The Andalusian Earth Sciences Institute, focuses on remote submarine landslide dating using the transient response of gas hydrate stability. Our pilot study was published in *Geology* journal in January 2023. We developed a novel technique for remote submarine landslide dating that doesn't require sediment core analyses. This is an important result, because, this is the only dating approach that does not involve sediment core sampling. We apply numerical conductive heat flow model at landslide-impacted locations and correlate it with the BSR-derived depth and temperature. Furthermore, I developed a rapid quick-look analytical solution for submarine slide dating that can be applicable at the continental margins worldwide, which is especially relevant with the extending public seismic databases. The goal of the future project is to estimate timing and origin of multiple submarine landslides in several offshore regions including the New Zealand, the Gulf of Cadiz and Mediterranean Spanish margins, Norwegian margin. The objective of this project is to address one of the major problems in the field of submarine mass transport, formulated in the Pope et al. (2015) paper: "Are large submarine landslides temporally random or do uncertainties in available age constraints make it impossible to tell?"

Resumen del Currículum Vitae:

I am a marine geoscientist at the IACT-CSIC (Granada), serving as the Principal Investigator on a project funded by the Andalusian EMERGIA grant. I also hold a visiting researcher position at the University of Texas Institute for geophysics. My expertise spans marine geology and geophysics, with a focus on imaging, characterizing, and modeling geological systems related to unconventional resource exploration, fluid flow, gas hydrates, submarine landslides, permafrost, and climate change.

I earned my Ph.D. in marine geology from The Arctic University of Norway in 2015. Subsequently, I was awarded a competitive postdoctoral grant in Norway, followed by 3 years of postdoctoral research in the USA. Between 2021 and 2023, I conducted research at the University of Texas at Austin, leading two industry-sponsored projects. In total, I have acquired 8 years of international research experience across three institutions, alongside a robust network and ongoing collaborations with leading industry partners (total attracted funding ~ €450,000).

Between 2006 and 2024, I have participated in 13 research cruises and 2 drilling campaigns in the Barents, Kara, Laptev, Norwegian, Mediterranean seas, Fram Strait and the Gulf of Mexico. Most significant roles include: supervisor on the industry-sponsored geophysical survey in the Kara Sea in 2013, lead geophysicist on a 2016 scientific cruise in the Barents Sea, lead geophysicist on a 2023 drilling campaign in the Gulf of Mexico. I have also participated in 3 on-land field trips in Italy, Spain and Morocco mainly focusing on the deep-water sedimentary systems.

As of December 2024, my scientific contributions include 36 publications: 30 journal publications; 10 first-author papers in Q1 journals (among others, *Geology*, *Nature Communications*, *Earth and Planetary Science Letters*) and 20 co-authored articles. I published 3 book chapters, and 3 scientific reports (with DOIs). From the total count, only 17% of my publications are in co-authorship with my PhD mentor. My work has garnered 1170 citations (H-index: 18, Google Scholar). Additionally, I have co-supervised 6 students (4 Master's and 2 Ph.D.) at two U.S. universities, and served as reviewer for 17 journals. I participated in 15 research cruises, 25 conferences and delivered 6 invited talks.

During my term at the University of Texas at Austin, I developed a novel mathematical approach for age-dating submarine slope failures without sediment sampling. This method, which I enhanced by developing publicly available software, remains a central focus of my research at IACT-CSIC. Since joining the IACT-CSIC, I have integrated into the Spanish research system, established strong collaborations, and participated in several projects, including an Arctic IODP drilling pre-proposal (ongoing), Permafrost Advisory Board and a COST action (ongoing). I am currently applying for the Ramón y Cajal grant to secure a permanent research position in Spain.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: GARCÍA ROA, ROBERTO
Referencia: RYC2024-049496-I
Correo Electrónico: roberto.garcia.roa@gmail.com
Título: Factores bióticos y abióticos que influyen en la selección sexual y comunicación animal

Resumen de la Memoria:

The study of animal communication and its role in sexual selection has always captivated me. This passion has driven me to explore diverse biological systems, acquire cutting-edge methods, and embrace interdisciplinary approaches to unravel its mysteries. A journey that began during as an undergraduate, when I independently sought international collaborations, conducting research internships in Nicaragua and Uruguay and learning about acoustic communication at the Fonoteca (MNCN-CSIC).

During my PhD, I further expanded my expertise through internships in Argentina, Belgium, and the United Kingdom. These experiences shaped my ability to think independently and contribute significantly to the research groups I worked with. For example, I developed novel gas chromatography-mass spectrometry (GC-MS) procedures to detect and measure lizard chemical signals in my PhD group. Later, as a Juan de la Cierva postdoc at the University of Valencia in Pau Carazo's lab, I introduced phylogenetic comparative methods and complementary model systems to study the ecology of male harm. My work on the thermal ecology of sexual selection—an unexplored topic in the group and an emerging field in general—established a new research line in Pau Carazo's lab that attracted funding from three different Spanish institutions. This helped the group to grow, leading to the recruitment of two PhD students and a laboratory technician.

To build a comprehensive foundation for studying the ecology and evolution of sexual selection, I focused my recent Marie Skłodowska-Curie project on the evolution of visual communication in lizards. With expertise spanning acoustic (undergraduate), chemical (PhD), and visual (postdoc) communication, as well as sexual selection (PhD and postdoc), I have developed a robust and versatile background. This diverse expertise equips me to address new arising questions about how sexual selection operates in nature.

Along the way, I have acquired a wide range of technical and theoretical skills that have made the difference to achieve my scientific goals. These efforts have culminated in publications in prestigious journals such as Proceedings of the Royal Society B, Functional Ecology, and Biological Reviews, spanning fields such as evolutionary biology, functional morphology, and animal communication. Additionally, I have also led over 20 peer-reviewed papers in specialized herpetological journals, highlighting my dedication to also advancing both fundamental biological science and herpetofauna conservation.

Very relevant is my commitment to science communication. I have a strong commitment to communicating science to a broad audience, which has spilled over into several contributions to popular science media; for example, in National Geographic.

Together, these experiences have provided me with a solid foundation upon which to build a successful independent research career, combining innovation in sexual selection and animal communication research with a passion for conservation and public engagement.

Resumen del Currículum Vitae:

Seven years after completing my PhD, I have authored 43 papers published in SCI journals, including Biological Reviews, Proceedings of the Royal Society B, Functional Ecology, and Global Ecology and Biogeography, among others. I am also the author of 13 peer-reviewed articles in non-SCI journals, primarily focusing on natural history research, and one book chapter. These publications collectively demonstrate my commitment to advancing both theoretical understanding and fundamental biological science. Among them, I have 32 first-authored papers (18 SCI; 13 non-SCI), with my work cited over 800 times (H-index = 17, i10 index = 23; last 5 years).

Throughout my career, I have consistently secured competitive national and international funding for professional development: as an undergraduate (UAH grant, Bancaja, Santander CRUE), as a Ph.D. student (FPI Spanish Government fellowship), and as a post-doc (Juan de la Cierva Formación; SIIDER Fellowship; Marie Skłodowska-Curie fellowship). Over the years, I have made significant empirical and theoretical contributions (e.g. García-Roa et al. 2018, Pro B; García-Roa et al. 2019, Funct Ecol; García-Roa et al. 2020, Biol Rev), opening two new research lines in Carazo's lab and laying the foundation for a promising novel research avenue to understand the ecological context of sexual conflict. In total, I have presented my work through 17 contributions in congresses and as an invited speaker at five scientific congresses/symposiums.

I have had the privilege to supervise one BSc student, five MSc students. Also, I have co-supervised one Ph.D. student with Dr. Pau Carazo. I have led the organization of two cycle of scientific conferences (UAH, 2012; MNCN; 2015) and participated in the organization of other scientific events such as the ICBIBE symposium (Valencia, Spain, 2022) and I Zoological Congress of Uruguay (Montevideo, Uruguay, 2011). My career demonstrates a strong commitment to contributing to conservation through my involvement in several international projects (e.g. Antarctica, 2022, in partnership with Greenpeace International and National Geographic; Republic of Guinea, Gabon, and Cameroon 2022-23, in partnership with the Pan African Sanctuary Alliance). This scientific pathway also reflects an intense effort to knowledge transfer, which is significantly strengthened by my skills as a scientific and conservation photographer. I have published 35 articles in popular science magazines, including National Geographic, The Guardian and Mètode, and have been invited to give a dozen of talks in outreach events in the last 5 years. I have received over 30 photographic awards since 2015, and my visual work on animal behaviour, natural history and conservation has been exhibited by multiple national and international institutions (e.g. Natural History Museum of London; British Ecological Society). In 2022, I was appointed as a fellow of the prestigious International League of Conservation Photographers, and I have recently got the Alexia Conservation Grant.



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In summary, my professional trajectory represents a combination of increasing scientific knowledge, transferring it to the general public, and thereby contributing to the understanding and preservation of the natural world.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales

Nombre: AUSIN, BLANCA

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Título: Biogeoquímica y paleoclimatología

Resumen de la Memoria:

I have a dual background in Paleoclimatology and Biogeochemistry, with focus on lipid biomarkers and radiocarbon. The major relevance and contribution of my scientific output resides in addressing multidisciplinary research questions at different time scales merging observational, analytical and modeling approaches.

1) For instance, I revealed that hydrodynamic particle sorting processes exert a ubiquitous influence on the radiocarbon age of sedimentary organic carbon in the world's oceans. My work has provided a generic framework that may serve as a guide to refine the assessment of OC burial and constrain the extent to which down-core variations in sedimentary records reflect hydrodynamic changes versus derived proxy signals.

2) I have also explored temporal differences among co-deposited proxy-carriers from down-core sediments at unprecedented resolution. By modeling approaches, I quantified the input of very old allochthonous material in our sedimentary sequences. For the first time, this information was used to correct the measured sea surface temperature record. My work implies a major step towards the quantification of the impact of allochthonous inputs on paleoclimate signals and our ability to provide reliable paleoclimate reconstructions.

3) Other work has contributed to improve our knowledge of the drivers and impacts of rapid climate changes in the NE Atlantic Ocean and Western Mediterranean Sea.

4) Nowadays, I am focused on quantifying the impact of hydrodynamic processes on the fate of marine proxy particles and the fidelity of the derived signals. Last December, my team and I accomplished an ambitious sampling program specifically designed to capture, through the deployment of mooring lines, particles transported in the water column at various depths and record the hydrographic conditions during a complete seasonal cycle in a cross-section in the SW Iberian margin. Ours are the first moorings ever recovered from this reference region for high-resolution paleoclimatic investigations. In total, we have obtained 4 sediment traps with bi-weekly samples for 1 year and associated data on temperature and salinity, current speed, and turbidity. The latter constitute the core study material to produce novel knowledge on the provenance and transport pathways of proxy particles, including coccoliths, organic carbon, and alkenones. Along with my research group, I will also aim to implement methodologies to identify and consider possible biases in paleoclimatic reconstructions.

Resumen del Currículum Vitae:

I was awarded an FPU grant for my doctoral studies. Later, I received two Postdoctoral positions on an internationally competitive basis that were assigned to projects I devised, designed, and wrote myself: first, an ETH Fellowship-Marie Curie Actions for People COFUND Program of the European Commission, and secondly, an SNSF Postdoctoral fellowship. In 2022 I received a Starting Grant from the European Research Council for 1,499,766 € (<https://passage.csic.es/>). In 2024, I promoted to tenured Professor and then moved to IRNASA-CSIC as Distinguished Researcher. To date, I have led 5 projects as PI or unofficial PI* (> 1,978,000€ as PI) and been involved as a research/work team member in 8 projects from other PIs.

I count on two recognized research periods (sexenios) and have spent almost 5 years abroad in prestigious institutions like ETH Zurich (No. 1 in the QS World University Rankings in Earth & Marine Sciences), Oxford University, Institute of Geography and Oeschger Centre for Climate Change research, or IPMA.

In 2023, I set up the Biogeosciences Laboratory at USAL (now at IRNASA), being responsible for fund accounting and laboratory design, negotiations with vendors, public bid, purchase and installation, operation of the newly acquired instrument, and direction.

I have been the Chief Scientist of two oceanographic cruises: PASSAGE23 and PASSAGE24, taking full responsibility of the organizational and scientific aspects of both cruises. I have also sailed in three other cruises, including the Integrated Ocean Discovery Program Exp. 378.

I have published 25 research papers (22 in Q1) in top-field journals (e.g., Nature Communications, EPSL, etc.). Of these, I am the first author of 11, having conceptualized the project, processed the samples, conducted most of the analyses, led result interpretation and discussion, and written the research article integrating contributions from my coauthors. I am the second or last author of 6 other papers, having been involved in project conceptualization and substantially contributed to discussion and article writing. I have given seven invited talks and seminars, been part of the Scientific Committee in three conferences and Convener in three international sessions.

I am the sole supervisor of two PhD students and have trained a young technician for our laboratory. The four of us constitute a new research group at IRNASA. I have also mentored 10 Master's and 10 Undergraduate Students. I evaluate scientific projects for ANECA and advise potential ERC grantees during mock interviews by FECYT. I have reviewed multiple manuscripts (Nature Comm., Geology, QSR, etc) and served on three PhD Thesis committees (ETH Zurich, Uni. Barcelona, and Marum).

I have been a lecturer for 8 years at ETH and USAL and obtained the "Excellent" evaluation in the DOCENTIA teaching quality program (2019-2022). I am also a Lead Author of the next executive report of CLIVAR-España (Climate Variability and Predictability).

I am included in "Científicas e Innovadoras" by the MICIU of Spain, along with 403 other outstanding scientists, and also in the Portal to Excellent Women Academics of the SNSF. I received the Premio al Joven Talento Femenino 2023 by the Fundación Real Academia de Ciencias de España and Mastercard in the category of Biology, Geology, and related sciences among 184 candidates.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: ROCES DIAZ, JOSE VALENTIN
Referencia: RYC2024-050218-I
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Título: Iberian forests, landscapes, and ecosystem services: geographical patterns, temporal dynamics, disturbances, and drivers of change (ForLandES)

Resumen de la Memoria:

I am a researcher focused on forests and landscapes. I studied Forestry (BSc, University of Santiago 2009) and obtained a MSc in Natural Resources (2010) at the University of Oviedo. In 2012, I received a competitive PhD Fellowship (2012-15) and joined the GIS-Forest Group (University of Oviedo). After my PhD, I worked as postdoctoral researcher in two EU research projects at the CREAM (Barcelona 2016) and AgroScope (Switzerland, 2017). In 2018, I obtained a COFUND Marie Curie Fellowship to work at Swansea University (UK) exploring the main effects of fire on forest ecosystem services. In 2020, I obtained a Juan de la Cierva Incorporación fellowship at CREAM and to explore temporal dynamics of forest ecosystem services and their resilience. In 2022, I returned to the University of Oviedo firstly with a fixed-term position as a substitute lecturer, and now (March 2024) as postdoctoral researcher at the Biodiversity Research Institute IMIB (University of Oviedo & CSIC). Since I started my career I have spent 4 years abroad and 3 years in other national institutions different to the one where I obtained my PhD. In total, I have worked or done long-term research visits in 7 research centres/universities of 5 different countries.

During the last years, I have raised my capacity to do research in an independent and autonomous but collaborative way. The main part of my career has been supported by individual fellowships obtained through competitive calls including a PhD studentship and two postdoctoral fellowships (>225k€ of awarded funding). I have also obtained 12k€ as PI for organising an international workshop. I have been part of research projects totalling >9 Mill.€ funding, and also 8 private contracts. I have authored 28 peer-reviewed articles (+3 under review) being 1st author on 13/31 (2nd on 6/31) and 4 book chapters, and most of them (88%) are in the 25% top journals (CitationScore). My h-index is 20 and, overall, these publications have ~1400 citations (Jan.25 Google Scholar). I have the I3 researcher certification and the ANECA accreditation of Profesor Contratado Doctor. I have participated in over >30 Conferences, organized two International Meetings and chaired two sessions.

People obtain many different goods and services from forests and landscapes which are key to our well-being. These benefits are not supplied in a homogeneous or constant way, as their provision varies across spatial gradients and shows different types of temporal dynamics due to many drivers or disturbances. Understanding this is key to promote a sustainable and a multifunctional management of these natural resources. My main research line is focused on exploring geographical and temporal gradients in forests and their services, and it combines approaches and methodologies from forestry, landscape ecology, GIS or remote sensing. I am exploring two general aims: 1) Identifying the main factors affecting the distribution and functioning of forests and the supply of their main ecosystem services; and 2) Unravelling historical dynamics of forests, landscapes and their services at regional scales by combining different types of data or methodological approaches (from bio-physical to socio-cultural). For this, I collaborate with many national and international researchers, being part of national and international projects and research networks.

Resumen del Currículum Vitae:

I am an enthusiastic researcher in ecology and my main interests are: i) to study forests and landscapes, and their goods and services; ii) to analyse how global change impacts them; and iii) to integrate this information on planning for sustainable management. My research combines approaches from ecology, geography, landscape ecology or forest sciences. I studied Forestry (BSc, University of Santiago 2009) and obtained a MSc in Natural Resources (2010) at the University of Oviedo. In 2012, I received a competitive PhD Fellowship in 2012, joining the GIS-Forest Group (University of Oviedo) where I acquired expertise on forest ecosystem services assessment, developing specific methods for their analysis and mapping. After my PhD, I worked as research officer at the CREAM (Barcelona 2016) and AgroScope (Switzerland, 2017). There I took advantage of my previous experience, and collaborated with multidisciplinary teams for developing indicators of ecosystem services on rural landscapes. In 2018 I obtained a Cofund Marie Curie Fellowship to work at Swansea University (UK) exploring the main effects of fire disturbances on forest services. In 2020, I obtained a Juan de la Cierva Incorporación to come back to Spain and to explore at CREAM temporal dynamics of forest services and their resilience. In 2022, I returned to the University of Oviedo firstly with a fixed-term position as a substitute lecturer, and now (since March 2024) as postdoctoral researcher at the Institute of Biodiversity Research IMIB (University of Oviedo, CSIC & Asturias gov.).

I have spent 46 months abroad and 36 months in Spanish institutions different to the University of Oviedo. I have authored 28 (+3 under review) peer-reviewed articles (1st author on 13/31, 2nd on 6/31), being most of them (88%) are in the 25% top journals (source: CitationScore). My h-index is 20 and, overall, these publications have ~1400 citations (Jan.25 Google Scholar). I obtained a I3 researcher certification and an accreditation of Profesor Contratado Doctor. I have participated in over 25 Conferences, organized 2 International Meetings and chaired 2 sessions. I have obtained >225k€ funding from competitive calls, including 1 PhD fellowship, 2 postdoctoral fellowships, and 2 grants for international visits. I have been part of Research Projects totalling >9Mill.€ funding, and also 8 private contracts.

I am Associate Editor of the journal Regional Environmental Change since Sept.20. I have reviewed >35 articles in journals as Global Change Biology or Global Ecology and Biogeography. I have been part of scientific panels and reviewed proposals for funding for institutions such as German Research Agency, Spanish Research Agency or Freiburg University. I was invited by the Spanish Government as an expert on forest services for the Spanish Strategy on Ecological Restoration (2022). I have carried out teaching and supervision activities: teaching: ~600h University of Oviedo (BSc in Forestry & MSc GIS), and 70h Swansea University (2019); co-supervision: 3 PhD (B. Rodríguez-Morales, University of Santiago 2020 + 2 ongoing at the University of Oviedo), 10 BSc and 4 MSc thesis. I am also very active in outreach activities including writing articles (eg at The Conversation) or developing collaborations with general media or local companies in educational and outreach events.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: RODRÍGUEZ SÁNCHEZ, ALEJANDRO
Referencia: RYC2024-048789-I
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Título: Bioingeniería para solución de problemas medioambientales

Resumen de la Memoria:

My main research interest is the field of bioengineering, with the aim to develop a line of research based on microbial ecology and how microbial communities can be used to solve environmental problems in our world today. During my research career I have developed a bioengineering research line focusing on study of microbial communities in environmental technologies and the environment, development of new environmental technologies, and the effect of contaminants on microbial communities in the environment and environmental technologies, working with an extensive network of 78 national and international co-authors and publishing with the foremost experts in the field such as Mark van Loosdrecht (TU Delft, Netherlands), Damià Barceló (University of Almeria, Spain) or Riku Vahala (formerly Aalto University, Finland), attaining a h-index of 24 and 1583 citations on December 31st 2024, according to Scopus.

My primary current project involves the scale-up of continuous flow aerobic granular sludge technology for the treatment of wastewater. Public and private companies have demonstrated their interest in this technology, expressed by providing funding for its transfer to the industrial sector (PR/23/01, University of Granada, 15,000€; foundation of Ecogranular Technologies SL, BeAble Capital, 174,000€), ensuring an exploitable line of research.

This technology has opened new possibilities in many wastewater treatment processes. Among them, I am particularly interested in researching its capacity for treatment of dairy wastewater in a joined effort with my international collaborator Prof. Niall O'Leary at University College Cork. Emanating from this novel technology also emerges the current PhD research that I am directing in collaboration with Prof. Alejandro Gonzalez-Martinez about the application of novel artificial intelligence algorithms for the design of biological wastewater treatment technologies.

I have just finished a project studying the effect that contaminants of emerging concern pose on microalgal-bacterial consortia in photobioreactors for treatment of wastewater, in which I served as PI in collaboration with Prof. Juan Carlos Leyva-Díaz at University of Granada. This has opened a window for working on microalgae-bacteria consortia, and thus I have started a research line involving the effect that environmentally relevant concentrations of bisphenol A have on the microbiome of microalgae, collaborating with Prof. Juan Manuel Medina Sanchez at University of Granada. In addition, I am researching on the effect that anticancer drugs have over the microbial communities in aerobic granular sludge systems and their bacterial immunity through investigation of changes in bacterial CRISPR-Cas regions in collaboration with Prof. Alejandro Gonzalez-Martinez.

I will continue research on microbiome engineering of agricultural soil to provide enhanced microbially-mediated plant protection and productivity, such as control of soil-borne microbial plant pathogens and prevention of heavy metal uptake on sensitive plant species. I plan on relying on my experience and international collaboration with Prof. Lori Hoagland at Purdue University.

Apart from the bioengineering research line, I am working on computational biology research and pedagogy of health sciences.

Resumen del Currículum Vitae:

Starting as a master's student, I developed a deep interest in microbial communities, their dynamics, and their potential to address today's pressing environmental challenges. Over the course of my career, I have gained extensive experience in exploring bioreactor microbiomes, mastering molecular biology techniques, and leveraging bioinformatics and biostatistics tools. My research has delved into the diversity and dynamics of microbial communities across biological treatment processes, soil ecosystems, and plant-microbiome interactions. Through these investigations, I have identified critical factors affecting fungal pathogens, antibiotic-resistant bacteria, and human viruses, utilizing advanced methods such as next-generation sequencing, metatranscriptomics, and third-generation sequencing, including Single Molecule Real-Time sequencing.

These studies have spanned diverse geographic locations, from the Polar Arctic Circle to the Peruvian Andes, and examined various environmental stresses, such as salinity, low temperatures, and toxic chemical exposure. My research contributions have resulted in 55 published research articles in indexed journals within the fields of biological processes, environmental engineering, and environmental microbiology, accumulating 1,583 citations and an h-index of 24 (Scopus). Additionally, I have authored four book chapters and presented my findings at 20 national and international conferences. Currently, I have a Maria Zambrano contract, and I am working under the guidance of Prof. Alejandro Gonzalez-Martinez at the Institute of Water Research at the University of Granada, Spain. My research focuses on microbiome-oriented enhancements for the stable operation of aerobic granular sludge processes under continuous flow conditions. I also lead bioinformatics research on microbiome analysis robustness, the application of aerobic granular sludge technology for treating dairy wastewater, and the effects of emerging contaminants on microalgae photobioreactors. Furthermore, I have initiated a new research line exploring the pedagogy of health sciences.

Throughout my graduate studies and postgraduate experience, I had the privilege of working as a teaching assistant in undergraduate courses in Spain, contributing up to 185 class hours. During my postdoctoral tenure at Purdue University, I developed and taught a graduate course on microbiome analysis, totaling 30 class hours. Alongside formal teaching, I have mentored numerous undergraduate and graduate students during my Ph.D. and postdoctoral research. Additionally, I have supervised one international undergraduate thesis, one international master's thesis, and I am supervising one Ph.D. thesis.

Beyond research and teaching, I have developed complementary skills as a scientist. Serving on the technical committee of the Baby Food Council of the United States provided valuable experience collaborating with industry stakeholders to create impactful, research-informed solutions for society.



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As part of my editorial contributions, for the journal *Frontiers in Microbiology*, I am an associate editor for the Microbiotechnology section, review editor for sections Extreme Microbiology and Bioprocess Engineering, and topic editor for Microbial Remediation of Heavy Metal Pollution. I have also served as a guest editor for three special issues in *Water* and one in *Microorganisms*.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: CARMONA BARNOSI, LEILA
Referencia: RYC2024-049765-I
Correo Electrónico: leila.carmona@uca.es
Título: Estudio de la biodiversidad marina, especialmente la sistemática de Heterobranquios marinos.
Resumen de la Memoria:

I hold a BSc in Marine Sciences and an MSc in Oceanography from the University of Cádiz. At this institution, I secured a prestigious FPU scholarship for my PhD studies on the systematics of Aeolidiidae (Nudibranchia, Gastropoda), which yielded nine publications. From this research line, I have described over 20 new species and a new genus, significantly impacting the scientific community.

For my postdoc at the University of Gothenburg (22 months), I got funded by the Swedish Taxonomy Initiative (2,000,000 SEK, approximately €179,328.78, including salary and research support). This project allowed me to advance my research lines and publish two papers as the sole author. After my maternity leave, my research at the University of Cádiz (first as a PTA, afterwards as PSI, and now as a postdoctoral researcher) aims to incorporate molecular tools into studying and conserving marine biodiversity. For this purpose, I am the scientific manager of the Molecular Biology Lab at the INMAR and the head manager of the Molecular Biology and Genomics Laboratory within the INDALO project. Additionally, I have been involved in negotiations to include the UCA in the European Marine Biological Resource Centre (EMBRC), which will be effective in 2026. Recently, I obtained through a competitive call at the Andalusian level within the framework of the Plan Complementario de Ciencias Marinas y del Plan de Recuperación, Transformación y Resiliencia the GIBMAR-BB project (PCM_00025/ 2023-2025 / €234,904.93). This project focuses on generating a baseline of marine biodiversity in the Strait of Gibraltar and the Gulf of Cádiz using metabarcoding, ROVs, and mesocosms, addressing the impacts of climate change.

My future research focus will utilise a metabarcoding approach to establish a baseline for marine biodiversity in southern Spain, encompassing both sides of the Alboran Sea. Amidst a significant extinction crisis, resources for studying, monitoring, and conserving marine biodiversity remain limited. I now intend to make substantial progress in marine biodiversity conservation by adhering to FAIR (Findable, Accessible, Interoperable, and Reusable) data principles. Consequently, the results will be comparable across spatial (other national and international observatories) and temporal (future monitoring programmes) scales, and will also be pertinent to policymakers in the development of effective biodiversity monitoring programmes.

My results will unleash a myriad of new possibilities to prevent Global Change consequences. For instance, since it is impossible to conserve what is unknown, a complete inventory of marine biodiversity will lead to better protection programmes. Additionally, the monitoring programme proposed here will be a milestone in the early detection of non-indigenous species (NIS), which are one of the greatest threats to marine biodiversity worldwide.

Resumen del Currículum Vitae:

SCIENTIFIC OUTPUTS:

I have authored or co-authored 34 peer-reviewed publications (with 2 under review), leading 28 (84.8%) as first or corresponding author. Of these, 10 (29.4%) are ranked in the top quartile (Q1) of the JCR, and eight (23.5%) are in the second quartile (Q2). I am the corresponding author on ~65% of my publications and the first author on 41.2%. My research profile exhibits a strong citation record, with 620 citations in Scopus and 824 in Google Scholar, resulting in an H-index of 14/15 (Scopus/Google Scholar). I have presented 38 research communications at international conferences, receiving two awards for best oral presentation.

INDEPENDENCE AND LEADERSHIP:

I have won several competitive calls that secured my salary since I started graduate school. I raised over 99k € for my salary and doctoral research stays during my MSc and Ph.D. studies (La Caixa, FPU scholarship). During my PhD, I was also funded with several grants for mobility and research (over 3.000€). As the principal investigator, I have secured funding for four research projects (totalling 240,659€ for the three Spanish projects and 2,000,000 SEK for the Swedish, approximately 179,328.78€).

INTERNATIONALIZATION AND MOBILITY:

I have held international research positions for 31 months (22 as a postdoctoral researcher and nine as a PhD student). I have built a global network of collaborators (~100% of my publications involve international collaborators), including Costa Rica, Mexico, the United States, Norway, Sweden, Germany, Morocco, India, and Australia. Recently, I initiated a series of visits to several Moroccan institutions to establish a framework for cooperation with the University of Cádiz.

ENGAGEMENT:

- ACADEMIC COMMUNITY:** My commitment to teaching and outreach is evident. I have taught over 520 hours in undergraduate and graduate programs, supervised 5 master's theses, 3 final degree projects, and one doctoral thesis, organized and taught a postgraduate course, and led a project to digitize the Department of Biology's collection. I am currently supervising three master's theses and two final degree projects, contributing to the training of the next generation of marine scientists. Additionally, I reviewed more than 30 manuscripts submitted to peer-reviewed journals.
- PUBLIC:** I have actively participated in several outreach initiatives, including coordinating activities for European Researchers' Night and leading the development of a children's book on marine life.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: DESCALS FERRANDO, ADRIÀ
Referencia: RYC2024-049338-I
Correo Electrónico: adriadescales@gmail.com
Título: Understanding global ecology and change using satellite remote sensing

Resumen de la Memoria:

I am a multidisciplinary researcher specialized in remote sensing, global ecology, forest ecology, fires ecology, machine learning, and cloud computing. My research is focused on a) understanding long-term impacts on ecosystem functioning, b) integrating remote sensing and global ecology to monitor global environmental change, and c) Develop novel tools for Earth Observation using state-of-the-art satellite data, cloud computing, and machine learning techniques. My key achievements are a) demonstrated an exponential increase in wildfire activity linked to climatic warming in the Arctic, b) developed the first global map of oil palm plantations using satellite big data and deep learning techniques, and c) contributed to the understanding of the impacts of climatic constraints on vegetation phenology under climatic warming.

Thanks to my ability to attract funding, my research has always been very independent, raising highly competitive funds such as a) Marie Curie postdoctoral fellowship (success rate ~14%) at University of Antwerp October 2024, to study nutrient cycling within primary tropical forests, b) Beca Leonardo from Fundación BBVA (success rate ~9%) at CREAM in October 2023, to study the nutrient transport from savannah fires carried by trade winds towards undisturbed rainforests, and c) Expert Contract for the European Commission for mapping all oil palm plantations worldwide with unprecedented detail using high-resolution satellite data.

I have also collaborated in 10 national and international projects, including the Horizon Europe ALFAwetlands project, for which I served as Junior coordinator; I was involved in deciding the methodologies used the remote sensing tasks and coordinating researchers from 5 different international institutions. My research is highly international, including research experience in 6 different countries (Spain, Belgium, United Kingdom, Italy, Poland, and Japan), and including prestigious institutions such as University of Cambridge and the European Commission Joint Research Center.

I have published 33 SCI articles and I am the first author in 12 SCI articles (including Science) and coauthored articles in Nature Plants and Nature Communications. 11 SCI papers were published without any of my doctoral supervisors. I have supervised 1 MSc thesis at University of Barcelona and 1 PhD at CREAM. I am currently supervising 1 PhD student at University of Barcelona. My research has been awarded by Consejo Superior de Investigaciones Científicas with Premio a tesis doctorales relevantes del CSIC 2023.

The primary focus of my future research line will be to understand the impacts of land-use change, such as burning and deforestation, are diving changes in the carbon uptake capacity and biodiversity within fragmented forests. This will involve the use cloud-computing platforms for processing satellite big data, including high-resolution data from Sentinel-2 and Landsat. I will use advanced modelling approaches using state-of-the-art machine learning to assess the impacts of land cover changes on the functioning of fragmented tropical forests. The research will elucidate current and future impacts that affect the carbon sequestration capacity of terrestrial ecosystems.

Resumen del Currículum Vitae:

Throughout my academic journey, I have acquired a strong scientific background on monitoring terrestrial ecosystems, technical remote sensing and computational skills, and independent thinking through (a) collaboration in projects where I developed remote sensing algorithms, specially using high-resolution satellite data (Sentinel-2 and Landsat), (b) a strong publication track record evidenced by an h-index of 18 and by my contributions to high-profile science journals (i.e. in Science, Nature Communications, and Nature Plants), (c) acting as a reviewer for scientific journals (Nature Climate Change, Nature Communications, and Remote Sensing of Environment), (d) presentations in international conferences and active outreach in newspapers (New York Times, Agence France-Presse, and Physics Today), and (e) contribute to Open Science by publishing geospatial datasets and algorithms.

SCI publications: 33 (12 as first author and 11 without any PhD supervisors). h-index (Google Scholar) = 18; i10-index (Google Scholar): 24; Citations (Google Scholar): 1534.

10 competitive research projects including Junior coordinator in Horizon Europe's ALFAwetlands .

2 competitive fellowships: 1) Marie Curie Postdoctoral Fellowship, 2) Beca Leonardo Fundación BBVA.

1 expert contract for the European Commission.

Supervision:

Finished: 1 PhD at CREAM and 1 MSc at University of Barcelona.

Ongoing: 1 PhD at University of Barcelona.

Research experience and stays abroad in 6 institutions: University of Cambridge (4 months), European Commission Joint Research Center (6 months), University of Antwerp (4 months; currently working here), University of Liverpool (1 week), Mie University (6 months), and University Krakow (3 months).



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Turno General

Área Temática: Ciencias y tecnologías medioambientales

Nombre: BECA CARRETERO, PEDRO

Referencia: RYC2024-049987-I

Correo Electrónico: pedropersiobk@hotmail.es

Título: Doctor

Resumen de la Memoria:

My research spans 5 countries (Denmark, Ireland, Germany, Israel, Spain), 2 continents, and 9 institutions (UA, IMEDEA-CSIC, NUG, UCA, MfN, ZMT-Leibniz, ADSSC, IIM-CSIC, UV), totaling 70 months abroad. This includes 5 international postdocs (65 months) and 5 months of research stages during my Ph.D. I currently hold an adjunct lecturer position at the NUG.

2012-2014 (Pre-Ph.D.): I earned a Master's in Global Change (2011-2012) and received a COST scholarship (€2,500) at Aarhus University (Denmark), gaining expertise in mesocosm experiments with seagrasses (1 article as first author). In 2013, I completed a 10-month voluntary stay at IMEDEA-CSIC under Dr. N. Marbà and Dr. A. Travasset (1 article), followed by a 3-week research stay at ADSSC (Israel) under Dr. G. Winters in 2014, focusing on tropical seagrass meadows (1 article as first author).

2014-2019 (Ph.D.): At NUG, I developed and secured funding for my Ph.D., 'Irish Seagrass Ecology and Habitat Mapping in the Context of Climate Change' (€79,000). Under Prof. D. Stengel, I conducted 3 international stages (5 months total): (i) at MfN (Berlin) on spatial and ecological modeling; (ii) at ADSSC on biochemical plasticity and stress responses; and (iii) at UCA on restoration ecology. During this time, I published 9 articles as first author and 3 as a co-author.

2019 (1st Postdoc): I worked 3 months as a postdoc on the Irish national VOCAB project at NUG, led by Dr. R. Cave (1 article as first author).

2019-2020 (2nd Postdoc): I worked 19 months as a postdoc on the international SEANARIOS project at Leibniz-ZMT (Germany) under Dr. H. Reuter, applying cellular automata models to predict seagrass responses under thermal and nutrient stress (2 articles as first author).

2019 (3rd Postdoc): I contributed to SEASTRESS as a postdoc at ADSSC (Israel) for 6 months under Dr. G. Winters, where I also co-wrote the ASSEMBLE PLUS project 'NAIVE-HASP,' exploring physiological differences in Halophila stipulacea populations (4 articles, 2 as first author).

2020-2022 (4th Postdoc): I was awarded the Juan de la Cierva Formación fellowship (22 months) at IIM-CSIC under Prof. X.A. Álvarez-Salgado, focusing on DOM and fatty acids as biomarkers. This included mentoring 3 Master's students and contributing to 8 articles.

2022-2024 (5th Postdoc): I secured a Humboldt Fellowship to lead the CCISCAS (24 months) project at Leibniz-ZMT in collaboration with Dr. H. Reuter, investigating the impacts of climate change and invasive species on seagrass communities (2 articles as first author).

2025-2026 (6th Postdoc): I am co-leading NaturPorts (2024-2026), funded by Biodiversidad, applying nature-based solutions to ecosystem restoration in port areas

I have participated in 8 projects as a postdoc, (co-)work package leader, or PI: 2 international (SEANARIOS, SEASTRESS) and 6 national. Among these, 3 are Irish (VOCAB, BlueC, RESET), 1 German (CCISCAS [PI], Humboldt), and 2 Spanish (NaturPorts, SeaCarbon [PI]), as well as 1 ASSEMBLE PLUS project. I have secured €514,300 in funding: €257,900 for my salary (€2,500 COST, €48,000 Ph.D., €79,000 JdC, €68,400 Humboldt, €60,000 NaturPorts) and €269,400 for research (€112,950 as WP leader/PI: €5,000 Ph.D., €19,200 Humboldt, €48,000 NaturPorts, €49,750 RESET, €19,500 SeaCarbon; and €143,450 as co-WP leader/partner: €15,000 ASSEMBLE PLUS, €69,950 RESET, €32,000 BlueC).

Resumen del Currículum Vitae:

My research career addresses three key questions: (i) How do seagrass ecosystems respond to climate change, and what biomarkers best capture these responses? (ii) What are the spatial distribution patterns of seagrass species, and how do their interactions drive niche changes and species substitutions? (iii) What are the hidden ecosystem services (ES) of dissolved organic matter (DOM), and how can they be quantified? I have developed novel methodologies, including the use of fatty acids (FAs) as diagnostic tools and the application of cellular automata as ecological models. These innovations have enabled me to establish international collaborations, publish highly cited articles, secure prestigious postdoctoral fellowships, and lead research projects.

Since 2018, I have published 31 indexed articles, including 19 as first author (four as co-first author) and one as last author. My work has received 602 citations (SCOPUS) from 417 documents, with a 50% increase over the past two years. Up to 92% of my publications are international collaborations.

I have presented my research at 27 conferences (15 international), including ISBW12, 13, 14, ISEH 2016, ISEG 2016, ASLO 2023, and SIBECOL 2023.

In my career, I have worked in five countries (Denmark, Ireland, Germany, Israel, and Spain), two continents (Europe and Asia), and nine institutions (UA, IMEDEA-CSIC, NUG, UCA, MfN, ZMT-Leibniz, ADSSC, IIM-CSIC, and UV). I have participated in eight projects as a postdoc, (co-)work package leader, or PI: two international (SEANARIOS and SEASTRESS) and six national. Among these, three are Irish (VOCAB, BlueC, RESET), one German (CCISCAS [PI]), and two Spanish (NaturPorts and SeaCarbon [PI]). Additionally, I contributed to one ASSEMBLE PLUS project.

I have secured €514,300 in funding: €257,900 for my own salary (€2,500 COST, €48,000 Ph.D., €79,000 JdC, €68,400 Humboldt, €60,000 NaturPorts) and €269,400 for research: €112,950 as work package leader or PI (€5,000 Ph.D., €19,200 Humboldt, €48,000 NaturPorts, €49,750 RESET, €19,500 SeaCarbon) and €143,450 as co-WP leader or WP partner (€15,000 ASSEMBLE PLUS, €69,950 RESET, €32,000 BlueC).

I have supervised five Bachelor's students, five Master's students, one Ph.D. student, one JAE student, and two postdocs. During my Ph.D., I supervised three Bachelor students, one Erasmus Master's student, and one external student. Four of these students now hold Ph.D. or postdoctoral positions. Currently, I officially supervise a Ph.D. student (BlueC), a Master's student (RESET), and two Bachelor students at NUG. As Adjunct Lecturer at NUG (2022-2025), I deliver 4-5 lectures annually, totaling 70 hours.

In 2023, I co-authored the article One Hundred Priority Questions for Advancing Seagrass Conservation in Europe (Plants, People, Planet). I edited a Special Issue on Marine Macrophyte Restoration and Restocking (JMSE, 2022-2023). I collaborate as Reviewer-Editor for FMS and as a reviewer for journals like MPB, MEPS, and GCB. I am leading a theme at SIBECOL 2025 ('Exploring Evolutionary Adaptation and Resilience Mechanisms') and chairing the 13th Workshop in Marine Lipidomics (Vigo, 2026). Since 2024, I have participated in project evaluations for the Spanish National Plan.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: EIRAS BARCA, JORGE
Referencia: RYC2024-049118-I
Correo Electrónico: jorge.eiras.b@gmail.com
Título: Extreme weather events in Southern Europe; past, present and future..

Resumen de la Memoria:

As an atmospheric physicist, my interests have always revolved around moisture transport phenomena and the extreme hydrometeorological events. I have always tried to approach my research from a mechanistic perspective, going beyond the purely statistical description of the observations and trying to provide the physical causes that trigger them.

The first stage of my career was focused on the study of the atmospheric river phenomenon, a phenomenon of abrupt moisture transport that is closely related to extratropical baroclinic structures. I started this research in the Nonlinear Physics Group at the University of Santiago de Compostela. We have managed to make relevant contributions, analyzing the role they play in extreme precipitation and flooding in the Iberian Peninsula, demonstrating their relationship with explosive cyclogenesis, analyzing the modulation exerted on them by the NAO, providing one of the first detection algorithms, demonstrating that they can be described as Lagrangian coherent structures, and participating in the development of a global scale for their categorization. Directly related to this topic I have published 14 papers.

The second phase of my career was mainly developed within the framework of a two-year Fulbright scholarship at the UIUC. During this period, my research focused on land-atmosphere interactions in the Amazon Basin. We demonstrated the remarkable impact of anthropogenic deforestation on the hydrological cycle, analyzing both historical data and future projections.

Finally, the most recent phase of my career –which I have combined with a heavy teaching load– has focused on the analysis and evolution of moisture sources and sinks in different climatic regions. In particular, in recent years we have made significant contributions to the analysis of the expected evolution of various sources and sinks for the remainder of the century. This research has required the coupling of both Lagrangian and Eulerian models, and their adaptation to be initialized with CMIP6 model outputs.

Parallel to the development of these three main lines, I have also had the opportunity to contribute to other closely related phenomena. For example, the phenomenon of advective moisture transport known as "low-level jets" has also been a relevant part of my research. Similarly, I have contributed to the field of atmospheric residence time and have developed a European Space Agency (ESA) project aimed at analyzing and validating a new satellite database.

In the coming years, I intend to use all the experience I have gained to analyze and study extreme weather phenomena that have a high social and economic impact. In addition to the causes of extreme precipitation and floods, I intend to study the physical causes of cold and heat waves. Much of my effort will be focused on studying the evolution of all of these, as well as inferring their frequency and intensity over the remainder of the century; in the context of climate change.

I have participated in nine national and international research projects, among which the four detailed in the full report stand out. I have held management positions that demonstrate leadership skills, and I have supervised and continue to supervise undergraduate and graduate projects that also require significant dedication and I currently supervise two Ph.D. students.

Resumen del Currículum Vitae:

Major milestones in my research and teaching career:

2023: Accreditation as a full university professor by ANECA (TU).
2021-2024: Assistant Professor (AD) at the Defense University Center (associated center of the University of Vigo).
2020: Accreditation as Contract Professor by ANECA (CD).
2018-2020: Fulbright Scholarship. Department of Atmospheric Sciences, University of Illinois (UIUC), USA.
2018-2020: Postdoctoral Program Xunta de Galicia. Environmental Physics Laboratory (EPhysLab, UVigo).
2018: Ph.D. International Doctorate, excellent cum laude.
2016: Visiting PhD. Student. University of Illinois, USA.
2015-2018: PhD. Doctoral student. National subprogram grant for doctoral training (FPI, Gobierno de España). Nonlinear Physics Group (GFNL, USC).
2013-2014: MSc in Climate Sciences. University of Vigo (UVigo).
2008-2013: BSc in Physics. University of Santiago de Compostela (USC).

Short written summary of the main milestones:

In 2013 I graduated in Physics from the University of Santiago de Compostela (USC), after having financed my studies by working as a computer technician for the USC itself, among other temporary jobs. Before finishing my studies, I joined the Nonlinear Physics Group under the cover of a collaboration grant to develop research support functions. It was during this stay that I began to develop the project that would lead me to study the physics of the atmosphere, in particular the phenomena of moisture transport, and to acquire the computational skills necessary to work with various numerical models. Two years later, this link was formalized through the National Subprogram for the Training of Doctoral Candidates (former FPI). The



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FPI allowed me to teach in different courses of the BSc. in Physics and Mathematics. This work would culminate in the defense of my Ph.D. thesis of the International Doctoral Program in 2018, with a paper entitled "Atmospheric rivers and tropical moisture transport: relevance for extreme precipitation and explosive cyclogenesis", with the qualification of excellent cum-laude.

In 2018, I received a postdoctoral grant from the Xunta de Galicia and a Fulbright scholarship, which would lead me to develop two years of research at UIUC (Illinois, USA), integrated in a project of analysis of the hydroclimatology of the Amazon, among others. I also taught courses in statistical methods and physical climatology.

Returning to Spain in 2021, I obtained a position as Assistant Professor at the Centro Universitario de la Defensa, where I teach Physics in the Mechanical Engineering Degree. I continue to be associated with the Environmental Physics Laboratory, where I have participated and continue to participate as a senior researcher in several national and international projects, mostly related to moisture transport and moisture sources. This has allowed me to develop my research career without interruption.

PUBLICATIONS

Total papers: 30

Q1 papers: 23

High impact (Nature Group): 3

h-index (Google Scholar): 16

i10 index (Google Scholar): 19

944 citations in Google Scholar

Oral presentations: 27

Books & Chapters: 1

FELLOWSHIPS

Fulbright Fellowship (Department of State, USA)

Postdoctoral Fellowship (Xunta de Galicia, Spain)

FPI Predoctoral Fellowship (Government of Spain)

TEACHING

>1000 hours of certified teaching at the undergraduate and graduate levels

2 Ph.D. Students. 14 BSc and MSc thesis.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: JIMENO REVILLA, BLANCA
Referencia: RYC2024-048839-I
Correo Electrónico: bjimenorev@gmail.com
Título: Physiological and molecular mechanisms mediating variation in responses to environmental change in birds

Resumen de la Memoria:

I am an integrative biologist with broad experience in ecophysiology and behavioral ecology. My research develops interdisciplinary approaches to investigate physiological and molecular mechanisms underlying organismal responses to challenge. I combine experimental and observational studies in the field and in the lab, using birds as study species. My work has contributed to a more integrative, transdisciplinary and mechanistic understanding of phenotypic plasticity and life-history decisions on the face of rapid environmental change.

My research record includes 26 publications (15 -60%- as first author, and 6 -24%- as second or last, H index=13, total citations = 558 GS, 422 Scopus) in high impact journals (91% Q1, 52% D1, including 2 invited contributions). I did my PhD studies abroad (U. of Groningen), where I expanded my knowledge towards ecophysiology, took part in teaching activities, and boosted my national and international networks. I did several stays abroad, including a self-led epigenetics project funded by international sources. After my PhD, I did a first postdoc at the U. of Montana (US), where I led several field- and lab- based projects, enrolled in mentoring activities and started new international collaborations. I returned to Spain with a Juan de la Cierva fellowship at the U. of Castilla La Mancha (IREC-CSIC). There I started a new research line within my host lab to investigate the changes in gene expression as potential mediators of the long-term effects of early environment on the physiology of free-living birds. I then led an MSCA-IF project at the IPE-CSIC (Spain), where I applied innovative and interdisciplinary approaches to investigate the pioneering hypothesis that epigenetic potential mediates phenotypic plasticity across spatial and temporal scales in natural bird populations. I have just started and lead a new research project as a MSCA-cofund/DS Train fellow at the U. of Oslo (Norway), where I will take my ongoing research line further, to investigate the patterns linking epigenetic potential and dispersal propensity across species at a global scale.

My leadership and capacity to obtain funds from national and international sources has characterized my research trajectory, from the first steps of my education throughout internship grants, during my PhD throughout PhD studies and project grants, and more recently with larger competitive research funds to coordinate my own project (MSCA-IF/MSCA-cofund); but also to conduct scientific communication events (CoB Scientific Meeting Grant). I have presented my work at 17 scientific conferences, in 2 of them as invited speaker. I have given 6 invited research talks and 5 invited outreach talks. I have hosted and organized an international symposium and chaired another in an international conference. I have built and keep an active international research network.

I have 6+ years of postdoctoral experience in US, Spain and Norway, did my PhD fully abroad and spent ~9 months of short stays in international research institutions. I have peer-reviewed for 19 scientific journals (44 reviews), and been part of a PhD thesis evaluation committee. I have supervised 2 master theses (plus 2 more ongoing), 3 bachelor theses, and several undergrads.

Resumen del Currículum Vitae:

My research develops interdisciplinary approaches to investigate physiological and molecular mechanisms underlying organismal responses to environmental challenge. I combine experimental and observational studies in the field and in the lab, using birds as main study species and merging ecophysiology, behavioral ecology and evolutionary biology. Throughout my career I have led pioneering studies on several disciplines, with my research trajectory gradually evolving across complexity scales: from the descriptive study of behavioral patterns in the very first stages of my career, through endocrine dynamics and energy metabolism during my PhD, down to epigenetics and transcriptomics during my postdoc years. Within this framework, my main scientific contributions can be grouped along 4 research lines:

i) The deep impact of early life: I study molecular and physiological mediators of these processes and how they are shaped by environmental conditions, focusing on endocrine regulation, gene expression and epigenetic mechanisms.

ii) Revisiting the ecological interpretation of glucocorticoid hormones: Glucocorticoid hormones mediate organismal responses to external and internal, perceived or anticipated challenges, which has traditionally led to them being known as “stress hormones”, and considered indicators of animal welfare. Despite this widespread interpretation, we know very little about the causes of the huge variation in these hormones and the underlying physiological mechanisms. These are, however, fundamental questions towards an accurate interpretation of glucocorticoids in an ecological context and their use in ecophysiology or conservation biology. Much of my work has focused on addressing this issue by investigating sources and mechanisms of variation in glucocorticoids, both in the long (e.g. early life adversity) and in the short (i.e. metabolic demand) term, challenging the traditional view of glucocorticoids and contributing to a more mechanistic, functional-based interpretation.

iii) Proxies of coping capacity and stress resilience: A fair amount of my recent research has focused on finding novel, more integrative physiological traits that can be used as proxies of coping abilities in the current context of environmental change. My later work also stresses the need to turn research efforts towards estimates of hormone dynamic regulation (e.g. changes in receptor expression), instead of working with absolute hormone levels only, especially in a conservation context.

iv) Epigenetic potential as mediator of phenotypic plasticity: My just finished (MSCA-IF) and recently started (MSCA-cofund) projects broaden my research scope by introducing an innovative concept within a state-of-the-art scientific framework and across various disciplines. Epigenetic



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mechanisms → changes in gene expression that do not involve changes in the DNA sequence → enable more rapid and plastic phenotypic responses than are possible via genetic change, and individual genomes may differ in their capacity to respond epigenetically → i.e. epigenetic potential. I predict that individuals with higher dispersal propensity will show greater epigenetic potential. I will address this question at broad spatial and temporal scales, connecting molecular mechanisms, evolutionary processes and broad scale population dynamics.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: RODRÍGUEZ LOZANO, PABLO
Referencia: RYC2024-050461-I
Correo Electrónico: pablo.rodriguezlozano@uam.es
Título: Ecology and socio-ecology for the conservation of freshwater ecosystems
Resumen de la Memoria:

I am an interdisciplinary researcher fascinated by river ecosystems and their human dimensions, working on "Ecology and socio-ecology for the conservation of freshwater ecosystems". Within this research topic, I mainly work in two interconnected research lines: "Ecology of non-perennial rivers" (including community ecology, trophic webs, functional ecology, aquatic macroinvertebrates, fish, and bioindicators) and "Human dimensions and socio-ecological conflicts around freshwater ecosystems and water resources" (in which I integrate approaches and methodologies from Ecology, Environmental Sciences, Geography, Social Sciences, and Humanities).

Currently, the two main research projects I lead as PI (Caudales Menorca and SALBIA) put together these two puzzle pieces (i.e., ecology and socio-ecology) to better achieve the conservation of freshwater ecosystems. Caudales Menorca aims to establish the hydrological, ecological, and sociocultural basis to assess environmental flows in non-perennial rivers. SALBIA project (Generación de Conocimiento 2022) will assess the ecological (i.e., biodiversity and carbon cycling) and social (i.e. benefits obtained from nature, social structure and well-being) impacts of freshwater salinization in the Gambia river. Both projects use an inter- and transdisciplinary approach beyond the nature-human dualism in which river ecosystems are understood as socio-ecosystems.

Here, I present three specific research goals that are beyond my past research experience:

- 1) Revealing the ecological values of non-perennial rivers for terrestrial vertebrates
- 2) Disentangling the social perceptions and values towards non-perennial rivers.
- 3) Assessing the ecological and social impacts of freshwater salinization in the Gambia river

To develop my research lines, I will keep on applying to funding opportunities both at international, European and national level. Additionally, I will continue to cultivate my extended international collaboration network to pursue joint research interests. The Ramon y Cajal fellowship will offer me a unique opportunity to consolidate my research lines, at the forefront of freshwater ecology and socio-ecology. The outcomes of this Ramon y Cajal fellowship will significantly contribute to the excellence of research in my field.

Resumen del Currículum Vitae:

I earned a degree in Environmental Sciences from the Universidad Autónoma de Madrid (2009), receiving the First Award for Academic Excellence from the university and the National Award of Academic Excellence from the Spanish Government. Subsequently, I joined the Ecology Department of the Universitat de Barcelona, where I completed my MSc (2010) and my PhD in Ecology (2016). I achieved the highest qualification for my PhD (Cum Laude) with an International Mention and received the Outstanding PhD Award from the Universitat de Barcelona. After my PhD, I have mainly worked at two institutions thanks to competitive postdoctoral fellowships: 32 months at UC Berkeley (Ramon Areces) and > 5 years at Universitat de les Illes Balears (Margalida Comas and JdC-Incorporación). Since January 2025, I work as an Assitant Professor (Profesor Ayudante Doctor) at the Ecology Department of the Universidad Autónoma de Madrid.

As a researcher, I hold the I3 accreditation (I3/2021/1012). I have authored 31 JCR international peer-reviewed publications, with 75% not involving my PhD. I have a major position in 15 articles (48%) (first author, second author, or senior author), and I am the corresponding author in 9 articles (29%). Additionally, I have co-authored 1 book, 6 book chapters, and contributed to a handbook for stakeholders. My publications have >800 citations (h-index: 16; i10-index: 18). I have presented my research at 18 international conferences with oral presentations (3 as an invited speaker) and co-authored >40 conference communications. I have been part of the Scientific Committee of two conferences and organized 9 Special Sessions.

I have been the Principal Investigator of four competitive research projects (1 national, 3 regional), totaling over €240k in funding. This includes a national project from the Generación de Conocimiento call. I have participated in other 15 research projects funded through competitive calls (10 international, 4 national, 1 regional) and I currently lead a Work Package (WP) in the European project LocAll4Flood. I have secured funding for my salary (>€300k), funds to hire other researchers in my research group (>€80k), and attracted FPU and FPI predoctoral contracts in collaboration with other scientists.

My teaching experience is extensive (509 hours), including international teaching at UC Berkeley, and I am co-supervising three PhD students. Additionally, I have supervised 4 master theses, 3 bachelor theses, and mentored 7 undergraduate students. I led a teaching innovation project resulting in a teaching publication (book chapter). I hold the accreditation of "Profesor Titular de Universidad".

My international experience is outstanding. Besides my 32-months postdoc at UC Berkeley, I undertook two international stays during my PhD at the University of Otago (New Zealand) and the Queen Mary University of London (UK). I belong to worldwide and European research networks focused on the ecology and socio-ecology of non-perennial rivers.



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Besides, I actively participate in institutions and scientific societies to raise awareness and eliminate existing barriers for historically excluded groups. I coordinate the Diversity and Inclusion Commission of the Iberian Ecological Society, and I am an active member of the AIL Gender and Science Group and PRISMA.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: NOGUERALES RODRÍGUEZ, VÍCTOR
Referencia: RYC2024-048821-I
Correo Electrónico: titunoguerales@hotmail.com
Título: Understanding the ecological and evolutionary processes shaping the patterns of DNA variation over space and time

Resumen de la Memoria:

My research aims at understanding the ecological and evolutionary mechanisms shaping patterns of biological variation, from populations through to communities. To achieve this, I develop an integrative research program combining high-throughput sequencing with spatial modeling, demographic simulations, and artificial intelligence.

My research has provided key knowledge on i) the role of environmental dynamics in determining gene flow through landscapes and for taxa delimiting in species complexes of insects (Noguerales et al. 2018 J Biogeogr; Noguerales et al. 2018 Mol Ecol), ii) the evolutionary consequences of hybridization at different spatiotemporal scales (Noguerales & Ortego 2022 Evolution; Ortego, Gutierrez-Rodriguez & Noguerales 2021 Evolution; Noguerales et al. 2024, Mol Ecol; Noguerales & Emerson 2024 J Evol Biol), (iii) the factors shaping the spatial patterns of diversity and community composition in soil arthropod fauna and host microbiomes (Noguerales et al. 2024 bioRxiv, under review; Noguerales et al. 2023 Mol Ecol; Overcast, Noguerales et al. 2023 Mol Ecol; Fujisawa, Noguerales et al. 2022 Sys Entomol).

After receiving my PhD (2017, UCLM), I moved to the University of Cyprus as a postdoctoral researcher for 2 years, funded by the EU-Horizon2020 iBioGen project. In 2020, I moved to IPNA-CSIC through a Juan de La Cierva-Formación fellowship. I have also conducted internships for another 14 months in different institutions, including the University of Michigan (USA) and the Natural History Museum (UK). In August 2024, I initiated my current position at the ULL as a Viera y Clavijo researcher, laying the foundation for my investigative group while also acquiring teaching responsibilities in the Degrees of Biology and Environmental Sciences. As a PI, I have been recently awarded two research grants (The Linnean Society of London). I have also actively participated in other 2 international projects (including H2020, 1M), 5 national projects (>900K), and 3 regional projects (>210K).

My participation in these projects has resulted in the publication of 38 peer-reviewed articles, (14 contributions to conferences), of which 20 are published without my PhD supervisors, having a balanced record of first-author/second-author (25) and supervisor publications (3). Having a more senior researcher position is allowing me to start consolidating my research independence, developing my scientific ideas, and enhancing my leadership skills by supervising students. I am co-supervising 1 PhD student (ongoing). I have also mentored 5 BSc students (1 ongoing), 2 MSc students, and 1 early-career postdoc. I have trained 3 visiting BSc, MSc, and PhD students during their internships.

During the RyC, I wish to develop two integrated research lines aiming at i) understanding how environmental changes interact to determine the demography, adaptation, and differentiation of populations and species, as well as its genomic vulnerability to climatic change, and ii) disentangling how host-microbiome variation unfolds in response to environmental dynamics under different ecological scenarios of population divergence and gene flow. This research program will provide a solid platform to enhance my investigative group and a key step toward attaining a permanent academic position, providing me with the security to develop a long-term research agenda.

Resumen del Currículum Vitae:

CURRENT POSITION

2024-present Viera y Clavijo researcher, ULL, Canary Islands, Spain

PREVIOUS POSITIONS

2023-2024 Postdoctoral researcher, IPNA-CSIC, Spain
2020-2023 Juan de la Cierva-Formación postdoctoral fellow, IPNA-CSIC, Spain
2018-2020 Postdoctoral researcher, UCY, Cyprus
2017-2018 Postdoctoral researcher, UCLM, Spain
2013-2017 FPI predoctoral fellow, IREC-CSIC, Spain

INTERNSHIPS

2023 UCLM, Toledo (3 weeks)
2020 NHM, UK (2 weeks)
2019 NHM, UK (3 weeks)
2018 IPNA-CSIC, Spain (1 month)
2016 EBD-CSIC, Spain (4 months)
2015 UMICH, USA (3 months)
2014 UMICH, USA (3 months)

ACADEMIC EDUCATION

2017 PhD, UCLM, Spain
2013 MSc Ecology, UAM, Spain
2009 BSc Biology, UAM, Spain

PUBLICATIONS

-38 peer-reviewed articles (1 under review) and 1 book chapter



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- First (15), second (10), or senior (3) author in 28 out of 38 articles
- 20 (out of 38) articles published without my PhD supervisors
- 11 articles co-authored with scientists of >8 foreign institutions
- 75% of my articles published in Q1 journals (7 Molecular Ecology, 3 Evolution, 3 Journal of Evolutionary Biology, 2 Journal of Biogeography, 1 Global Ecology and Biogeography, 1 Molecular Ecology Resources, 1 Systematic Entomology)
- 2 articles as senior author in non-SCI journals
- 600 citations, h-index=15 (Google Scholar, 17/01/25)

PROJECTS

Investigative team:

- 4 international projects (including EU-H2020, 1M €), leading work packages
- 5 €Plan Nacional projects (>900K €), leading work packages
- 3 regional projects (>210K €, Canarias, Castilla-La Mancha), leading work packages

Principal investigator (PI):

- 2 international grants (LynneSys, PSMF), The Linnean Society of London
- 1 starting grant associated with the €Viera y Clavijo position, ULL
- 3 more proposals submitted or under evaluation, as a PI

FELLOWSHIPS

- 2024 Viera y Clavijo, ULL, accepted
- 2024 Fundación Banco Santander, ULL, awarded and declined
- 2020 Juan de La Cierva-Formación, awarded and accepted
- 2018 Juan de La Cierva-Formación, awarded and declined
- 2018 Junior Researcher, FCT, Portugal, declined
- 2013 FPI predoctoral, accepted

SUPERVISION

- 1 PhD thesis (ongoing)
- 2 MSc theses
- 5 BSc theses (1 ongoing, 2 international)
- 1 early-career postdoc (international)
- 3 visiting PhD and MSc students (international)

OTHER CONTRIBUTIONS

- 14 communications to international congresses (6 first author, 5 second author, 3 senior author)
- 5 invited seminars (3 international)
- 1 invited conference talk (ENTO conference, Glasgow, 09/2025)
- Co-organization and teaching in 2 international workshops
- Co-organization of 5 international symposia and working groups
- >100 hours of official teaching (ULL)
- Member of the evaluation committee of 2 international research project funds
- Member of the evaluation committee of 1 international PhD candidate
- Reviewer for >17 top-ranked journals

DISTINCTIONS

- Best Master Thesis, UAM
- PhD scored Summa Cum Laude and International Mention
- Accreditation for Profesor Contratado Doctor, ANECA
- Seal of Excellence, MSCA Global PF
- Candidate on the waiting list for EMERGIA (2023) and RyC (2022)
- Annual Best Early Career Entomologist Prize, Royal Entomological Society, UK
- Featured Early Career Researcher, Journal of Biogeography
- 2 SCI articles featuring 2 of my publications
- 4 articles covered through press releases in newspapers or science blogs



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Área Temática: Ciencias y tecnologías medioambientales

Nombre: JIMÉNEZ RAMOS, ROCÍO

Referencia: RYC2024-050622-I

Correo Electrónico: rocio.jimenez@uca.es

Título: Ecología en ecosistemas costeros

Resumen de la Memoria:

responses to natural and human-induced environment change, with the goal of better valuing and protecting the services they provide. Specifically, I focus on productivity, trophic webs, and carbon cycling in coastal ecosystems to both advance ecological knowledge and influence management decisions.

I completed my PhD at the University of Cádiz under the supervision of Dr. FG Brun and Dr. JJ Vergara from 2013-2017. During my PhD, which received an Excellence award among all PhDs in Science by Cádiz University (2017), I studied biodiversity patterns, plant-herbivore interactions, and global change factors in seagrass meadows. This research resulted in cutting-edge publications demonstrating how hydrodynamic conditions and nutrient loads determine the presence and activity of different herbivores from pelagic and benthic habitats, describing the percentage of carbon exported through the trophic network in the temperate seagrass *Cymodocea nodosa*.

During my postdoctoral period, I have focused my career on advancing my research program and exploring adjacent fields, with the goals of enriching my own research, enabling other scientists to do the same, and sharing our discoveries with the world. I have developed and demonstrated experience in conducting and leading marine field campaigns as boat captain (certified in 2009), scientific diver (certified in 2008), and drone pilot (certified in 2021). These experiences have encompassed (i) in coastal areas internationally recognized as UNESCO Biosphere Reserves, such as the Sea of Cortez (Mexico, 2015), the MPA in Watamu coast (Kenya, 2018), and the Southern Atlantic (Península Valdés, Argentina, 2022-2023); and (ii) intertidal estuaries such as those in the U.S. Pacific Northwest (Yaquina bay, USA, 2022), subtidal seagrass beds (25-30 m depth) in the Mediterranean Sea (Cabrera National Park, Spain 2019-2021), and the fjords of northern Europe (Güllmar fjord, Sweden, 2021 and 2024). My investigations have used a combination of research vessels, scuba diving, mesocosms, and laboratory experiments.

I led my line of research as postdoctoral researcher resulting in the first article that quantified the percentage of recalcitrant DOC released by vegetated coastal ecosystems (i.e., seagrass meadows and the invasive alga *Halimeda incrassata*); publishing relevant advance on the vulnerability of large organic carbon deposits (i.e., remineralization) in the sediments of seagrass meadows to erosion, incorporating the degradation of the isotopic signal of its sources (δ13C and δ15N); and groundbreaking work providing the first empirical demonstration of how marine mammals contribute to blue carbon stocks in coastal systems.

I have produced a total of 35 scientific publications, 60% of which I led as the first, last, and/or corresponding author. Of the 21 papers that I led, 10 were published in D1 journals, which attests to the strength and impact of my research. I have more than 620 citations (averaging 152 citations in the last two years), with continued year-to-year growth, and an h-index of 18. In addition, I was certified as an R3 researcher in 2023.

Resumen del Currículum Vitae:

I completed my PhD at the University of Cádiz evaluating the plant-herbivore interactions and global change factors in seagrass meadows. After defending my thesis on 13th October 2017 with honors, I began my first postdoctoral contract funded by European FEDER funds. In this position, I served as principal investigator (PI) of the CADIYCO project establishing my first international collaborations as independent researcher and advance the field of coastal carbon dynamics. In 2019, I was awarded an excellence postdoctoral contract funded by the Balearic government (2019-2021; Margalida Comas call 2018) at IMEDEA-CSIC, working on carbon dynamics in coastal systems and began additional projects on invasive algae. Later, I was awarded as a PI of the Spanish national project RECOUNT (P2 category, 2021-2024). Then, I returned to the University of Cádiz and it expanded my developing research objectives on organic carbon remineralization and DOC characterization in coastal communities.

During my seven years of postdoctoral research, I performed several stays (a total of 4,3 years outside my host institution) where I built independent and interdisciplinary research collaborations. My extensive network includes research groups from Sweden (Dr. E. Infantes) studying the complex biophysical interactions governing C remineralization on seagrasses; the United States (Dr. R. Mueller) studying the role of the seagrass microbiome in DOC utilization; Portugal (Dr. CB. de los Santos) studying blue carbon and ecosystem services; Spain (Dr. Fiona Tomas), studying invasive algae, global change; Argentina (Dr. R. Loizaga) studying stable isotopes and the contribution of marine mammals to coastal organic carbon stocks. I have published high-impact, peer-reviewed articles with all these teams. I was certified as an R3 researcher in 2023; and I was certified as a Assistant Professor (2018 as Ayudante Doctor and 2023 as Contratado Doctor) by ANECA.

I have participated in a series of knowledge transfer activities contributing to the development of the first Carbon Standard for the certification of blue carbon credits (published by the Junta de Andalucía) and participating to several restoration projects. I have designed a biodegradable unit for seagrass restoration, submitted as a national patent (no. 202330414). For five years (2013-2017), I was a coordinator of the FAMAR Environmental Volunteering Program. In 2022, I received an award from the science dissemination project funded by the DesQbre Foundation (Junta de Andalucía, P750). I was also the head of the Association of Oceanographers of Andalusia (AOA; created in 2016).

I am currently a lecturer for the Master of Oceanography, where I coordinate the Coastal Ecosystems subject, as well as for several courses in the Environmental and Marine Sciences degrees at University of Cádiz (>250h). I also supervise the creation of several subjects from European master's, the Sea-EU bachelor and the international committee of the "EuroMarine International School 2023". I led two teaching innovation projects (P3.580



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as PI), focused on team-building and neurocreativity. I have presented contributions at the International Congress of University Teaching (Jiménez-Ramos et al. 2016, ISSN: 2385-6203). To date, I have supervised 6 undergraduate projects in Marine and Environmental Sciences and 10 master's theses.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: ASENSIO FANDIÑO, VERÓNICA
Referencia: RYC2024-048710-I
Correo Electrónico: veroasensio@gmail.com
Título: Suelos artificiales para rehabilitar suelos degradados

Resumen de la Memoria:

I am the Scientific Director of the company EDAFOTEC since October 2020. I am in charge of leading and coordinating all technical and scientific activities in both commercial and R&D&i projects. Previously, I worked as postdoctoral researcher in Brazil for almost 6 years. From May 2014 to August 2017 (3 years), I worked at the Centre for Nuclear Energy in Agriculture of the University of São Paulo (USP-CENA), in Piracicaba, Brazil. I did an international stay within this stay, linked to a broader project, in the INRA-Bordeaux Sciences Agro (France) for 15 days in 2014. From October 2017 to June 2020, I was in another USP centre at Piracicaba (Brazil), the "Luiz de Queiroz College of Agriculture" (USP-ESALQ), working as a researcher in the Soil Science department.

I graduated in Biology at the University de Vigo (UVIGO) in 2008. I completed my Master and Advanced Studies Diploma (DEA) in 2010 in the Department of Plant Biology and Soil Science of UVIGO. I carried out my PhD Thesis "Assessing the quality of reclaimed mine soils" from 2010 to 2013 in the same department and the same supervisor. I received 2 awards for my PhD. Thesis: one from the Spanish Soil Science Society (SECS) and another for the UVIGO. During my PhD., I did two international stays. One month in the Norwegian University of Life Sciences (UMB), in Ås (Norway) and 3 months in the University of Hohenheim in Stuttgart (Germany).

I published 42 scientific articles and 3 book chapters. I published 39 abstracts in scientific events (national and international). I was part of the organization team of 2 scientific events: the 1st Symposium of the Postdoctoral Program of the University of São Paulo (USP) in 2016, and the Brazilian Critical Zone Symposium in 2019.

I participated in 12 projects and I was the PI of 6 of them. Four of these 6 projects were funded through the European Commission, being 2 of them from the Horizon Europe program (Terrasafe and C-SINK).

I supervised 7 undergraduate students in Brazil (scientific initiation), 1 graduate student for a specialization course, 1 Minor Thesis, and 2 Master Thesis. I was the external tutor of the External Academic Practices of 1 undergraduate student. Since 2011, I have reviewed numerous scientific articles.

Resumen del Currículum Vitae:

My research line is focused on the elaboration and evaluation of tailor-made artificial soils (Technosols) to rehabilitate degraded soils, especially those that are contaminated. I have the scientific and industrial perspective since I have worked in different universities and a private company. I started with this topic in my Master and I continued during my PhD, my second postdoctoral stay and in my work as Scientific Director in the company EDAFOTEC, my current job. EDAFOTEC is a technology-based company and recognized as innovative SME by the Ministry of Science and Innovation from Spain. Our projects are focused on the rehabilitation of degraded soils and polluted water with the application of nature-based solutions, such as artificial soils (Technosols), bioremediation or biochar.

From the beginning of my research career in 2008 until today, I was acquiring knowledge on the behaviour of both natural soils and Technosols, as well as on other nature-based solutions that can be used to improve soil health: phytoremediation, bioremediation, biochar and nanoparticles. During my first postdoctoral stay I made a break on this research line to learn how to evaluate the physiological behaviour of trees and soil-plant hydraulic interactions. I worked with this research line for 3 years in the University of São Paulo (USP-CENA, Brazil) in close collaboration with French researchers from the CIRAD and the INRA. After that, I continued with the research line about Technosols in a different centre of the University of São Paulo (USP-ESALQ) for 30 months.

For the last 4 years, I am the only researcher in EDAFOTEC and the PI of all the projects that I am involved. I am the person in charge of coordinating, supervising and executing all technical and scientific activities, as well as obtaining external funding for R&D&i projects. I also leading funding acquisition for R&D projects, being involved in proposals for several funding programs (Horizon Europe, Interreg Sudoe, Eurostars, PRIMA, EIC Accelerator, CDTI Missions, GAIN, Mine the Gap, Ports 4.0). Since I am in the company, we obtained grants for 2 national projects and 3 from the European Commission.



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Área Temática: Ciencias y tecnologías medioambientales
Nombre: PAYO PAYO, ANA
Referencia: RYC2024-049889-I
Correo Electrónico: ANAPAYOPAYO@GMAIL.COM
Título: Understanding dynamics of seasonally mobile species in the face of global change
Resumen de la Memoria:

Since obtaining my PhD in 2017 (Best Biology PhD UB), I have established myself as an independent academic internationally at University of Aberdeen (2020-2023) and nationally at Universidad Complutense (2023). Here, I lecture on topics related to ecology and population dynamics and I lead my own research group: Animal Ecology Lab.

I tackle a broad range of scientific questions dealing with animal ecology. My research trajectory focuses on theoretical & applied aspects of demography, population ecology and animal behavior with specific emphasis on biodiversity conservation. I combine the study of individuals, populations, and communities at marine as well as terrestrial ecosystems. This involves the study of multiple animal species in collaboration with numerous national and international research groups.

I am an interdisciplinary researcher, I combine innovative theoretical and quantitative demographic analyses with social science approaches to quantify past, present & future drivers acting on animal life-history strategies. I currently work on 3 research lines, spanning ecology, evolution, and conservation biology: 1) Eco-evolutionary dynamics of partial migration, 2) Evaluating the importance of intrinsic & extrinsic factors on animal demography, 3) Protecting marine biodiversity in the context of offshore renewable energy development.

Part of my theoretical research focuses on methodological advances on modelling eco evolutionary dynamics of vital traits such as partial migration. My quantitative skills allow me to combine complex statistical analyses and long-term data to study the effects of consecutive perturbations on individual traits and on the demography and (meta) population dynamics & evolutionary trade-offs of long-lived species. This knowledge is critical to inform biodiversity management and conservation as it provides insights on the demographic mechanisms underlying species dynamics in the face of global change.

I strive to provide evidence that helps tackling global biodiversity threats. For example, I collaborate with industry & government organizations to provide guidelines on minimum data collection requirements for Offshore Wind Renewable Farm development or with local stakeholders to understand the social perceptions underlying stakeholder decision making in rewilding. These research lines are fundamentally applied and generate impact in policy and species management at local, national, and international level.

However, my interest in ecology goes beyond particular species or conservation problems. I have recently started a new research line on cancer ecology with Dr. María Salazar Roa (RyC fellow at UCM). By using interdisciplinary approaches, we overcome the classic view of cancer as a genetic disease, where tumour complexity is defined only from its evolutionary component, and move towards a more holistic approach where its ecological context also matters. In practice this means that we aim to experimentally quantify key eco-evolutionary traits that drive spatial-temporal dynamics of tumours and used those estimates to model alternative therapeutic strategies that help to improve patient diagnostics & prognosis.

Finally, I believe that sound scientific evidence should be at the forefront of decision making. I work to improve science literacy using innovative methods such as performing arts and illustration.

Resumen del Currículum Vitae:

Research narrative: I combine cutting-edge statistical & quantitative demographic analyses to quantify anthropogenic & environmental drivers acting on life-history strategies, to provide evidence that informs the biodiversity conservation in the face of global change. I work on 3 research lines, spanning ecology, evolution, and conservation biology: 1) Evaluating the importance of intrinsic & extrinsic factors on animal demography, 2) Eco-evolutionary dynamics of partially migratory species & 3) Protecting marine biodiversity in the face of offshore renewable energy.

Demonstrated scientific maturity, independent thinking, & leadership: I led the Animal Ecology Lab - a team of 1 postdoc, 3 PhD, 2 Hons & 2 MSc students- at University of Aberdeen (UoA).

High-quality outputs: This has been recognized through my academic trajectory (e.g., BSc, MSc & PhD Academic Excellence Awards) & my publication record which includes high-quality international peer-reviewed journals (e.g., Journal of Animal Ecology, Ecological Applications or Proceedings of the Royal Society B). I have published 27 SCI articles with 42% as lead author, and >50% independently from my PhD group, 18 are Q1 SCI, 1 book & 1 chapter, 18 reports, 34 conference contributions. WOS cites: 316. H-index: 10. Academic excellence award BSc & MSc (2010), Best Biology PhD (2018), JdC Formación (2019), MSCA-IF Seal of Excellence (Reserve 2017 & 2019) & Reserve RyC (2021, 2022 and 2023).

Internationalization: I have spent over 64 months at international research institutions where I have curated fruitful network of collaborators including world leading policy and academic leaders.

Outstanding funding record: Since 2020, I have contributed to securing 8.3 million € from international funding calls by participating of large international research consortia. Of the above, I am directly responsible for ~820K €.

Capacity building: I have a strong track record of teaching (at undergraduate and graduate levels) and supervising ECRs. I'm currently supervising 1 post-doc (+1 starting in 2023), 7 PhD students (3 as first supervisor), and I have supervised 1 international PhD visit, 11 MSc (+2 starting in 2023), and 8 BSc (+2 starting in 2023). Contratado & Ayudante doctor ANECA Accreditation. I taught 1477 hours at University of Aberdeen between 2018-2023 and I teach up to 170 h/y at Universidad Complutense on modules related to animal ecology & conservation.

R&D management: I was Chair of UoA-SBS Ethical Review Committee. I led UoA delegation at COP26. I have served as tribunal for 3 PhD vivas. I am Editor of the SCI-Journal Frontiers in Marine Science and Ardeola & I act as reviewer for 14 SCI-Journals. I'm part of the British Ecological Society Review college, British Ornithological Union meetings committee and Sea Scotland Steering Group. I am part of the scientific committee of the Birds as individuals conference & UHM Movement Ecology Workshop.

Outreach: In the last 10 years, I have reached >1 million people with my outreach activities. I have participated in > 300 outreach events & #8213; including science communication shows, invited talks, national and international radio, and TV interviews. I'm a member of Big Van Ciencia. In 2018 I hosted a science TV show (Balears fa ciència). I have published two outreach books and I have sold 44K copies of 'The secret life of Viruses'.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: MORGANTI, TERESA MARIA
Referencia: RYC2024-050260-I
Correo Electrónico: teresamorganti@hotmail.it
Título: Marine sponges as sinks of anthropogenic carbon: toward a nature-based solution to address climate change and ocean pollutants

Resumen de la Memoria:

I am marine ecologist, with expertise in benthic eco-physiology and carbon biochemical cycling. During my career, I have investigated the functional role that benthic filter feeders play in nutrient and organic matter cycling. My skills encompass a range of field and laboratory techniques, such as in situ metabolic measurements (respiration, pumping rate and feeding) to nutrient, isotope and image analysis.

As PhD student at the Centre d'Estudis Avançat de Blanes (Spain), I studied the feeding ecology and metabolism of five common Mediterranean sponge species in situ. My research contributed significantly to our understanding of sponge feeding and metabolism, by describing a trophic niche separation as a mechanism facilitating dense sponge assemblages to thrive in oligotrophic conditions. I also provided a comprehensive picture of sponge-pumping activity under the full range of natural conditions, identifying the sponge size as main driving factor. The output of my research was published in 4 peer-reviewed articles, as first and corresponding author.

During my first postdoc at the Max Planck Institute for Marine Microbiology (Germany), I investigated the feeding ecology of deep-sea sponge ecosystem discovered in Central Arctic, one of the most oligotrophic areas on Earth. I applied a multidisciplinary approach using stable and compound specific isotope analysis, image analysis and radiocarbon dating. We discovered that the sponge community feed on recalcitrant (i.e., difficult to digest) sources of organic matter, mostly originated from fossilized ancient hydrothermal organisms. This unexpected discovery significantly advanced our knowledge on deep-sea feeding ecology. The results were published in Nature Communications and Current Biology.

During my second postdoc at the Leibniz Institute for Baltic Marine Research (Germany), I successfully translated my foundational knowledge in marine ecology and biochemistry for the application of marine carbon dioxide removal (mCDR) methods. I established the natural science evaluation criteria for mCDRs and led a systematic review on mCDR monitoring gaps.

Currently, as a Beatriz de Pinós's Fellow at the Marine Science Institute of Barcelona, I am investigating the role that marine sponges play in transforming organic matter from both natural and anthropogenic sources.

For my RyC research line, I aim to explore nature-based solutions to address two critical issues impacting ocean health: climate change and organic pollutants. Specifically, I plan to assess sponges as potential anthropogenic carbon sink. My research objectives will include: (1) evaluating whether sponges are net carbon sink, and (2) testing their role in removing or transforming organic pollutants. This line of research nicely combines my extensive knowledge of feeding ecology and carbon cycling processed by sponges with the emerging field of marine animal forest as possible contributors for mitigating climate change. Given sponges' ability to filter large volume of water and potentially remove organic pollutants, I am particularly interested in exploring their potential as bioremediator tools. This research will have a significant impact for the society as it will dramatically increase our understanding of the valuable ecosystem services provided by dense sponge communities, such as carbon sequestration, cycling and water purification

Resumen del Currículum Vitae:

In 2011 I was awarded highly competitive PhD Spanish scholarship, which allowed me to develop a 4 years PhD project at the Centre d'Estudis Avançat de Blanes, Spain. My PhD represents a comprehensive seasonal study of sponge eco-physiology in situ. This study required intensive field sampling and eco-physiological measurements. I was responsible for organizing and executing all field and laboratory work. I developed a novel methodology that has been already successfully used in over 10 published studies. My work was presented in two international conferences, in one I was awarded for the "best poster". I led 4 publications as first and corresponding author and I finished my PhD cum laudae.

After my PhD, I moved out of the sphere of action of my PhD supervisors. My first postdoc was at the Max Planck Institute for Marine Microbiology, Germany, where I was responsible to investigate the food and energy sources used by deep-sea sponge community discovered in Central Arctic. My research has starred the covers of the most important scientific journals in the world, such as Nature Communication and Current Biology. My work fundamentally rewrote our understanding of deep-sea ecosystem and overturned the paradigm that sponges are sessile organism. During my second postdoc at the Leibniz Institute for Baltic Marine Research, Germany, I was part of multidisciplinary team that aimed to develop an assessment framework to evaluate marine carbon dioxide removal (mCDR) methods, using a transdisciplinary approach. During this period, I designed and led the organization of two workshops, I led two publications (one under review and one in prep.) and the development of a mCDR literature database. I am currently Beatriz de Pinós's Fellow at the Marine Science Institute of Barcelona, Spain. I am leading the "Holobiont-DOM" project that aims to investigate the role that sponges play in transforming organic matter from natural and anthropogenic origins.

My leadership indicators are consolidated by the obtained funding (1 postdoctoral fellowship, 1 postdoctoral activity funding, 4 travel grants, 1 PhD fellowship, 1 Erasmus grant and 2 full membership fee waiver), board member and reviewing task (~5 articles/year, 2 projects), 1 book chapter and 7 invited talks.

I am deeply engage to disseminate science to broader audiences through press released, two live radio interviews at BBC and CCN world and several other interviews in worldwide prestigious media such as National Geographic and The New York Times. I use my X account to disseminate my science to peers and the public and I regularly participated in outreach activities such as "Skype a Scientist" and "Soap Box Science".

Beside the academia, in 2016 I co-founded a startup Greensoeasy/CO2ntribute in Berlin. We developed a CO2 footprint calculator for students. As Chief Scientific Officer, I led the development of CO2 footprint estimates, user-web interface and scientific contents.

I thus have international experience inside and outside the academia, a stable network of renowned collaborators from different fields, peer-reviewed publications in well-recognized journals, secure sufficient research funds, and extensive experience in dissemination of my work to wider audience. I am in the right path to achieve outstanding objective with a worldwide impact in my research agenda as Ramon y Cajal's fellow.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: CABELLO YEYES, PEDRO JOSÉ
Referencia: RYC2024-048979-I
Correo Electrónico: pedrito91vlc@gmail.com
Título: Aquatic metagenomics and ecological genomics of marine and freshwater picocyanobacteria

Resumen de la Memoria:

Since its formation ca. 4.567 billion years ago (bya) Earth has undergone various fundamental changes that help us understand the existence and habitability of life on our planet. Some of these milestones include: 1) the emergence of water, ca. 3.8-4 billion years ago (bya); 2) the formation of live cells, with the first prokaryotic fossil records dating from 3.5-3.4 bya and 3) the appearance of the first photosynthetic organisms during the Proterozoic, also known as "The Great Oxidation Event". Thus, in the context of Earth's evolution, prokaryotes have virtually colonized and adapted to all types of ecosystems, including the most representative biome on our planet, i.e. the aquatic biome. Since the start of my scientific career, I have been integrating these three disciplines (water research, aquatic microbiology and photosynthesis) by studying microbes via culture-dependent and culture-independent approaches. Most of my science has been based on aquatic metagenomics of freshwater systems and ecological genomics of cultured freshwater picocyanobacteria. One of the main topics I have targeted includes the prokaryotic salinity adaptations and marine-brackish-freshwater transitions between aquatic systems. Bacteria and archaea have evolved different strategies to cope with salt stress. "Salt-in" halophiles keep high ion concentrations (i.e. Na⁺/K⁺) inside the cell with highly acidic proteomes/isoelectric points (pIs) to keep a proper hydration sphere around proteins. "Salt-out" strategists (marine microbes) have slightly less acidic proteomes/pIs, produce compatible solutes and accumulate most inorganic salts outside the cell, maintaining a salt-free cytoplasm. However, we know very little about what makes a bacterial cell obligately marine or conversely obligately freshwater, though the latter microbes possess more neutral/basic proteomes/pIs. Nor do we have a good mechanistic understanding of the attributes that give rise to transitional brackish/euryhaline prokaryotes. Using globally distributed cluster 5 picocyanobacteria as models my research line aims to determine the physiological/functional differences that have led them to adapt to each habitat. My previous bioinformatics work has identified the main proteomic and genomic differences between salt-adapted and salt-free microbes. Compatible solutes, sodium/potassium transporters, mechanosensitive ion channels or aquaporins are differentially present in prokaryotes representing each aquatic biome. However, there is a dearth of data at the cellular level of these tiny organisms. I hypothesize significant differences exist across the salinity divide in their intracellular ion concentration, pHs and lipid/membrane composition that have critical consequences for photosynthesis & hence CO₂ fixation capacity. To evaluate these, I will use an extensive culture collection of marine, brackish and freshwater isolates and will grow them across broad salinities, perform lipidomics, photosynthesis and cell physiology (pH/ion) measurements. Moreover, using genetically tractable model cyanobacteria I will engineer marine to freshwater and freshwater to marine transitions providing key new information on how salinity affects the photosynthetic process and answering this fundamental question: what makes an aquatic salt-adapted prokaryotic cell different to a salt-free one?

Resumen del Currículum Vitae:

I am an enthusiastic researcher with a strong interest in aquatic microbial ecology. My background is based on ecogenomics and metagenomics of freshwater systems and cyanobacterial/photosynthesis research. I completed my PhD in 2018 (UA, Spain) supervised by Prof. Francisco Rodríguez-Valera (UMH, Spain). I was part of various sampling expeditions in Lake Baikal (Russia), the Mediterranean Sea and Spanish freshwater lakes/reservoirs as part of various projects aiming to study aquatic prokaryotes via metagenomics. All these works analysed microbes contributing to the excellent water quality of freshwater lakes (Cabello-Yeves et al 2017 Appl. Environ. Microbiol. 84: e02132-17, 2020 Limnol. Oceanogr. 65: 1471-1488, Cabello-Yeves et al 2017a/b, Front. Microbiol. 8: a2131/8: a1151). In the context of Earth's evolution, I have also elucidated the main genomic/proteomic differences of microbes inhabiting saline (marine/brackish) and freshwater systems (Cabello-Yeves et al., 2019 Microbiome 7: 1-12). My current research integrates omics approaches and cultured-based approaches using picocyanobacteria (Prochlorococcus/Synechococcus/Cyanobium). These phototrophs produce ca. 25% of the oxygen of the planet and by fixing carbon they contribute significantly to supporting food webs and influencing Earth's biogeochemical cycles. I have been working with these organisms since 2016 and have isolated >50 freshwater strains from various lakes worldwide in a fruitful collaboration aided by Cristiana Callieri (CNR-IRSA, Italy) and Prof. Antonio Camacho (UV, Spain). In 2019 I got my first postdoctoral grant, an APOSTD fellowship (GVA, Spain) which allowed me to perform a large-scale comparative genomics analysis between freshwater picocyanobacterial strains and their well-studied marine counterparts supervised by Prof. Dave Scanlan at the University of Warwick (UoW) (see Cabello-Yeves et al 2022a/b, ISME J 16 (10), 2421-2432 and BMC Biology 20 (1), 175). Hence, I developed a deep interest in understanding why this group of cyanobacteria dominates all aquatic systems on Earth, knowing that this would be my primary research for the following years. This allowed me to join the UoW as an Alfonso Martín Escudero (FAME, Spain) postdoctoral fellow (2023-2024) and currently as a Marie Curie postdoctoral fellow funded by the UKRI (2024-2025). I have created a tight-knit network of international collaborators including cutting edge European microbial ecology groups at the Institute of Hydrobiology CAS/Algatech (Czech Republic), CNRS - Station Biologique de Roscoff (France) or CNR-IRSA (Italy). Despite my early career stage, I have published 30 peer-reviewed articles in top-ranking microbiology journals including first author manuscripts published in ISME J, Microbiome, BMC Biol., Env. Microbiol., Limnol. Oceanogr., Appl. Env. Microbiol. or Front. Microbiol. I have supervised three PhDs students and organized a one-week metagenomics course at the Universidad de Costa Rica in 2020. I have secured funding through individual fellowships for over 300K € from the GVA, FAME and UKRI/EU Marie Curie actions. I intend to establish myself as an independent researcher leading an interdisciplinary group in the field of aquatic microbial ecology combining culture-independent and culture-dependent approaches, with a primary focus on picocyanobacteria and microbial salinity adaptations.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: GARCÉS PASTOR, SANDRA
Referencia: RYC2024-051196-I
Correo Electrónico: sgarcespastor@gmail.com
Título: Ecology of human and climate influence in ecosystems

Resumen de la Memoria:

In response to ongoing human-induced climate and environmental changes, understanding the impacts on biodiversity and human well-being is vital for mitigating risks and ensuring long-term sustainability. This has driven my career as an ecologist, using molecular and microscopic techniques to explore how climate change and human activities affect ecosystems. My research focuses on three main areas: 1) paleoecological reconstructions, 2) molecular biodiversity assessments in aquatic ecosystems, and 3) developing novel molecular indicators for assessing ecological quality in aquatic ecosystems. The RyC fellowship will allow me to expand the third area, focusing on taxonomy-free and machine learning approaches for biomonitoring aquatic ecosystems, continuing my research on paleoecology and molecular biodiversity.

1 Paleoecological Reconstructions: My PhD research examined high mountain ecosystems' responses to human and climate changes, using biological indicators such as pollen, diatoms, charcoal, and DNA metabarcoding. I developed a new montane pollen ratio to infer altitudinal shifts in vegetation, addressing limitations in traditional pollen data. DNA analysis provided clearer insights into local taxa, particularly forbs, compared to traditional methods. After my PhD, I joined Dr. Inger Alsos at the Arctic University of Norway, where I worked on the EU-funded Ecogen project. Using sedimentary DNA (sedaDNA), I studied past plant and mammal communities in the Alps to understand ecological responses to climate and human impacts throughout the Holocene. This project led me to propose molecular indicators for retrieving ecological information from DNA sequences, offering insights into the impact of domesticated and wild mammals on vegetation, which traditional methods could not provide. I have contributed to various collaborative paleoecological studies, such as those examining human impacts on vegetation in the Pyrenees, Balearic Islands, and southern Spain.

2 Molecular Biodiversity Assessment in Aquatic Ecosystems: During my PhD, I began exploring environmental DNA (eDNA) and metabarcoding for biodiversity assessment in aquatic ecosystems, collaborating with researchers at the University of Salford and in projects monitoring freshwater ponds. I also worked on the Bioocult project, studying microeukaryotes in Spanish peat bogs, and contributed to the discovery of Micrognathozoa in the Pyrenees, a rare microscopic animal. More recently, I have worked on monitoring Iberian rivers in collaboration with Drs. Cayetano Gutiérrez and Rosa Trabajo as part of the Iberrios project.

3 Improved Ecological Quality Assessment in Aquatic Ecosystems through Novel Molecular Indicators: My current research aims to develop a cost-effective, objective, and reproducible approach to biomonitor diatoms, key indicators of water quality. By applying modern and ancient DNA analysis (sedaDNA), I seek to enhance our understanding of biodiversity and ecosystem dynamics. This work will integrate ecological, taxonomic, and functional data, offering deeper insights into environmental changes and ecosystem responses. It builds on my previous work in aquatic and terrestrial ecosystems while incorporating advanced molecular techniques and machine learning to better monitor and assess ecosystems.

Resumen del Currículum Vitae:

My research focuses on understanding climate change and human impacts on biodiversity through four lines of study: paleoecological reconstructions, investigating mountain ecosystems, exploring molecular ecological and human indicators, and assessing aquatic ecosystem health using molecular approaches.

Some of my most relevant scientific contributions so far are: i) developing a new montane pollen ratio to infer altitudinal changes in vegetation; ii) the use of universal eukaryotic markers (18S and COI) in a Pyrenean peat bog for paleoecological reconstructions and comparison to modern communities; iii) the use of sequences as ecological indicators, focusing on those sequences which are robust ecological indicators, and a new relative abundance index to interpret paleoecological DNA sequences; iv) proving that plant biodiversity in Alpine ecosystems has been primarily driven by cattle and other domestic mammals; and v) demonstrating the ability of environmental DNA analysis to detect elusive microfauna in unexpected locations, such as micrognathozoans in the Pyrenees. My work has directly impacted the advancement of molecular ecological tools and ecological monitoring practices, benefiting both the scientific community and applied environmental research.

I have authored 23 articles in high-impact journals such as Nature Communications, Current Biology, and Quaternary Science Reviews, and 5 book chapters. I have secured 386,500 € in grant funding as a P.I., including a competitive Beatriu de Pinós fellowship (funded by the Catalan government and the European Commission) and Junior Leader Fellowship Incoming from La Caixa Foundation, which supports my current research on diatom communities and water quality assessment. As a researcher, I have played a leadership role in projects like the Norwegian-funded Ecogen project, where I coordinated a multi-disciplinary team and oversaw an extensive field campaign, contributing to a first-author publication in Nature Communications.

My outreach activities include public talks such as a participation in Pint of Science, Catalan radio interviews, and social media engagement on Twitter and Bluesky. At Tromsø Museum, I participated in videos and events to present research to diverse audiences. I plan to organize seminars for diatomists to promote knowledge transfer, leveraging my role in the sedaDNA Society, Young Diatomists, and Diatomólogos Hispanohablantes.

I am collaborating with stakeholders to bridge research and practical applications, particularly in water quality and ecosystem management. By contributing to the dissemination and accessibility of research findings, I foster connections between science and societal needs.

I have co-supervised undergraduate, master's, and PhD students, mentoring them in clean lab techniques, molecular biodiversity assessment, bioinformatics, and fieldwork. Notably, I am co-supervising a PhD student at the Arctic University of Norway, and mentoring students in Spain. As an adjunct professor at the University of Barcelona (UB) since 2022, I have taught ~455 hours across biology, environmental science, and related programs, earning AQU accreditation as a tenure-track lecturer.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: GALLEGO RUBALCABA, JUAN VICENTE
Referencia: RYC2024-049247-I
Correo Electrónico: jg.rubalcaba@gmail.com
Título: Mechanistic modeling in macroecology and macroevolution

Resumen de la Memoria:

I am interested in the role of climate in modulating the geographical distribution (macroecology) and evolutionary trajectories of species (macroevolution) as well as their responses to climate change. Macroecology and macroevolution have long relied on statistical methods that largely overlook the mechanisms underlying organism-climate interactions. Yet, these methods face fundamental barriers to extrapolating observations to novel environments – a major limitation that challenges our capacity to predict the responses of organisms to climate change (Urban et al. 2016 Science, 353, ead8466). I address this challenge by developing mechanistic models: i.e., mathematical models that incorporate physical, chemical, physiological, and behavioral processes underlying organism-environment interactions (e.g., Briscoe et al. 2023 Glob Chan Biol, 29, 1451-1470). I develop and apply mechanistic models across three main lines of research:

(1) Assessing the energetic impacts of climate change on biodiversity. I investigate how environmental factors such as temperature, water or oxygen availability affect metabolic energy requirements of animals (i.e., reptiles, amphibians, birds, mammals, and fish) across ecological systems (i.e., aquatic and terrestrial realms; see Rubalcaba et al. 2020 PNAS). Currently, I am the PI of the project “Assessing the energetic impacts of climate change on biodiversity” funded by the Research Talent Attraction Program of Comunidad de Madrid. This project aims to quantify the energetic impacts of climate change across species, including terrestrial and aquatic ectotherms and endotherms.

(2) Assessing the role of climate in modulating macroevolutionary and macroecological patterns of functional traits in animals. Climate influences evolutionary trajectories of functional traits (body size and shape, color, physiological tolerance, or thermoregulatory behavior) through its effects on physiological performance and fitness. I investigate this effect from first principles: modeling the impact of climate on energy requirements of animals as a function on both phenotype and latitude (Rubalcaba et al. 2023 Nature Ecol & Evol; Rubalcaba et al. 2022 PNAS). Currently, I am the PI of the ongoing project “Biophysical constraints on the evolution of lizard morphology (EVOMORPH)” funded by the national R&D program. This project will investigate how climate modulates morphological adaptations in lizards combining mechanistic models and 3D printed specimens.

(3) Predicting and mitigating the impacts of climate change on animals. Mechanistic models provide not only a means to predict the physiological impacts of warming but also a way to design effective management strategies to mitigate these impacts (Rubalcaba & Jimeno 2021, Funct Ecol; 2022 Frontiers Ecol & Evol). Currently, I co-supervise the PhD Thesis by Beatriz Saldanha (University of Porto) “Effects of climate warming on steppe birds: Physiological, Spatial, and Behavioural Responses Influencing Reproductive Success”.

Resumen del Currículum Vitae:

I am an ecologist interested in the mechanistic underpinnings of macroecological and macroevolutionary patterns. My research adopts a multidisciplinary perspective combining mathematical modeling and empirical data synthesis to understand how organisms interact with their environment across broad spatial and temporal scales. The impact of my research is high, with most of my papers (78%) published in D1-ranked journals including PNAS and Nature Ecology and Evolution. I am the PI of two projects funded by the National R&D Program and the Comunidad de Madrid Research Talent Attraction Program (C.3 projects 1 and 2). These merits, among others, have qualified me to obtain the R3 Certificate of established researcher in 2024.

I carried out my doctoral studies at Universidad Rey Juan Carlos and defended my PhD Thesis on January 26th, 2017, receiving the Extraordinary Award. During my PhD, I did multiple international research stays at the University of Sergipe (Brazil, 2017), University of Exeter (UK, 2016), and Columbia University (USA, 2015) where I learned cutting-edge methods in mathematical modeling and macroevolutionary analyses that broadened the scope and impact of my thesis.

I spent a significant part of my postdoctoral career abroad, first at the University of Montana (USA, 2019, 9 months), and then at McGill University (Canada, 2019-2021, 2 years) with a Marie-Curie Global Fellowship. These stays boosted my international projection and leadership with 4 first-authored papers in high-impact journals (C.1 papers 2, 4, 5, and 6), invitation to international conferences (C.2 presentation 5), organization of workshops (C.4), and invitations to publish opinion pieces for Nature Climate Change “News and Views” and PloS Biology “Primer”. Furthermore, these stays consolidated a strong international network including research collaborators from the US, Brazil and Mexico (C.3 projects 4-6), or my participation in the international group RangeTherm, which so far materialized in one publication in Nature Ecology & Evolution (C.1 paper 3).

My research profile combines mathematical modeling and empirical data synthesis to understand and predict the physiological responses of organisms to climate change – a combined expertise that is currently not represented in the Spanish R&D system. I thus plan to consolidate my research line in Spain leading a lab that will integrate predictive models in macroecology and macroevolution. My lab currently includes one PhD student (Beatriz Saldanha), one research assistant (Marta Correias Araus), and one master student (Sofía Travieso Pérez). Before them, I mentored 4 undergraduate (Andrés Jiménez, Karina Buele, Noelia Alday, Andrea Vara) and 3 MSc Theses (Karina Buele, Miriam Bravo, Mario Castro) in topics related to thermal ecology and biophysical modeling.



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I am committed to disseminating the use of mathematical models in ecology and thus I have carried out both teaching and mentoring activities on this topic: I have organized workshops (C.4), which have been funded by different organizations (International Biogeography Society, Canadian Institute of Ecology and Evolution) and participating as a guest lecturer of the subject "Mathematical Ecology" in the Master Técnicas de Conservación de la Biodiversidad y Ecología (Rey Juan Carlos University, Madrid, 2018-ongoing).



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: NAVALÓN FERNÁNDEZ, GUILLERMO
Referencia: RYC2024-048901-I
Correo Electrónico: guiyelmo91@gmail.com
Título: Macroevolution of avian phenotype
Resumen de la Memoria:

I am a palaeobiologist with a solid background in vertebrate anatomy, digital morphology, and quantitative macroevolutionary approaches. My research aims to understand how evolution structures organismal form over large timescales. Specifically, I seek a deeper understanding of the evolution of skeletal morphology, primarily centred around, but not limited to, birds and their closest dinosaurian forerunners. My work-to-date has encompassed two approaches: 1) quantitative studies using hundreds of living species, and 2) systematic research on pivotal fossils, which provide the most direct evidence for evolution in deep time. My main future research goal is to establish a novel quantitative framework able to fully unite these two perspectives. This Ramón y Cajal research grant represents a first solid step towards accomplishing this medium-term objective by focusing on one of the most intriguing and unexplored aspects of avian macroevolution: the deep time origins of their unique brain.

My research makes extensive use of cutting-edge quantitative approaches, including landmark-based geometric morphometrics and high-dimensional phylogenetic comparative methods. The first analytical approach enables complex three-dimensional organismal form to be converted into mathematical coordinates while the second facilitates the use of high-dimensional morphological data in a phylogenetic context to evaluate the connection between key ecological innovations or ontogenetic features, and morphological evolution. I use the combination of these two approaches mainly, but not exclusively, to interrogate multiple aspects of the macroevolution of avian phenotype throughout their 150-million-year evolutionary history.

I have a strong track record of publishing my research in internationally recognised journals. Several of my scientific contributions are regarded as agenda-setting in the field including my doctoral research on the ecomorphology of the bird beak that was published in *Evolution* and was cited 165 times since 2019, and my postdoctoral work on the diversification of bird skeletons, recently published in *Nature*. The latter also represents the most detailed study of the evolution of organismal form to date in any group of vertebrates. Leading this pioneering research aided my professional and personal development into a mature researcher capable of tackling the challenges that accompany large-scale, collaborative research projects, including taking on leadership roles.

More specifically, my doctoral research focused on unravelling the evolutionary drivers of modern bird skull diversity. It questioned, for the first time at a broad scale, the central role of dietary adaptation in the diversification of avian beak shapes, often assumed as a truism in ornithology, and underpinned the views that ontogenetic development majorly shaped patterns of morphological evolution in birds. My postdoctoral research shifted my focus from the evolution of single anatomical structures to the coordinated evolution of whole skeletons or multiple structures within the head, such as the brain and the inner ear. It also allowed me to expand my research interests to other biological groups (e.g., mammal skeletal diversification) and incorporate new fossils into a macroevolutionary outlook, including my participation in the active collection of primary fossil data.

Resumen del Currículum Vitae:

I received my BSc from the Universidad Autónoma de Madrid, and I obtained my MSc degree from the University of Bristol (UoB) both dissertations received highest scores and were published soon after in international peer-reviewed journals. In late 2014, I secured a Postgraduate Scholarship from the Alumni Foundation (UoB) to work on the evolutionary drivers of bird skull diversity. I was awarded my PhD in June 2019 and was the recipient of the Faculty of Science Doctoral Prize for the Environmental or Mathematical Science for my doctoral research. In September 2019, I was hired for almost two years as a Postdoctoral Research Associate (PDRA) at the University of Oxford funded by a Starting Grant (ERC), securing this position against ten other candidates. Since May 2021 I have been a PDRA at the Department of Earth Sciences at the University of Cambridge (Cantab.) funded by a Future Leaders Fellowship (UKRI), which was awarded with my participation as named collaborator. I have published 18 papers in internationally recognised journals, eight as lead author including all my doctoral research, and another two as directing the methodological part of a large international collaborative project. I have an extensive research network with active collaborations with scientists from the UK, Spain, USA, Brazil, Argentina, and China, including active palaeontological fieldwork in Brazil and Spain (total experience of ~15 campaigns across five different palaeontological sites). I have presented my research at major international conferences in North America, Europe, and Australia including the invitation to two specialised symposia at international conferences. I have also been invited as a guest speaker five times, two at international conference symposia, and three as part of departmental or museum guest lectures, two in the UK and one in the USA. Furthermore, I am a member of the Editorial Board of Royal Society's *Biology Letters* since 2023 and I participated as organizing committee of one Spanish and two international conferences. My expertise and track record using and developing quantitative methods in evolution allowed me to participate as part of the examination committee for the final defence of two PhD candidates (Dr Iris Menéndez, 2021; and Dr Patricia Carro, 2023). I have designed my own course materials and taught palaeontology, vertebrate evolution and quantitative methods at the Universities of Bristol, Oxford, Cambridge, Autónoma de Madrid and Alcalá de Henares (total of ~100 hours). I have supervised and occupied pastoral roles for several undergraduate and postgraduate students (three of them are now PDRAs at different institutions in USA and Spain), including my participation in the research project of five PhD students and the production of seven publications as the direct result of my academic supervision. I have actively participated in multiple popular science activities across my career including *Jornadas de Puertas Abiertas* at Las Hoyas fossil site (2016-2022) and I was lucky enough to participate in the forthcoming documentary *The Rise of Birds* which features extensively some of my research and will air within 2024-25 in France, US, Germany, and China. My research has also received significant media attention, including international news agencies like Reuters or BBC News.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: GUIRADO HERNÁNDEZ, EMILIO
Referencia: RYC2024-049356-I
Correo Electrónico: e.guirado@ual.es
Título: Inteligencia artificial y funcionamiento ecosistémico
Resumen de la Memoria:

Mi trabajo representa una fusión entre mi sólida formación en ciencias ambientales y mi experiencia en ciencias de la computación, con el objetivo de abordar desafíos relacionados con el funcionamiento de los ecosistemas de alcance global. En el corazón de mis investigaciones y proyectos reside un enfoque multidisciplinario que busca comprender cómo una variedad de perturbaciones, incluidos cambios climáticos y otros factores ambientales, influyen en los ecosistemas a nivel mundial en un contexto del cambio climático. A través de un análisis exhaustivo y el empleo de herramientas computacionales avanzadas, busco desentrañar los complejos mecanismos que subyacen a estas interacciones, con el fin de obtener una comprensión más profunda de su impacto en la salud y la estabilidad de los ecosistemas. Este enfoque integral no solo busca identificar los desafíos presentes, sino también estrategias de mitigación y adaptación que sean fundamentadas en evidencia científica y que puedan contribuir a la preservación y restauración de la biodiversidad y los servicios ecosistémicos vitales para nuestro planeta.

Durante la mayor parte de mi carrera me he centrado en el estudio de las zonas áridas, que son a la vez clave para sostener nuestro planeta, con ejemplos emblemáticos de ecosistemas propensos a sufrir perturbaciones. Recientemente, con mi trabajo en la Universidad de Alicante, intento ampliar este concepto a los ecosistemas terrestres en general. Esta línea de investigación constituye mi principal interés científico y es una idea original desarrollada por mí en el grupo donde realicé mi posdoctorado.

Mi programa de investigación ha hecho avanzar nuestra comprensión de la distribución y extensión de ecosistemas forestales y patrones espaciales de vegetación de zonas áridas. Mis trabajos, han sentado las bases para una comprensión radicalmente diferente sobre las consecuencias del cambio climático y sus aumentos de aridez asociados en los ecosistemas de zonas áridas. La relevancia e impacto de mi trabajo se ejemplifica por el gran interés de colegas de todo el mundo que han citado las publicaciones, sus puntuaciones en Almetric y el hecho de que esté siendo reportado como un avance clave en informes internacionales, por ejemplo, en la COP28. Estos trabajos también están abriendo debate sobre las implicaciones de la vulnerabilidad global de los ecosistemas de zonas áridas respecto a los impulsores del cambio global, que ha sido mi principal tema de investigación desde entonces.

Mi formación multidisciplinar, así como mis habilidades no sólo en el uso, sino también en el desarrollo de técnicas estadísticas originales y complejas, me han conferido la posibilidad de abordar problemas en la interfaz de múltiples disciplinas, siendo un valor estratégico en los grupos de investigación en los que he estado.

He dirigido y apoyado contribuciones en diversos campos, como la ecología espacial, comunidades ecológicas, biogeografía de zonas áridas y funcionamiento del suelo. Estos estudios me ayudan complementado mi formación, ofreciéndome un entendimiento multidimensional que aplico a la resolución de cuestiones ecológicas.

Resumen del Currículum Vitae:

Soy un investigador con formación multidisciplinaria especializado en el estudio del funcionamiento de los ecosistemas desde una perspectiva innovadora que integra sensores remotos e inteligencia artificial. Desde la finalización de mi doctorado en la Universidad de Almería, he desempeñado roles como investigador postdoctoral en instituciones de prestigio, incluyendo la Universidad de Granada, la Universidad de Brest (Francia) y la Universidad de Alicante, donde actualmente soy investigador postdoctoral. Mi principal línea de investigación se centra en entender los factores que determinan la dinámica de los ecosistemas terrestres en el contexto del cambio global, lo que ha resultado en publicaciones en revistas de alto impacto como Nature, Science y PNAS.

Desde septiembre de 2023, soy editor de la revista Drylands de Cambridge Prisms, fortaleciendo mi participación en la difusión del conocimiento científico. Asimismo, desde abril de 2024 lidero mi propia línea de investigación en la Universidad de Alicante, titulada Análisis ambiental de zonas áridas, con una financiación de 95877.43 €. En total, estoy liderando investigaciones financiadas con más de 200000€ en ayudas competitivas, entre ellas dos proyectos como investigador principal. El proyecto Barcelona's Mesocosm Facility to Improve Soil Ecology and Biodiversity, financiado de manera competitiva por el Ayuntamiento de Barcelona y fondeos europeos (33766.01 €) y el proyecto Evaluando la importancia de los determinantes de la distribución actual y futura de los bosques en las zonas áridas de nuestro planeta utilizando inteligencia artificial y sensores remotos financiado por la Generalitat Valenciana (~92470€). También obtuve una beca postdoctoral Juan de la Cierva Formación (~52600€). Mi experiencia incluye participación en 10 proyectos de investigación nacionales e internacionales, así como colaboraciones con la industria y entidades privadas como asesor científico de Garnata Drone Enterprise, una plataforma de agricultura de precisión y restauración ecológica.

He publicado 54 artículos indexados en el Journal Citation Reports (JCR), de los cuales 18 son como primer o último autor (34%). Además, soy autor de tres capítulos de libro en inglés y francés y he contribuido a informes internacionales como el Climate Futures Report y Tipping Points in the Biosphere, presentado en la COP28 en Dubái. Mis publicaciones han acumulado más de 3000 citas, 1210 sólo en el año 2024, con un índice-h de 25 y un i10-index de 40 según Google Scholar.

En el ámbito de la formación, supervisando a una estudiante de doctorado de Namibia en el marco del programa Learn Africa desde 2022, además de tutorizar a nueve estudiantes de máster (3 este año), cinco de grado y recibir a investigadores predoctorales y postdoctorales internacionales. También he impartido clases en másteres oficiales de la Universidad de Almería y la Universidad de Alicante relacionados con la conservación y el uso sostenible de recursos naturales.



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He realizado actividades de divulgación científica. He editado cuatro números especiales de revistas científicas (dos nacionales y dos internacionales) y he sido invitado a impartir seminarios y colaborar en iniciativas internacionales (En 2024 en University of Urunqi, China; University King Abdullah Science and Technology, Saudi Arabia). Destacan en el último año mi participación como asesor para la UNCCD y mi invitación al Parlamento Andaluz.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: FRAIJA FERNANDEZ, NATALIA
Referencia: RYC2024-049666-I
Correo Electrónico: natalia.fraija@uv.es
Título: Cetacean parasitology and conservation through systematics, phylogenetics and environmental DNA
Resumen de la Memoria:

Marine biologist by the University of Bogotá Jorge Tadeo Lozano. After completing undergrad formation, I moved to Spain pursuing a MSc degree in Biodiversity: Evolution and Conservation. Scientific enquiry directed me to become a doctoral candidate at the Marine Zoology Unit of the Cavanilles Institute of Biodiversity and Evolutionary Biology of the University of Valencia (UV), where my research line has been developed since then. My doctoral research was funded by the Generalitat Valenciana Project PROMETEO/2011/040 2011-2014. On the third year of my PhD through a visiting grant I moved abroad to the Life Sciences Department of the Natural History Museum (NHM) in London where a challenging and very fructiferous research collaboration began. Once the doctoral degree was achieved, I earned a postdoctoral fellowship Generalitat Valenciana APOSTD2017/089 (2017-2019) to visit the NHM and to explore the use of Next-Generation sequencing data in biological collections. During this period, I acquired, among others, the technical and analytical skills to process environmental DNA data, which in turn favoured my incorporation to my second postdoctoral research experience at AZTI, Basque Research and Technology Alliance in Sukarrieta (Vizcaya). The scientific relationship I started with colleagues from the NHM and AZTI continues until now. I am Scientific Associate of the NHM since June 2019 and together with Dr Tim Littlewood (NHM) and Dr Naiara Rodríguez-Ezpeleta (AZTI), main postdoc supervisors, we continue developing research through joint projects and research manuscripts. With a 2019 UV Talent attraction subprogram fellowship I returned to Valencia as a postdoctoral research fellow developing environmental DNA research to detect and characterise the helminth fauna from marine mammals using non-invasive approaches. Since then, I have started an early-stage research team interested in eDNA studies for marine mammal monitoring and for studying helminth fauna in cetaceans non-invasively. My current position as senior researcher and PI of the project CETABIOENA (Monitoring cetacean biodiversity using environmental DNA) is funded by a competitive grant I earned through the 2022 Early-career talented researchers funding program (Plan GenT, Generalitat Valenciana). Present position, has allowed the research team to grow with two currently PhD. students and, a former MSc. student and research technician.

Resumen del Currículum Vitae:

Marine biologist and PhD in marine resources with broad background in marine parasitology, evolutionary biology and molecular biology, and with specific training in systematics and high-throughput sequencing. Research interests stem from the desire to understand ecological and evolutionary processes in cetaceans by studying host-parasite relationships. Currently, tackling novel genomic approaches, including high-throughput sequencing and environmental DNA to understand the relationship between parasites, host and environment. Complementary and specific training courses span from marine mammal species identification, phylogenetics, cetacean necropsy and pathology to next-generation sequencing data management. Scientific accomplishments I have participated in 16 competitive research projects funded by European, Spanish and Valencian public entities, published 2 book chapters, 1 technical document and 29 scientific papers in high-impact journals. As PI I have received three competitive research grants (2022 Talented Research Support Programme Plan GenT, 2021 Synthesis+ Transnational access visiting grant and 2017 Systematic Research Fund) and two postdoctoral research fellowships (2021 Talent Attraction fellowship and 2017 Postdoctoral APOSTD grant). Internationalization and mobility I have acquired international research experience at the Life Science Department of the Natural History Museum, London (3 months as predoc and 16 months as postdoc) and at AZTI Research and Technology Alliance in the Basque Country (6 months as postdoc). I have established a collaborative network with colleagues from UK, Spain, Germany, Italy, Japan, India, Peru, Iran, Colombia and Czech Republic as attested by joint projects, scientific articles and congress contributions. Recognitions and awards I have received the seal of excellence for the project proposal PARACETAMOL Parasites of Cetaceans unlocked for their molecules submitted under the Horizon2020's Marie Skłodowska-Curie actions call H2020-MSCA-IF-2018 (overall score: 91.40%) and for H2020-MSCA-IF-2017 (overall score: 90.20%), the cum laude distinction for my thesis, the Univ. of Valencia doctoral outstanding award and the recognition of best talk at the "Ecology and Ecosystems session" in the British Society for Parasitology Spring Meeting. Society contributions Scientific services include peer-reviewing 25 manuscripts in Parasitology, Marine sciences, Marine mammals and Zoology journals and 17 outreach and press communication actions. Student and young researchers mentorship University teaching since 2021 includes 258,4 hours for the Biotechnology and the Biological Sciences degrees and the Master degree in Biodiversity: Conservation and Evolution (Univ. of Valencia). In addition, I have imparted national and international phylogenetic, cetacean and helminth-related courses and seminars. I have supervised 4 master students, one external internship student and currently three doctoral candidates, and participated on the examination board of four thesis from the Univ. of Valencia and the Univ. of the Basque Country.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: GONZÁLEZ ALEMÁN, JUAN JESÚS
Referencia: RYC2024-048474-I
Correo Electrónico: juanjeglez@outlook.com
Título: Advancing Atmospheric Dynamics: Understanding Anthropogenic Climate Change Impacts on Extreme Weather and Circulation Patterns

Resumen de la Memoria:

I've mainly specialized in studying cyclones with tropical characteristics, convective phenomena, atmospheric dynamics, extreme weather attribution, climate change, and numerical modeling. My groundbreaking PhD was the first in Spain to investigate tropical-like cyclones in the North Atlantic and Mediterranean, fulfilling a childhood passion and establishing a solid foundation for my career. Over the years, I have expanded my expertise through significant contributions to R&D projects, international collaborations, and influential publications, advancing meteorology and climate science.

Building on this foundation, my last studies revealed new and exciting research avenues that I aim to pursue through this Ramón y Cajal call, as my current position at AEMET is incompatible with these endeavors. This opportunity will enable me to establish my own research group, secure funding, and focus on these emerging areas while addressing unresolved questions from my PhD research. The innovative nature of this position will propel my career to the forefront of leadership in meteorology and climate science. My research objectives are as follows:

Primary Line of Research:

Investigating the influence of anthropogenic climate change (ACC) on atmospheric circulation and dynamics, particularly phenomena such as anticyclonic blockings, extreme marine heatwaves, cyclones, and convective events. While Contributions 8 and 9 explored ACC's thermodynamical impacts on extreme convective events (e.g., 2022), their dynamical aspects remain unexplored. Addressing these gaps is critical. This research will align with the DIATOMEA ERC proposal (if funded), facilitating strong collaborations and new projects. I will also study extreme convective events in the western Mediterranean from a seasonal forecasting and teleconnections perspective, enhancing anticipation of these phenomena and their societal impacts.

Secondary Line of Research:

Continuing to explore cyclones with tropical characteristics and their potential impacts on our region. This includes unresolved questions from my PhD, national R&D projects like IBERCANES and CONSCIENCE, and aspects of my granted (but not started) Marie Curie proposal. If funded, the MedRisk Marie Curie PhD Network proposal will support this work through a robust collaborative framework.

Training and Mentorship:

I aim to attract talented students for Master's and PhD theses and involve undergraduates in all research stages, tailoring projects to their goals. Funding will be sought through national and European projects and PhD fellowships like FPU and Severo Ochoa.

Scientific and Societal Impacts:

This research will assess climate change's dynamic impacts on atmospheric circulation, addressing key questions such as midlatitude dynamics' sensitivity to ice melting, Europe's disproportionate warming, and the limitations of current forecasting models. By also exploring emerging theories like quasi-resonant waves, these findings will enhance societal adaptation strategies and provide policymakers with actionable insights, pushing the boundaries of meteorological knowledge.

Resumen del Currículum Vitae:

Professional Overview:

Juan Jesús González Alemán is a highly accomplished atmospheric scientist who has rapidly established himself as a leading figure in meteorology and climate science. Since earning his PhD in 2018, he has authored 41 articles in peer-reviewed journals (7 as lead author), with most appearing in prestigious international publications. He has also contributed to over 55 conferences, 5 books, and 13 R&D projects, including 8 European initiatives, many of which he has helped conceive and lead tasks.

Research and Innovations:

Juan Jesús's research focuses on cyclones with tropical characteristics, convective phenomena, atmospheric dynamics, extreme weather attribution, climate change, and numerical modeling. His PhD, the first in Spain on tropical-like cyclones in the North Atlantic and Mediterranean, laid the foundation for his pioneering work. Many of his publications are based on original ideas, reflecting his innovative approach and significant contributions to advancing knowledge in these fields. His leadership and commitment have secured over €1 million in research funding.

Awards and Recognitions:

Juan Jesús's outstanding contributions have been recognized with prestigious grants, such as the Marie Curie Postdoctoral Fellowship and the Juan de la Cierva grant. He was the Spanish candidate for the WMO Young Scientist Awards in 2019 and has twice received awards from the Spanish Meteorological Association (2016, 2018). Additionally, he was invited to the WMO's 10th International Workshop on Tropical Cyclones (IWTC-10) as a global expert.

International Collaboration and Engagement:



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A strong advocate of international collaboration, Juan Jesús has participated in numerous global research initiatives and worked with renowned organizations. His involvement includes invitations to join the WMO's Tropical Cyclones and Climate Change Working Group and UNEP's Mediterranean Experts group. He has conducted multiple research stays abroad and contributed to projects such as the ACCORD consortium and the EU's Destination Earth initiative.

Science Communication and Societal Impact:

Committed to bridging science and society, Juan Jesús excels at communicating complex topics. His X (formerly Twitter) account, with over 55,000 followers, reaches millions monthly, earning him media appearances in TV programs and news outlets. His work with AEMET-CSIC has also helped develop the first broad portfolio of climate services for Spain, addressing societal needs in collaboration with emergency teams, forecasters, and policymakers.

Mentorship and Teaching:

Juan Jesús's passion for fostering talent is evident in his mentorship of students and early-career researchers. He has co-supervised 2 PhD theses (with 2 ongoing) and several undergraduate and master's projects, with his mentees now holding postdoctoral roles at prominent institutions. He has also served as a trainer for AEMET, WMO, and AECID, teaching meteorological techniques to Ibero-American meteorologists.

Conclusion:

Juan Jesús González Alemán combines scientific excellence with leadership, innovation, and a deep commitment to public engagement. His work has made significant impacts on atmospheric science, global collaborations, and societal applications, exemplifying the role of a modern scientist dedicated to both discovery and the public good.



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Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: BERROCAL, JOSÉ AUGUSTO
Referencia: RYC2024-049827-I
Correo Electrónico: jberrocal@iciq.es
Título: Stimuli-responsive polymer materials

Resumen de la Memoria:

I was trained as an organic chemist during my PhD. I further specialized in supramolecular chemistry and materials during postdoctoral research in Eindhoven, Netherlands, and light-driven unidirectional rotary molecular motors in Groningen, Netherlands. In 2019, I began my independent career as a Maître Assistant at the Adolphe Merkle Institute (AMI) of the University of Fribourg, Switzerland, transitioning to stimuli-responsive polymer materials. Since July 2023, I have been a tenure-track Group Leader at ICIQ in Tarragona, Spain, where I continue advancing research on stimuli-responsive polymers.

My group integrates techniques from organic, supramolecular, and polymer chemistry to develop stimuli-responsive materials potentially applicable to sustainable development. Nevertheless, our primary target is to address fundamental questions in materials science. We are currently engaged in three primary research lines:

1. Polymer mechanochemistry and heterolytic mechanophores.

Our main focus is the development of triarylmethane derivatives as a new class of mechanophores. This concept was independently conceived and implemented by me and has led to the group's first publication in polymer mechanochemistry, an entirely new field for me.

2. Polymer recycling and upcycling strategies.

We are devising innovative approaches for the recycling and upcycling of polymers. Our initial contributions were published in 2023.

3. Artificial muscles combining colloidal nanoparticles and stimuli-responsive polymers.

This research is conducted under the EIC Pathfinder-²INTEGRATE project, a consortium-based grant that I lead at AMI (where I retain a 10% appointment until May 2026). We have not yet published results in this field. Due to its Switzerland-based nature, I will not include specific details in my RYC application.

In addition to these core activities, I have been contributing to other two research fields:

² Intramolecular Reactivity.

The primary focus of my PhD. This remains an area of interest where I collaborate with colleagues on a project basis.

² Self-Assembly Processes.

As stated above, my postdoctoral research focused on self-assembly in solid-state, solution, and liquid-solid interfaces. I have temporarily stepped back from this field to establish an independent profile, but I aim to re-engage with this community within the next five years.

Resumen del Currículum Vitae:

I received my BSc. (2008) and MSc. (2010) degrees in Chemistry at the University of Rome « La Sapienza ». I received my PhD in Chemistry (2014, cum laude) from the same university, working under the supervision of Prof. Luigi Mandolini and Prof. Stefano Di Stefano. I was trained as a physical organic chemist, and I dedicated most of my PhD research to the quantification of the efficiency of intramolecular reactions.

Post Ph.D., I joined the group of Prof. E. W. ("Bert") Meijer at the Eindhoven University of Technology, Netherlands, as a postdoctoral researcher. I worked on supramolecular chemistry and supramolecular materials deriving from discrete nanophase-separating oligomers (2014-2017). I then moved to the group of 2016 Chemistry Nobel Laureate Prof. Ben L. Feringa for a second postdoc experience (2017-2019), where I worked in the field of light-driven molecular motors and machines.

I started my independent academic career in 2019, when I joined the Adolphe Merkle Institute (AMI) of the University of Fribourg (Switzerland) as a Maître Assistant. During my time in Switzerland, I received prestigious grants, such as an ERC Starting Grant (2021), an EIC Pathfinder Grant (2022), and a grant from the Office of Naval Research (ONR) Global (2022). Moreover, in 2023 I was awarded the prestigious Thieme Journal Chemistry Award for up-and-coming researchers worldwide who are in the early stages of their independent careers.

Since July 2023, I have joined ICIQ as a tenure-track Group Leader (ICIQs Starting Career Program (ICIQ-SCP) funded by the Severo Ochoa Excellence grant). I have been appointed as a member of the Editorial Advisory Board of ACS Macro Letter in January 2024.



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Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: UNIONE, LUCA
Referencia: RYC2024-050712-I
Correo Electrónico: lunione@cicbiogune.es
Título: Study the role of glycans in infectious diseases

Resumen de la Memoria:

One of the key roles of cell surface glycans is to mediate interactions at the virus-host interface, controlling viral spread and/or activation of the immune system. Many viruses employ glycans binding proteins (lectins) for host cell entry, making the glycan coat the front-line of the battle. Examples include human Influenza A and most corona viruses, among others. Significant advances have been made in deciphering the so-called "glyco-code" through in vitro studies. However, on the cell surface, Nature deploys local glycan concentrations to generate selectivity, not only by varying 3D presentation and density, but also spatial-segregation. How does glycosylation tip the scale towards viral protection or colonization? Answering this question is not trivial. Different experimental approaches often lead to different outcomes, pointing out the dramatic role of glycan presentation for the molecular recognition process and the tremendous difficulty of translating in vitro results to the in vivo environment. My research line aims to decipher the glyco-code in the natural chemical environment, the cell surface, with minimal sample derivatization, and at atomic resolution. I propose to investigate glycan/ virolectin recognition event at atomic level in living cells. My team will chemically remodel glycans directly on the cell surface. The modified glycans will contain NMR-active probes to decode their biological role at the highest possible resolution.

Together with my team, I will address these questions by solving the key challenges:

Challenges 1 & 2. NMR spectroscopy is a low sensitive technique. The NMR signals of glycans suffer from very low chemical shift dispersion, which results into crowded spectra.

Solution. Introduce isotopically labeled sugars to increase the sensitivity of the technique and minimize the NMR spectral complexity.

The fluorine-containing glycan library will be constructed using a panel of chemically synthesised monosaccharide derivatives based on Sialic acid. My team has experiences with the synthesis of different sugar donors, many of them containing fluorine as NMR reporter. This strategy will allow us to detect virolectin binding to the glycans directly on cell surface by means of state-of-the-art NMR experiments. The development of technologies to facilitate glycan research has been highlighted as a key area within the scientific community. We need innovative methods to assess how alterations in host cell glycosylation profile viruses attachment. From a fundamental standpoint, this research line will break the limits in our understanding of glycans' structure, conformation, interactions in their natural environment, and their significance in biomedical events. New chemical and enzymatic synthetic procedures will be explored, and innovative analytical methodologies will be developed. The potential for translation is enormous since viral infection is a challenge for Society. The susceptibility of a given cell or tissue to be infected dramatically depends on the nature and accessibility of its surface glycans. Thus, profiling the cell glyco-content will provide a breakthrough for predicting potential glycans/virolectin interactions. Human and animal viruses will be targeted, including human influenza and coronaviruses, with the consequent impact on farm and human life.

Resumen del Currículum Vitae:

I graduated in Chemistry (10/2009) and obtained the Master degree in Organic Chemistry (03/2012) at the University of Napoli Federico II (Italy). In 2012 I moved to Madrid (ES) to start the PhD studies as part of the international project EU ITN Marie Curie (DYNANO). I joined the group of Prof. J. Cañada & J. Jiménez-Barbero (JJB) at the Center for biological research CIB-CSIC in Madrid. As part of the PhD training, I did 3 stays in high level research groups, 2 of them in the field of organic synthesis, under the guidance of Prof. Stephane Vincent in Namur (BE), and of Dr. Niels Reichardt in San Sebastián (ES) and one in computational chemistry, under the guidance of Prof. Martín-Santamaria in CEU University (ES). At that time, my research was focused in exploring molecular recognition events from the chemical perspective, mostly in unravelling the molecular basis of the recognition of small glycans (mono- and di-saccharides) and their analogues by protein receptors in solution, using a combined approach of molecular modelling and NMR. The results of my contribution in this research area are reported in 11 publications in high level Journals and the dissemination of my work by participating in 8 national and international symposia (during the PhD studies). In October 2016 I received the PhD, with the work entitled "Sugars and Proteins: The role of Dynamics in Molecular Interactions". In 2018, I was awarded with the competitive (national-wide) Torres Quevedo contract for pursuing oriented scientific research in the pharmaceutical company Atlas Molecular Pharma, where I contributed to the identification of therapeutics in rare diseases and participated in the achievement as orphan drug designation (EMA, FDA) of one molecule (ciclopirox). Coming back to fundamental research, but always looking to highly competitive projects with possibilities of translation, in 2019 I applied to and was awarded with the highly competitive International Human Frontier Science Fellowship (HFSP) to move to Utrecht Univ (NL) to carry out my project working with Prof Geert- Jan Boons. I acquired skills for synthesis of complex glycan molecules by combining chemical & enzymatic synthesis. After 2 years at Utrecht, I was back to Spain as Postdoctoral Fellow at CIC bioGUNE, first, under the HFSP scheme, which allows spending a 3rd year at a different research center. In 2022 I was awarded with the Juan dela Cierva, and specially with the Ikerbasque Research fellow, a 5-years tenure track position aimed to be established as PI. During 2023, I applied to the ERC starting grant with a research project named Glyco13Cell aimed to decipher the role of glycans in infectious diseases at atomic resolution. The project was financed with 1.5 M €. In the same year, I also applied to the Proyectos de generación de conocimiento with a project entitled InhibiFlu, aimed to the design and synthesis of broad inhibitors of the human influenza A virus. The project was financed with 98 K €. Since 01/12/2023, I have been promoted to Associate Researcher and I have started to develop a new expertise in the Chemical Glycobiology lab, in which I am currently integrated, leading that area and its applications in bioGUNE. Since January 2025 I have been appointed as visiting professor from the Medical School of the University of Deusto.



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Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: PARRILLA PONS, MARC
Referencia: RYC2024-049754-I
Correo Electrónico: marc.parrilla@gmail.com
Título: Investigación y desarrollo de sensores vestibles para el monitoreo de biomarcadores relevantes para la salud

Resumen de la Memoria:

Resumen de la trayectoria investigadora:

Mi trayectoria empieza con la obtención del doctorado con mención cum laude con el nombre "New electrochemical sensors for decentralized analysis". Durante el doctorado me focalicé en el aprendizaje de nuevas técnicas y métodos para desarrollar sensores electroquímicos de bajo coste en diferentes plataformas (por ejemplo papel y textil). Principalmente, mi tesis se focalizo en sensores potenciométricos y su caracterización analítica, aparte de otras caracterizaciones y uso de nanomateriales para incrementar el rendimiento de los sensores.

Después del doctorado, mi investigación pivotó a sensores "point of care" con el desarrollo de biosensores con electrodos serigrafados. Después de un año, cogí la oportunidad de abrir una línea de investigación sobre "wearables" en Suecia con la realización de una estancia postdoctoral. Allí, empecé mis líneas de investigación en parches con sensores para la monitorización del sudor y también el desarrollo de sensores basadas en microagujas.

En 2020, me moví a Bélgica para aplicar mi conocimiento en sensores voltamétricos basados en electrodos serigrafados. Investigué estrategias electroquímicas para la detección de drogas ilícitas de una manera rápida y de bajo coste. Esta línea de investigación estaba enmarcada en el contexto del proyecto Europeo Bordersens. Durante esta fase trasladé la tecnología, junto con el equipo, de TRL 3 a TRL 5, llevando los prototipos a los usuarios finales (por ejemplo policía y aduanas) para el testeo en un escenario relevante.

Después de casi dos años, conseguí mi propia financiación y la consolidación de la línea de investigación en "wearables" en la Universidad de Amberes focalizándome en el desarrollo de sensores basados en microagujas.

Línea de investigación:

Mi carrera investigadora se ha centrado principalmente en el desarrollo de sensores "wearable" para diferentes aplicaciones en el campo de la salud. Mi amplia experiencia en este tipo de sensores para la monitorización de biomarcadores y parámetros relevantes para la salud, me permite analizar y encontrar los retos que todavía existen para llevar estas nuevas tecnologías hasta la innovación y el mercado. Principalmente, durante mi futura investigación propongo desarrollar una estrategia electroquímica para evaluar la penetración de las microagujas que aseguren el correcto posicionamiento y cuantificar la inserción para poder correlacionar adecuadamente la respuesta analítica. Además, propongo el uso de nanoestructuras en las microagujas para incrementar el área electroactiva y su funcionalización con aptámeros que permiten el monitoreo continuo de los analitos. El foco de la aplicación será en el desarrollo de plataformas para detectar biomarcadores y drogas terapéuticas que proporcionen un tratamiento personalizado al paciente y así mejorar la recuperación del mismo y minimizar los costes del sistema de salud.

Recientemente, estoy abriendo también una línea de sensores electroquímicos para aplicaciones en agricultura. Después de analizarlo con potenciales usuarios finales, existe un brecha de conocimiento sobre como las plantas pueden ser optimizadas para mejorar el rendimiento productivo y evitar el estrés. Así, información bioquímica en tiempo real puede ayudar a tomar decisiones, por ejemplo sobre fertilización, con un impacto relevante en la producción.

Resumen del Currículum Vitae:

Me consolidé como investigador durante mi tesis doctoral con la obtención de la mención cum laude e investigación que llevó a nueve artículos científicos y a una aplicación de patente. Para masterizar en el desarrollo de sensores vestibles o "wearable" realice una estancia doctoral en la Universidad de California San Diego con el pionero Prof. Joseph Wang.

Antes de la defensa de mi doctorado, empecé como investigador en un centro de investigación, CIDETEC, en San Sebastián. Durante un año (2016-2017), estuve desarrollando biosensores basados en electrodos serigrafados en proyectos con empresas.

No obstante, como mi motivación para la investigación e innovación es la tecnología "wearable", a principios de 2018 me lancé a hacer una estancia postdoctoral de dos años en KTH Royal Institute of Technology en Suecia. Allí, empecé una nueva línea de investigación basado en los sensores "wearable" que dio lugar a siete artículos científicos y una aplicación de patente.

En 2020 quería continuar formándome y aprender de financiación Europea y gestión en proyectos Europeos con múltiples colaboradores. Así, me trasladé a Bélgica, a la Universidad de Amberes, para participar en un proyecto Europeo llamado Bordersens donde lideraba la parte de investigación de los paquetes de trabajo correspondientes. Además, al ser coordinadores del proyecto, teníamos también que asegurarnos de la ejecución del proyecto y la realización de los test de campo con los usuarios finales. Una vez aprendido este tipo de gestión y después de casi dos años, en 2021 conseguí mi propia financiación postdoctoral y para un estudiante de doctorado, para empezar mi línea de investigación en sensores "wearable", esta vez, en la Universidad de Amberes. En esta universidad he conseguido establecer la línea de microagujas basadas en sensores electroquímicos y he ampliado mi red de contactos a lo largo de Bélgica, Europa y Reino Unido (en este último a través de estancias de investigación cortas). Además de publicar en revistas de alto impacto durante mi estancia en la Universidad de Amberes (>30 publicaciones y dos aplicaciones de patentes) e incrementar las métricas de mi currículo, he conseguido financiación para continuar con mi línea de "wearables".

Además, he participado en dos trayectorias de valorización de tecnología "wearable" ("KTH preincubator programme" en Suecia y "Deep Dive into Business" en Bélgica) analizando el mercado, competidores y modelos de negocio sobre la tecnología que desarrollo que me permiten tener una perspectiva innovadora y de identificación de necesidades de mercado.

Mi liderazgo se ejemplifica con la supervisión oficial de dos estudiantes de doctorado, dos estudiantes de Master, y cinco estudiantes de grado, además de la supervisión "no escrita" de cinco estudiantes de doctorado. Asimismo, soy autor correspondiente en ocho de mis artículos científicos relacionados con mi línea de investigación en "wearables".



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No obstante, una vez ganado el reconocimiento por los científicos de mi campo y establecido conexiones que me pueden permitir aplicar a financiación con consorcios europeos, me gustaría retornar a España y consolidar la línea de investigación en "wearables" para aportar toda la inversión en mi conocimiento y crecimiento de vuelta a España.



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Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: ZANATTA, MARCILEIA
Referencia: RYC2024-049755-I
Correo Electrónico: zanatta@uji.es
Título: Development of functional materials for direct air capture and CO₂ conversion
Resumen de la Memoria:

My career goal is to become a leading scientist in sustainable materials, specializing in innovative solutions for converting greenhouse gases to combat climate change. To achieve this, I have become an expert in catalysis with advanced materials capable of capturing and converting CO₂ into value-added chemicals and fuel.

I obtained my Doctorate degree in Chemistry from UFRGS (Brazil) in 2017, with a focus on ionic liquids (ILs), CO₂ capture (CC), and homogeneous catalysis. My scientific achievements were recognized by CNPq (2017) and FAPERGS (2018), Brazilian funding bodies, with 2 postdoctoral grants for developing my research at UFRGS. During this period, I concentrated on converting CO₂ into high-value products using heterogeneous catalysis. Additionally, I explored new mechanisms of CC using ILs and alternatives for operating under wet conditions (Angew Chem). My research in CC led to significant advancements in CO₂ conversion, including photo and electroreduction of CO₂ under mild conditions (ChemSusChem).

In 2019, I secured a Junior Researcher contract at the Material Center (CENIMAT) of UNL (Portugal). During this period, I conducted intensive research on poly(ionic liquids) (PILs) and methodologies to modulate the porosity of PIL-based materials for CO₂ capture. I also developed a methodology to quantify CO₂ sorption using NMR techniques (J. CO₂ Util) and methodologies for producing highly porous PIL materials, particularly aerogels (Chem. Eng. J., IJMS). During this period at UNL, I published 8 papers (3 as corresponding author), 2 book chapters, and supervised 5 MSc students and 1 PhD student.

In 2021, I secured a prestigious MSCA-IF to collaborate with the Dr. Sans group at UJI, Spain. The focus of my project was the developing 3D printable catalytic materials for applications in CO₂ capture and conversion. During my MSCA period, I have published 14 papers with UJI affiliation (5 as corresponding author), including Adv Funct Mat, Green Chem. I pioneered the use of 3D-printed reactors for CO₂ cycloaddition reactions, enabling the transition from batch reactions to continuous flow systems (Green Chem, corresponding author). Additionally, I initiated my own research area focusing on direct air capture and integrated CO₂ conversion (DAC), with 3 papers published as corresponding author and one as a single author (ACS Sus Chem Eng, ACS Materials Au, Green Chem). Recently I become an independent researcher after securing an La Caixa foundation Junior Leader Fellowship. In this scope, I led a study demonstrating, for the first time, the potential to convert atmospheric CO₂ into biodegradable polymers by combining chemo- and biocatalysis in collaboration with UCD (Ireland) (Green Chem). This innovative approach became the foundation for my current research line in direct air capture and CO₂ conversion.

My scientific goal is to develop efficient and sustainable methods to capture CO₂ from the atmosphere and convert it into valuable products using integrated systems operating under mild conditions. This innovative approach requires expertise in synthetic chemistry, materials science, and process engineering areas where I have demonstrated exceptional leadership and capability to spearhead this research line.

Resumen del Currículum Vitae:

I received my PhD in Chemistry from UFRGS, Brazil, in 2017, with a focus on catalysis, and have published 5 papers related to my thesis, including in Angew. Chem. and ChemSusChem. Between 2017 and 2018, I secured funding for 2 projects through Brazilian research foundations in the field of sustainable materials. In 2019, I secured a Junior Researcher position at NOVA University Lisbon (UNL), Portugal, resulting in 8 papers, with 3 of them as corresponding author (Chem. Eng. J., Clean. Prod., and J. CO₂ Util.).

In 2021, I was awarded a Marie Skłodowska-Curie Actions individual Fellowship and joined Universitat Jaume I (UJI), Spain. In 2024, I secured a La Caixa Junior Leader Fellowship at UJI, where I am consolidating my leadership and independence.

During these 3 years at UJI, I have published 24 papers (9 as corresponding author, one as single author), including in Adv. Funct. Mat. and Green Chem, ACS Sus Chem Eng, Nanoscale Mat. Today Energy.

To date, I have published 44 papers (38 after PhD - last 7 years), 2 book chapters, with an h-index 20, citations > 1200 (Scholar). Noteworthy publications in prestigious journals like 2 in Angew Chem, 4 Green Chem, Adv. Func. Mat. and Chem. Eng. J. Additionally, I have presented 40 communications at international conferences (11 oral), delivered 4 invited lectures at universities, and 5 invited talks at high schools. I have also participated in 2 scientific panel discussions.

I have received more than 15 scientific recognitions, including: (i) RSEQ-GEQV Young Researchers Award (ES) (Real Sociedad Española de Química Grupo especializado en Química Verde, 2024). (ii) Highlighted by Nature Index as one game-changing researchers in materials science (Nature index, 2024), (iii) Rising Star in Materials Science by ACS MaterialAu (2023) and (iv) in 2022, I was among the top 5% of Junior researchers worldwide, selected by the Lindau Nobel Org. and the Brazilian Science Academy to participate in the Lindau Nobel Laureate Meeting.

Throughout my academic journey, I have demonstrated independence and leadership by publishing 84% of my papers during my postdoctoral period, with 55% as corresponding or first author across 3 different universities (UJI-ES, UNL-PT, UFRGS-BR). I have supervised 2 PhD students, 2 PhD ongoing, 5 MSc students, 2 undergraduate students. I also served as a Guest Editor for a special issue at Int. J. Mol. Sci. Additionally, I led an outreach program that produced a podcast with 23 episodes.

An important aspect of my career is my consistent success in securing funding. I have secured 8 projects (6 after PhD, 3 ongoing) which I have written and undertaken myself with a combined budget of €788k, 3 projects as PI (La Caixa, UJI, FAPERGS/CAPES), 1 as co-PI (international collaboration,



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CNPq), 2 postdoctoral individual fellowship (MSCA, CNPq) and 2 individual scholarships (during my predoctoral period), in 2 different countries (BR and ES) and from 5 different funding agencies. Additionally, I am PI of one transfer line of UCIE-INAM with industrial technology transfer project funded by AVI-GVA.

I have gained extensive experience through work in 8 research institutes across 4 countries: PT, ES, FR, and BR. Additionally, performed many short visits and lectures in international institutes. I have published paper as corresponding author in collaboration with University College Dublin (Ireland), Politecnico de Torino (IT), UFRGS and UNICAMP (BR), NOVA Lisbon (PT).



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Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: MALO DE MOLINA HERNANDEZ, PAULA
Referencia: RYC2024-049369-I
Correo Electrónico: paulamalodemolina@gmail.com
Título: Unveiling the Structure and Dynamics of Soft Matter: From Synthetic Polymers and Emulsions to Innovative Biomaterials

Resumen de la Memoria:

My research journey has been driven by a continuous pursuit of understanding the structure and dynamics of soft matter systems, evolving from foundational studies on synthetic polymers and emulsions to innovative applications in biomaterials.

I began my academic career at the Complutense University of Madrid, where I developed a solid foundation in chemistry. As an ERASMUS student at the Technical University of Berlin (TUB), I expanded my expertise by completing a Master's thesis on vesicle polymer networks. This experience inspired my Ph.D. research at TUB under Prof. Gradzielski, supported by the prestigious La Caixa-DAAD fellowship. During this time, I investigated the structure and dynamics of multiarm telechelic polymers in microemulsions, mastering advanced characterization techniques such as small-angle neutron scattering, dynamic light scattering, and rheology. This work provided valuable insights into how polymer architecture influences network properties, with implications for formulations in pharmaceuticals and personal care products.

Following my Ph.D., I expanded my research scope during a postdoctoral position at the University of California, Santa Barbara (UCSB). Here, I explored complex polymer networks and nanoemulsions under Prof. Helgeson's guidance. I developed responsive organohydrogels for chemical and biological threat protection, resulting in high-impact publications, a U.S. patent, and collaborations with multidisciplinary teams across the U.S. My work at UCSB emphasized the importance of linking molecular structure with macroscopic properties, a theme that continues to define my research.

In 2015, I joined the Polymers and Soft Matter Group at the Center for Materials Physics (CFM) in San Sebastián. My focus shifted toward the dynamics of molecular and polymer mixtures using neutron scattering. Collaborating with leading researchers at Forschungszentrum Jülich and ILL, I uncovered fundamental insights into the collective dynamics of polymers and small molecules, publishing in Physical Review Letters and Macromolecules.

In 2019, I was awarded an Ikerbasque Fellowship, recognizing my expertise in neutron scattering applied to macromolecular systems. This period allowed me to focus on the structure and dynamics of polymer blends and crowding solutions, laying the groundwork for my transition to independent research. By 2022, I had fully established an independent line of investigation centered on the Physical Chemistry of Biomaterials. My current work explores biomimetic particles to study complex media, including crowding and coacervation, as well as host-guest interactions in polypeptide nanoparticles for biomedical applications. These projects integrate advanced scattering techniques with macroscopic studies, bridging fundamental physical chemistry with real-world applications in health and sustainability.

Because of my expertise in neutron scattering, between 2019 and 2022, I served on the Subcommittee of College 9 ("Structure and Dynamics of Condensed Soft Matter") at the Institut Laue-Langevin (ILL) in Grenoble, France, and I review proposals for neutron scattering instruments at the NIST Center for Neutron Research (NCNR) in Gaithersburg, USA. My extensive experience with large-scale facilities includes experiments conducted at ILL, ESRF, ISIS, FRMII, BERII, LLB, PSI, NIST, and LANSCE.

Resumen del Currículum Vitae:

I hold a degree in Chemistry from the Complutense University of Madrid, Spain, and completed my Master's thesis as an ERASMUS student at the Technical University of Berlin (TUB), Germany. In 2012, I earned my Ph.D. (summa cum laude) in Physical Chemistry at TUB, supervised by Prof. Gradzielski, with a focus on the structure and dynamics of microemulsions in polymeric solutions, supported by the prestigious La Caixa Postgraduate Fellowship.

During my time at TUB, I developed expertise in small-angle neutron scattering, rheology, fluorescence correlation spectroscopy, and dynamic light scattering, and established key collaborations with Prof. Laschewsky's group at the Fraunhofer Institut and Prof. Schalley from the Free University of Berlin. I co-authored impactful publications, including one in Chemical Science. Later, at UCSB with Prof. Helgeson, I explored polymer networks and nanoemulsions, leading the tasks of the D[MS]2 project funded by the Defense Threat Reduction Agency, while collaborating with Prof. Valentine at UCSB's Materials Research Laboratory. This research resulted in publications in Macromolecules and Nano Letters, and a U.S. patent.

In 2015, I joined CFM in San Sebastián, Spain, focusing on the dynamics of small molecules and polymers using neutron scattering, collaborating with Prof. Richter's group at Forschungszentrum Jülich and Drs. Hoffmann and Prévost at ILL. In 2019, I received an Ikerbasque Research Fellowship to study neutron scattering applied to macromolecular systems within the PSMG. There, I contributed as a research team member to five grants (€815,885 total). By 2022, I began leading an independent line on biomaterials, having secured €173,941 as Principal Investigator across three projects, including the grant "2024-CIE4-000014-01: Impacto de la topología macromolecular en la estructura de complejos coacervados" (€96,000). My current and future research aims to bridge fundamental physical chemistry with applications in biomaterials and soft matter, focusing on designing materials that mimic biological systems and exploring their dynamic behavior through advanced scattering techniques.

I have published 35 papers, including two book chapters, with >1030 citations and an h-index of 18, encompassing 13 as first author, 1 as last author, and 10 as corresponding author, and hold a U.S. patent in application. I have presented >35 contributions at conferences (two invited talks and one keynote) and regularly present my work at conferences such as the European Colloid and Interface Society Meeting, QENS/WINS, the General Assembly of the German Colloid Society, and the International Soft Matter Conference. I have also presented my work to the general public in outreach initiatives such as Pint of Science and Zientzia Club. My extensive neutron scattering experience includes facilities like ILL, ESRF, and NIST.

At CFM, I co-lead the Light Scattering Laboratory and oversee the Transferable Skills Program. I have supervised five undergraduate assistants, three postdoctoral researchers, and two Master's theses, and I am currently supervising the Ph.D. project of Thu Phuong Le, expected to defend in March 2025. I also actively review proposals for neutron scattering facilities and journals like Langmuir and Macromolecules. Additionally, I am a member of SoftComp, the European Colloid and Interface Society, and P2Net.



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Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: STASYUK, ANTON
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Título: Advanced computational chemistry for porous materials development

Resumen de la Memoria:

The main line of my research is devoted to the study of photoinduced electron transfer (PET) processes in carbon nanostructures (fullerenes, nanohoops, nanotubes) and the computational design of their host-guest complexes for organic electronics and energy conversion. My research experience in this field can be divided into 4 groups:

1. Stereocontrolled PET in fullerene-based complexes
2. Solvent effect on PET
3. PET in all-carbon clusters
4. Role of defects in carbon nanostructures

In addition to carbon materials, I investigate other supramolecular complexes and photoluminescent compounds with promising photophysical properties.

At PhD and postdoc levels, I obtained competitive funding from national and international bodies for short-term research stays abroad. During PhD study, I did research stays at 3 European universities (10 months in total): Ghent University, BE; Adam Mickiewicz University, PL; University of Girona, ES. After PhD, I had short stays at the Institute of Organic Chemistry, PL; National Taiwan University, TW; University of Warsaw, PL; Karlsruhe Institute of Technology, DE.

I led a research line at the Institute of Computational Chemistry and Catalysis, Girona focused on the electron transfer in carbon materials within the DIMOCAT group. The excellent outcomes of my research (33 publications in Q1 journals) clearly demonstrate my maturity and independence. In 2024, I started a new independent research line dealing with porous materials. Currently, I supervise one PhD project at UdG (Gibu George, submitted for defense) and mentor a PhD student at UW (Grzegorz Cichowicz, expected defense in 2025).

I have published my results only in peer-reviewed high-impact journals dealing with nanoscale materials (e.g. Nanoscale, Nanoscale Adv.), materials chemistry (e. g. J. Mater. Chem. C, Mater. Des., Carbon), physical chemistry (e.g. J. Phys. Chem. C, Phys. Chem. Chem. Phys.) and in multidisciplinary journals (e.g. JACS Au, Angew. Chem. Int. Ed., Chem. Sci.).

The total number of publications = 57 articles, including 2 reviews and 1 book chapter (24 publications as a first author and 33 publications as a corresponding author). As a result of my intense international activity, more than 40% of my publications have been written in collaboration with scientists from Poland, Russia, Belgium, Finland, Germany, Switzerland, and Taiwan. In the last 3 years, I participated in 5 conferences as a presented author and contributed to the 11 talks and 4 posters of my colleagues.

My career goal is to establish a competitive computational chemistry research group that closely collaborates with experimental scientists, with a specific focus on electroactive organic materials. In addition to existing collaborations in carbon materials and photoluminescent compounds, I expect to establish close collaboration with research groups working on electrochemical materials, metal-organic frameworks, and catalyst design.

The planned research lines are based on three classes of materials: nanohoop-based polymers, metal-organic cages (MOCs), and metal-organic frameworks (MOFs). Their applications demonstrate a high social impact by addressing the issue of sustainable energy. I aim to apply interdisciplinary approaches and engage in active international collaboration to implement creative and pioneering projects for sustainable energy solutions.

Resumen del Currículum Vitae:

I am currently a senior researcher at the Department of Chemistry of the University of Houston, USA. In June 2024 I defended my Habilitation degree (University of Warsaw, PL), which formally recognizes my achievements and contributions to the field of carbon nanomaterials. My postdoctoral experience at the Institute of Theoretical and Computational Chemistry of the Universitat de Barcelona (IQTC UB) and at the Institute of Computational Chemistry and Catalysis of the University of Girona (IQCC UdG) helped me develop an independent research profile. My research interest mainly focuses on photoinduced electron transfer processes in carbon nanostructures and supramolecular complexes for photovoltaic applications.

My research career has been always linked to investigation of photoactive organic compounds in their electronically excited-states. As a PhD student at the Warsaw University of Technology/PL, I focused on the study of excited state intramolecular proton transfer (ESIPT) processes in heterocyclic imidazo[1,2-a]pyridines and their fused analogs. During postdoctoral stay at the National Taiwan University (2015) with Prof. P.T. Chou, I received an experience in spectroscopic and dynamic studies of excited-state proton/electron transfer reactions of organic molecules. At the Masaryk University/CZ (2016), I significantly improved my knowledge in photochemistry of organometallic compounds. At the UdG and later UB, I learned state-of-the-art computational tools for design of carbon nanostructures and prediction of their photophysical properties. My works help to explain the mechanisms of charge transfer processes in photovoltaic materials and photosensitizers using advanced computational methods.

In 2018, I received the Juan de la Cierva formación fellowship to start a new research line at the IQCC focused on the study of electron transfer processes in supramolecular complexes of fullerenes. In 2020, I was awarded the Juan de la Cierva incorporación fellowship to expand the research to other innovative carbon nanomaterials. In addition, I was awarded several short-term fellowships to visit research groups in Belgium, Poland, Taiwan, Germany, USA and competitive grants for computational resources in Spanish Supercomputing Network (RES) and Polish Grid Infrastructure PL-Grid. I have participated in 10 national and international research projects, delivered 6 invited lectures at different European institutions and companies, and presented research at 27 conferences (in 4 as an invited speaker).



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I served on the of organizing committee of the international tutorial school of two-photon absorption (Marie Curie ITN @TOPBIO) in Poland and the 3rd Online Symposium on Computational Chemistry of Memory by A.A. Granovsky. I have mentored 4 MSc students and 4 visiting researchers within HPC-Europa3 program. Currently, I co-supervise a PhD project at UdG (Gibu George, submitted for defense) and mentor a PhD student at UW (Grzegorz Cichowicz, expected defense in 2025). I am an Editorial Board Member for Frontiers (Theoretical and Computational Chemistry), guest editor for Chem. Eur. J. (2024), a reviewer for ACS, Wiley, Elsevier, and Nature journals, and an evaluator for the Alexander von Humboldt Foundation and the Foundation for Polish Science.



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Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: MARTÍN JIMÉNEZ, CRISTINA
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Título: 3D polymeric scaffolds and graphene derivatives for biomedical and tissue engineering applications.
Resumen de la Memoria:

Since April 2024, I have been a Senior Postdoctoral Researcher at IRICA (Ciudad Real), where I lead the "HYDROLWINE" project as a Principal Investigator (PI). I have a background in Chemistry and Materials Science. The most relevant achievements during my 11-years of scientific career are related to the following research areas: smart biomaterials for skin tissue engineering, degradation of 2D materials, biodegradable multifunctional graphene oxide platforms for targeted cancer therapy, safety assessment of graphene-based materials (GBMs), the role of GBMs in the final structure of hydrogels, self-healing materials, graphene-based scaffolds for 3D culturing and stimuli-responsive hydrogels for on-demand drug delivery. Internationalization and mobility: I have rich international experience in my scientific career, starting with my PhD studies under the joint supervision of Prof. Maurizio Prato in Trieste and Dr. Ester Vázquez in Ciudad Real. During my PhD I collaborated with researchers from several institutions abroad and obtained funding for a stay at the University of Brighton. After finishing my PhD studies, I worked as a postdoc participating directly in the European Graphene Flagship Project. Later, I joined Dr Alberto Bianco's group at the CNRS in France, where I established strong collaborations. From October 2020 to April 2024, I was a Marie Curie researcher at UC3M, leading the "3DSkG" project as PI and teaching international students. I have also carried out stays at non-academic institutions.

Independence and leadership: I would like to emphasize that I have experience as a PI, which demonstrates my ability to design and execute high-impact research projects. I have supervised several students at UC3M, UCLM and CNRS, and I am actively looking for opportunities to fund PhD students. A "Ramón y Cajal" position would be of great help in this regard. Throughout my postdoctoral research, I have demonstrated excellent independence in bringing innovative ideas and opening up new lines of research, not only in academic but also in non-academic institutions. I have also managed to create a network of excellent collaborators. This has resulted in the publication of multiple articles in high quality journals. In addition, I have taken on leadership roles, including serving as a jury member for research awards and master's and doctoral thesis defenses, acting as a reviewer for JCR-indexed journals, and supervising a doctoral thesis. In addition, I have demonstrated my commitment to scientific dissemination by organizing international conferences, giving talks and workshops, and participating in interviews with the media.

The proposed research aims to integrate bactericidal agents based on 2D nanomaterials with 3D bioprinted scaffolds to combat multidrug-resistant pathogens. By incorporating phototherapy as an alternative on-demand bactericidal strategy, the project seeks to develop customized artificial tissues for regenerative and personalized medicine. This work will be conducted in a new biological laboratory that I successfully established at IRICA, contributing to interdisciplinary research and strengthening the critical research capacity of the center.

Overall, my multidisciplinary research background and teaching experience highlight my potential for a successful academic career within Spanish universities.

Resumen del Currículum Vitae:

I hold a PhD in Chemical and Pharmaceutical Sciences and Technologies from the "Università degli studi di Trieste" (Italy) and a PhD in Chemistry from the UCLM (International and Cum Laude Mention). I carried out my doctoral studies under the joint supervision of Prof. Maurizio Prato and Dr. Ester Vázquez, focusing on new graphene-based composite materials, and being funded by the Italian pre-doctoral competitive grant "Borsa di studio per realizzare il dottorato de ricerca" (Ministero dell'Istruzione, dell'Università e della Ricerca, Italy). During my PhD studies, I spent several stays at prestigious centers such as the University of Brighton (UK) and the "Scuola Internazionale Superiore di Studi Avanzati" (Italy), working on the synthesis and characterization of new graphene-based hydrogels and their application as biomaterials for three-dimensional cell culture. I then worked as a postdoctoral researcher at IRICA (Spain) developing self-healing hybrid hydrogels, and in October 2017 I joined Dr. Alberto Bianco's group at CNRS (France) to work mainly on the biodegradation and biomedical applications of various carbon-based nanomaterials. In 2020, I obtained a CONEX-Plus Marie Skłodowska-Curie grant at UC3M, where I led the European project 3DSkG as Principal Investigator, which focused on new biomaterials for wound healing. This project allowed me to collaborate with the company Domotek, specializing in 3D bioprinting techniques. I also managed to sign with the company a material transfer contract in which I was the responsible investigator, which demonstrates my capabilities in terms of transfer merits.

In April 2024, I rejoined Dr. Ester Vázquez's group and am currently co-supervising Juan Alcaide's Ph.D. thesis and serving as Principal Investigator of the "HYDROLWINE" project, which I secured through competitive funding.

I have published 38 articles in indexed journals, 29 of which are in Q1 journals, and I am the first, second, or last author in 44% of them. My H-index (WoS) is 21, with 2,918 citations (as of December 2024). My scientific contributions have been recognized with awards such as the Spanish Carbon Group Award and a positive evaluation for my first research term (sexenio), with eligibility for the second term in 2025. I have participated in international projects and developed key research lines in materials science, focusing on the biocompatibility and biodegradation of nanomaterials. Currently, I am the second reserve candidate in the 2023 Ramón y Cajal Fellowship call, having also been a reserve candidate in the 2022 call.

In the teaching field, I have delivered over 220 hours of lectures (in both English and Spanish) in Chemistry, Biomedical Engineering, and Physics Engineering programs, receiving very positive evaluations. I have also supervised undergraduate, master's, and Ph.D. theses at various institutions, including UCLM, CNRS, and UC3M, and have been involved in teaching innovation projects.

I organize international events and coordinate outreach activities, with my commitment to public engagement reflected in initiatives such as the European Researchers' Night and the Science and Innovation Week in Madrid. I also serve as a guest editor for the journal Nanomaterials, regularly review scientific articles, and was a jury member for the 'Premios de Investigación e Innovación de Castilla-La Mancha 2022'.



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Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: FLOREZ FERNANDEZ, NOELIA
Referencia: RYC2024-050496-I
Correo Electrónico: noelia.florez@uvigo.es
Título: Ingeniería de procesos sostenibles para producir sistemas particulados funcionales a partir de polímeros bioactivos de origen natural

Resumen de la Memoria:

Finalized her studies at Universidade de Santiago de Compostela (2011), the research career of the applicant started at CSIC. Subsequently, Dr. Flórez-Fernández was awarded with a FPI grant to develop her doctoral thesis, in the department of Chemical Engineering (Universidad de Vigo), focused on extraction of bioactive compounds from several brown algae using ecofriendly extraction technologies. The synergy between the environmentally friendly processes and the extraction of bioactive compounds woke up a special attention to focus her scientific career of the applicant towards the application in biomedicine field. In 2018, the applicant was awarded with a postdoctoral position in a competitive call (Xunta de Galicia). She moved to abroad for 30 months, the expertise of the group was based in pharmaceutical technology, mainly in the formulation of drug delivery systems as polymeric microparticles and nanoparticles using natural biopolymers and in the study of the antitumoral activity. Afterthat, she was awarded with a postdoctoral grant to open her own research line (Xunta de Galicia). The applicant supervised 2 PhD (1 ongoing), several final projects degrees (also abroad), and she was awarded with several projects as PI and participating as research team from her PhD. She has received several awards in connection with her research career (PhD, poster communication, final degree project agenda 2030). The applicant has an active international collaboration, in research published papers, networks, member of congress committees (organizing and scienfitid), and she has high commitment with the social dissemination activities. Nowadays, her research line is focused on the framework of sustainable process engineering using marine biomass to obtain bioactive compounds, with the aim of producing drug delivery systems with potential application in biomedical, cosmetical or food fields/industries.

Resumen del Currículum Vitae:

International PhD in Science and Agrofood technology development (2018) in the chemical engineering department at Universidade de Vigo, FPI Fellowship and award of Excellence in engineering and architecture area, two Fellowship as postdoctoral researcher and R3 accreditation. Dr Flórez-Fernández has 85 total contributions: 66 articles (83% Q1, 34% D1- JCR, 57% Open Access, 54% collaborative ratio, 26% international ratio, 40% main author), 19 chapter of books and guest editor in 3 special issues. Dr Flórez-Fernández was included in the Stanford's ranking of more cited researchers. The dissemination of her results in 51 congresses, national and international, with a total of 99 contributions (oral and poster). Her first postdoctoral grant (2018) was funded by Xunta de Galicia (for 42 months). In order to advance in her research line, the applicant moved to CCMAR (Center of Marine Science, Portugal) for 30 months to learn about drug delivery systems developing bioactive polymeric nanoparticles, microparticles and antitumoral activity. Dr. Flórez-Fernández achieved her second postdoctoral grant funded by Xunta de Galicia in 2022, where she has financial support to develop her own line of research. Her current project is involved within of the circular economy, to obtain value-add products based on the production of drug delivery systems from bioactive fractions obtained from natural sources as marine seaweeds. The applicant has achieved Principal Investigator (PI) in 4 projects, 2 of them as coordinator PI and also, she is/was member in 11 national and international projects. The candidate has involved in technological development and innovation activities according to requirements from enterprises (5 external contracts, 1 as PI). The applicant, within her commitment to the knowledge transfer, has 2 international patents. The applicant has an active participation in actions being the social media of the research group. She contributes to dissemination activities from European to autonomous calls, also journal interviews. She organizes international seminars, webinars and workshops. The applicant has been supervisor of 1 PhD, 12 final degree projects (4 abroad), and currently she supervises 1 PhD student. Two of these young researchers continue developing their PhD. The applicant has been supervisor of several StemBach projects. Dr. Flórez-Fernández has been member of jury in 6 final degree projects (two abroad), 2 International Doctoral Thesis and member of the scientific and organizing committee in 3 international congresses. The applicant has received several awards, extraordinary award for her PhD, poster communication award and, also, one of the final degree projects supervised was awarded by Universidad de Vigo for the best final degree project within 2030 Agenda. Dr Flórez-Fernández has the accreditation of assistant PhD lecturer, collaborating lecturer and private university lecturer by National Agency (ANECA). Currently, the Dr Flórez-Fernández requested associate professor accreditation.



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Turno General

Área Temática: Ciencias y tecnologías químicas
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Correo Electrónico: marta.barniol@upf.edu
Título: Synthesis of bioactive compounds, chemical probes and novel chemical biology tools targeting therapeutically relevant membrane proteins and enzymes

Resumen de la Memoria:

Among my scientific achievements during my PhD are the development of the first triple inhibitors of the influenza A M2 channel, which was the starting point of several new successful research efforts in my PhD lab, and the development of the first-in-class dual acting NMDA-P2X7 inhibitors. Importantly, I autonomously designed and lead this work as a PhD student, establishing key collaborations with international research labs from the United Kingdom and South Korea. The importance of my PhD work was highlighted by being awarded the Young Researcher Prize of the Spanish Society of Medicinal Chemistry. In 2017, I started my postdoctoral research at KU Leuven (Belgium), where I focused on proteases of therapeutic interest. Importantly, I pioneered and later on established a method to study membrane proteases in their native environment using synthetic co-polymers. This has supposed a change in the field and has served to kick-start several follow-up projects and collaborative research endeavors. In October 2021 I joined the Bogoyevitch lab at Stanford University (USA), as a senior postdoc, to work at the frontier between phage display and chemistry. After a year, I was appointed as a visiting assistant professor and I set the basis for an optimized a phage display-based technology to generate highly selective inhibitors and probes for therapeutically relevant proteases. I have presented this novel work on several renowned conferences and it will be published in 2025 as a journal article. Since May 2023 I am a La Caixa Junior Leader Fellow at the UPF, where I lead the lab of chemical biology and I am the co-director of the peptide synthesis facility at the same university.

I have developed chemical tools for biomedical research from my MSc onwards. My future research plans are inspired by the acquired methodological skills in my graduate and postdoctoral experience and will combine synthetic medicinal chemistry, molecular biology, proteomics, biochemistry and cell biology methods in which I am highly skilled. However, where my PhD was focused on bioactive compounds and my post-doc on methodological developments, I will aim my future research program on: (1) the development of novel chemical methodologies to prepare highly selective biomedical tools, (2) the identification and validation of novel targets for anticancer chemotherapy, with a focus on proteolysis, lipid enzymes and lipid metabolism dysregulation and (3) the identification and synthesis of fluorescent contrast agents for fluorescence guided surgeries linked to solid tumors (i.e. breast cancers). All in all, I aim at continue driving innovation by working at the interface of chemistry, biology and medicine.

Resumen del Currículum Vitae:

To date, my scientific career has resulted in 32 peer-reviewed publications (29 articles, 2 book chapters and 1 conference proceeding), 18 oral communications of which 7 invited talks and more than 27 poster presentations at international conferences, two of which received the best poster award.

My career has a strong international component, since I have carried out research in 7 renowned host institutions, namely: University of Barcelona (Spain), University College London (UK), University of California San Francisco (USA), Institut Biologia Molecular Barcelona-CSIC (Spain), KU Leuven (Belgium), ISAS (Germany) and Stanford (USA). This has allowed me to build an extensive international network.

The impact and relevance of my work has been recognized on several occasions with important prizes, such as the Best PhD Thesis Award, the Premi al Talent Científic Emergent from the Societat Catalana de Química or the Incentive Award from the Belgian Chemical Societies, this prize is awarded annually to a researcher of less than 35 years of age in recognition for their impactful, innovative and creative research in the broad field of chemistry. I have a strong track record of funding acquisition; I have secured a Proyecto generación de conocimiento as PI (2024-27, 200 000 €), a la Marató grant (2021-24, 300 000 €) and a research project financed by the Flemish Government (2018-20, 35 000 €). During my time in research, I have earned a number of prestigious and competitive research fellowships such as the EMBO scholarship (2015), the Marie Curie IF (2017-2019), the postdoctoral grant from the Flemish Government, FWO (2019-2022) or the Maria Zambrano (2021-2024, returned).

I have organized conferences for specialized scientific audiences, such as the international meeting Young Research for specialized scientific audiences, such as the international meeting Young Researchers in Medicinal Chemistry Symposium and, likewise, I contribute at working towards gender equality in science. In this regard, I have started and taken part on initiatives to promote visibility of women scientists, such as the event WiS: Woman in Science at KU Leuven. I actively engage in outreach activities, having been part of the team of Pint of Science, event that aims at bringing science closer to society. Since December 2023, I am an elected member of the Young Leaders Academy of the University alliance EUTOPIA, aimed at strengthening the research ties in Europe.

Throughout my scientific career I have trained junior researchers, I have formally mentored 2 postdocs (1 junior, 1 senior), 3 PhD students, 9 MSc students, 5 of which I was their thesis director, and 7 undergraduate students. I have been part of the master thesis evaluation committee of the Faculties of Chemistry and Bioengineering, at KU Leuven (2018-2021) and been an advisor of a PhD student at KU Leuven (2019-2024). I have teaching experience (412 h) and I am the Head of Chemistry at the Faculty of Medicine and Life Sciences at the UPF where I coordinate 3 core subjects in the degrees of Human Biology and Medicine. I have guest-edited two special issues of a peer-reviewed journal and since 2020 I serve as expert for the European Commission, evaluating Marie Curie postdoc fellowships and HADEA Health projects linked to pandemics.



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Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: HAMZEHLLOU, SHAGHAYEGH
Referencia: RYC2024-050509-I
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Título: Machine Learning Towards Polymers Sustainability
Resumen de la Memoria:

In 2020, more than 29 million tons of plastic post-consumer waste were collected in Europe. However only 0.2% of this amount were chemically recycled, which is mainly due to the lack of efficient and economical chemical recycling strategies with high value products. The rest are either recycled mechanically into lower-value secondary products or used for energy recovery operations or end up in the environment. Another approach to deal with the problem of polymer waste is developing degradable polymers. However, despite the developments of few novel chemical recycling processes to high value products (upcycling) and synthesis of novel degradable polymers, there is still little knowledge on the mechanisms and the correlation between the process/environmental conditions and the products of the recycling/degradation processes. This knowledge gap, is the bottleneck of further development and use of the novel chemical recycling processes and leaves open questions such as: does the recycling process lead to less toxic/aggressive (by-)products? How recycling process conditions affect the recycling products of a polymer? Is the recycling process optimized? What remains from a degradable polymer under different environmental compartments?

The overall aim of this research line is to fill this knowledge gap from macromolecular reaction engineering aspect; i.e. by developing open access knowledge-based machine learning (ML) tools for some data limited chemical recycling processes and degradation of polymers as benchmark systems. The resulting tools can give a-prior knowledge on reaction conditions of the recycling processes to obtain desired product and predict the degradation products of a polymer under complex environmental conditions.

To reach this aim, the problem will be tackled using knowledge-based machine learning i.e. integrating the knowledge from conventional first principle models (deterministic and stochastic ones) into conventional machine learning models. This is a combination of knowledge/data scenario, which open the possibility of using machine learning in data-limited problems of polymer recycling and degradation processes. In this approach, data/knowledge from first principle models in controlled simplified conditions will be integrated in a data driven ML models. Knowledge-based artificial intelligence will be used to prevent/adjust/improve/optimize different recovery strategies and degradation processes of polymers. As a benchmark Polyethylene (PE) and polypropylene (PP) catalytic chemical recycling and degradation will be studied.

Resumen del Currículum Vitae:

The applicant did her BSc and MSc on polymer engineering at Polymer department of Amirkabir University of Technology (Tehran, Iran). Later she moved to the industrial sector, (a Turbo generator manufacturer) as an R&D engineer. During this period (4 years), she won the Best Employee Prize from the company on November 2009.

In 2010, she was granted with a scholarship in the framework of a European project, Marie Curie training network ITN NANOPOLY to do a PhD at the University of Basque Country. She obtained PhD in Applied Chemistry and Polymer Materials. Her PhD thesis was awarded by the University of the Basque Country (Premio Extraordinario de Tesis Doctorales de la UPV/EHU) as one of the top 10 dissertations in the science discipline in the 2013/2014 academic year. Moreover, one of her papers was selected as the most cited paper of the year in Macromolecular Reaction Engineering Journal and increased the Impact Factor of the journal.

She spent two secondments during her PhD; in one of them, she learned about the commercial Predici software at Freie University of Berlin. During the second one, she worked on modeling the microstructure of crosslinked polymers at BASF Company (Ludwigshafen, Germany).

Later she continued the research at Basque Center for Macromolecular Design and Engineering as a Postdoctoral fellow through a European project, RECOBA H2020-SPIRE-2014. Later in 2018, she won a very competitive proposal-based grant at the University of Basque Country. She won the Jürgen Springer Prize for Young Scientists, POLYCHAR 27, in World forum on advanced materials Naples, Italy. Currently she is working as a researcher at POLYMAT involving in different projects on modelling and simulation of polymer microstructure, morphology, topology and use of artificial intelligence (AI) and machine learning in the development of polymers. She is the PI in a project granted by the University of Pau under which she is supervising a joint PhD student. She is PI in two project funded by a private companies (Chryso on the cement superplasticizers and POLYMAT Industrial Liaison Programme, ILP), PI in project funded by Basque Government PIBA_2024_1_0046 and the main research team member in the Ministry project PID2023-153147OB-I00, in those she is supervising three more PhD students. She is the member of International Council on Materials Education since 2019, steering committee of the PRE XII on June 2025 in Florida, and the scientific committee of POLYCHAR conference and guest editor of two especial issues in Polymers and Processes journals.

She is currently co-supervising 4 PhD students. She co-supervised a PhD student (defended in 2019) and two final year project of an undergraduate student (graduated in 2019 and 2023). Furthermore, she was a lecturer for undergrad students (4th grade students in the Chemistry grade) and master students (Master Química y Polímeros at Chemistry Faculty of the UPV/EHU) of the courses "Procesos Industriales de Polimerización" and "Polymer Reaction Engineering" from 2016 till 2020. She was a lecturer of a two-day CINEMA workshop at Lyon 2024.

Overall, she published 40 articles, 6 book chapters (17 papers as the first author, 8 as the corresponding) and coedited two books with H-index 18 (Scopus). She presented in 36 different national and international conferences/meetings and attended 19 courses. She was a keynote lecturer (45 minutes talk) at the Polymer Reaction Engineering X May 20-25, 2018.



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Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: MORENO ALCANTAR, LUIS GUILLERMO
Referencia: RYC2024-048755-I
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Título: (Bio)Inorganic Supramolecular Chemistry

Resumen de la Memoria:

After completing my Bachelor's and Master's in Chemistry the Universidad Nacional Autónoma de México (UNAM), both related to studying metal complexes. I was awarded a PhD fellowship that allowed me to conduct studies on the synthesis and fundamental analysis of supramolecular non-covalent interactions (NCIs), particularly metallophilic contacts in luminescent multimetallic Au and Ag compounds. During my stay at UNISTRA my research focused on studying self-assembled structures using platinum(II) luminescent compounds as building blocks. With my work, we deepened our understanding of the effects of media on the self-assembly of these compounds. In my current position, I have been working on the development of multifunctional metallacages (MCgs) for biomedical applications, particularly for anticancer therapy. Besides the host-guest chemistry arising from the formed cavity, capable of hosting small molecules and whose chemical character can be tuned by the design of the building blocks, metallacages can be modularly designed to include functional moieties that project them as virtual multicomponent multifunctional platforms.

In the future, I want to continue working on the interface of inorganic, supramolecular, and bioinorganic chemistry, with two research lines. The first line started with my work as a Humboldt fellow, exploring self-assembled structures, including photoactive building blocks, in particular gold porphyrins, which have demonstrated exceptional photoelectrochemical properties. These properties have started to be explored for biomedical applications; however, the available platform designs are suboptimal as they suffer from poor stability and lack of targeting. In this regard, I will explore strategies to increase stability and functionalize the structures with active targeting moieties. Other photoactive building blocks can be included in my research lines in the future. Within my main research objectives, I highlight the use of these systems, highly positively charged 3-dimensional structures as strong stabilizers for non-canonical DNA structures, a role that has been poorly studied but that our recent studies have highlighted, showing the need for further research in this promising area. Furthermore, rising interest in the photoelectrocatalytic application of gold porphyrins suggests important possibilities to perform catalysis within gold porphyrin-based cages, which is an area that I plan to explore. The second line takes a step further in my experience with self-assembled luminescent compounds, taking the challenge to create the first out-of-equilibrium self-assembly cycle coupled to a living process and visualize it in real time, taking advantage of the luminescent properties of coordination luminescent compounds. The control of responsive dissipative self-assembly cycles within cells would open new possibilities for imaging and therapeutic applications. Besides these topics, I have developed other scientific interests and maintain several collaborations, which span from the fundamental study of electronic processes to understanding the molecular structure and the organization of inorganic compounds via non-covalent interactions, continuing to the constructions and application of supramolecular materials.

Resumen del Currículum Vitae:

I completed my PhD in chemistry in 2018 at the Universidad Nacional Autónoma de México (UNAM) with a thesis dealing with the metallophilic interactions and luminescence in gold and silver multinuclear compounds. Afterward, I was appointed postdoctoral fellow at the group of Prof. Luisa De Cola at the University of Strasbourg (UNISTRA), where I spent two years working in the control of the self-assembly of supramolecular luminescent coordination compounds. After I had a short stay back in Mexico, in which I collaborated with the group of Prof. Hugo Torrens, at UNAM, in the study of the non-covalent interactions in fluorinated metal complexes. In 2021 I was granted an Alexander von Humboldt Research Fellowship for postdoctoral researchers to work at the Technical University of Munich (TUM) hosted by Prof. Angela Casini and Prof. Roland Fischer; my research project dealt with the synthesis of multifunctional metallacages for biomedical applications. Since 2023, I have been a postdoctoral Fellow at the group of Prof. Casini, working in the EIC Pathfinder project SMARTdrugs, with the aim of creating metallacages to be used as new radiotheranostic platforms. I have authored 29 peer-reviewed publications in recognized journals, including Nature Reviews Chemistry, Angewandte Chemie, Journal of the American Chemical Society, and CCS Chemistry, among others. In most of my publications, I participate as a leading author, with 16 first and 19 corresponding authorships. I have consistently improved my recognition, and the citations of my work have increased recently, reaching 400, with an H-index of 11; the tendency is increasing, passing from 50 citations in 2022 to ca. 150 in 2024. I have participated in 9 national and international conferences, presenting oral contributions and authored several posters. I have important teaching experience, and besides daily mentoring activities, I have supervised the research work of students over the years, having directed 3 bachelor's and co-directed 8 bachelor's and one master's thesis. Currently, I co-supervise the work of two PhD students at TUM. I have also delivered six seminars in diverse institutions, including, among others, the Brooklyn College of the City University of New York, the Institute of Chemistry of UNAM, and The Department of Chemistry of the University of Oviedo. Besides the Humboldt Fellowship, I have received diverse competitive grants and funding for research and travel, including a Postdoctoral fellowship from the CONACYT (Mexico) to extend my stay at UNISTRA (2021). A collaboration grant from the Royal Society of Chemistry (2024), a Leonhard-Lorenz Foundation grant (2024), and four RSC travel bursaries. In 2021, I received the Seal of Excellence for my MSCA IF application. I have been distinguished with some honors, including the Level I of the Sistema Nacional de Investigadores de México, nominated to the nominated for the EurJIC-Wöhler Young Investigator Prize 2021, invited to the EurJIC Talents special collection and selected Fellow of the European Talent Academy. I have been a member of the organization committees of two international events, participated in project revision boards for the founding agencies in Mexico, and revised for several recognized journals.



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Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: AYALA CABRERA, JUAN FRANCISCO
Referencia: RYC2024-049923-I
Correo Electrónico: juanfrancisco.ayala@ehu.eus
Título: High-throughput cutting-edge methodologies to assess human and environmental chemical exposure

Resumen de la Memoria:

Dr. Juan F. Ayala Cabrera joined the group of Prof. E. Moyano at the University of Barcelona (UB) to do his PhD about novel liquid chromatography- (LC-MS) and gas chromatography-mass spectrometry (GC-MS) methodologies using unconventional atmospheric pressure ionization (API) sources. This stage included a stay at the University of Duisburg-Essen (UniDUE, Germany), evaluating the potential of other API sources for GC-MS and comprehensive two-dimensional gas chromatography using novel ionic liquid-based stationary phases. He completed the PhD in Analytical Chemistry and the Environment in 2020 (Cum Laude, International Mention and Extraordinary Award). Then, he joined the research group of Prof. O. Schmitz (UniDUE), one of the world-class Centers of Excellence from Agilent Technologies through different research projects and third-party contracts. This expands his research towards new challenges such as the build and set-up of novel API sources for LC-MS and GC-MS, fundamentals on ionization mechanisms and the development of methodologies applied to several fields including metabolomics, lipidomics and food analysis. This postdoctoral stage (2.5 years) expanded his skills in scientific instrumentation by setting API sources based on plasma and photoionization as well as his international visibility and networking participating in several international conferences and projects. Considering his interest in learning about multitarget and non-target approaches, he has joined the group of Prof. N. Etxebarria at the University of the Basque Country (UPV/EHU) thanks to a Maria Zambrano grant and a highly competitive tenure-track call for young researchers in Spain (1.6 years). Additionally, he was awarded with a Marie Skłodowska Curie Action fellowship, one of the EU most competitive and prestigious awards to support the research of the most promising scientists (0.5 years to date). The main goal of this project is to build cutting-edge instrumentation consisting of novel and/or dual API sources and their integration in non-targeted analytical approaches to achieve a wide-scope determination of per- and polyfluoroalkyl substances in drinking water and human biofluids. Along his research career, he has participated in several national and international projects and his contributions in the field of ionization for the improvement of analytical methods for organic contaminants at ultra-trace levels have been pioneering and widely recognized in conferences and scientific publications. Also, the development of new ion sources and their application to hot topic determinations have allowed him to open new research lines and get his own funding at the different stages of his career, showing his leadership and independence. The research line he is implementing at the UPV/EHU aims to expand the analyte coverage of analytical approaches using lab-made single/dual ion sources combined with state-of-the-art MS instrumentation to ensure a reliable determination of the exposure to emerging contaminants (ECs). The development of multi-purpose ionization sources and analytical strategies integrating automated data acquisition and data treatment workflows will set the basis to assess the exposure of humans and the Environment to ECs and link their levels with potential emission sources ensuring a sustainable development under the One Health paradigm.

Resumen del Currículum Vitae:

Dr. Juan F. Ayala-Cabrera encompasses 10 years of research experience, with 4.6 years of experience as postdoctoral researcher. He completed his PhD at the University of Barcelona (UB) with outstanding marks (Cum Laude, International mention) and several awards. As postdoc, he has worked in both international (University of Duisburg-Essen, UniDUE, Germany,) and national institutions (University of the Basque Country, UPV/EHU). He has shown a great ability to get his own funding at different stages of his career by obtaining fellowships in national and international calls as well as projects and third-party contracts. Thus, as predoctoral/undergraduate student, he obtained three well-known fellowships, highlighting the FPU grant of the Spanish Government to carry out his PhD. As postdoctoral researcher, he has also obtained 2 fellowships at competitive calls such as the Maria Zambrano fellowship and the distinguished Marie Skłodowska Curie Actions (MSCA) postdoctoral fellowship (MSCA-2022-PF-01 No. 101108881) awarded by the EU. Overall, he has been able to obtain 306k € for funding during this research career.

His main research aims to deal with the development of cutting-edge methodologies, including novel ionization sources, to improve analytical methods by enhancing sensitivity, selectivity, and the analyte coverage in order to have reliable tools to evaluate both human and Environmental health. He has participated in 18 research projects, including 3 internationals. In some of them, he is participating as responsible for working packages highlighting the MSCA fellowship, where he is the principal investigator of the project, and the national network for innovation in sample treatment, PI of the UPV/EHU research group. He has published 25 high-impact JCR articles and 3 book chapters, most of them during his postdoctoral stage and collaborative projects out of his thesis, being the corresponding author in 7 and the first author in 15. The impact of the research is exponentially increasing (+200 cites last two years), showing the relevance of the work for the scientific community. He has also contributed to scientific conferences (67 communications), being 40 internationals (including 1 invited lecture and 2 awards) and 18 nationals (3 awards). He has also taken part in committees, as session chairman and as reviewer in high-impact JCRs.

His impact on the society is also notable, being involved in 4 third-party contracts with national and international companies/institutions. He also collaborates with private companies or public bodies through multidisciplinary research projects. He is also concerned about spreading science to different kinds of audiences by means of outreach activities such as interviews in media, events aiming to disseminate experiments to children, and as lecturer in young researcher's meetings and master programs. He has also significantly improved his leadership skills by mentoring 3 ongoing PhD theses. Besides, he co-supervised 8 MSc theses (+3 ongoing), 5 end projects of bachelor's degree (+2 ongoing) and national and international PhD stays. Moreover, he is a member of 5 scientific communities and, particularly, part of the SEEM board where he has promoted 3 editions of the SEEM young scientist conferences to increase their knowledge in MS, their networking and communication skills.



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Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: VIVANCOS UREÑA, ÁNGELA
Referencia: RYC2024-051006-I
Correo Electrónico: angela.vivancos@gmail.com
Título: Organometálica. Síntesis, catálisis y fotofísica.

Resumen de la Memoria:

I have worked in several research areas, including organometallic synthesis and mechanisms, NHC carbene complexes, homogeneous catalysis, and the photophysics of platinum species. My work has been conducted across five relevant institutions: IIQ-University of Sevilla, University College Dublin, University of Bern, LIKAT, and the University of Murcia, and I have achieved significant results at each institution. This dedication has resulted in 21 high-quality scientific publications, where I have been the driving force in most cases, underscoring my leadership and critical role in these projects. During my PhD I focused on the reactivity of iridium complexes towards small molecules. The study of reaction mechanisms involving the formation and cleavage of molecular bonds promoted by the metal allowed us to obtain new species as well as to delve into the knowledge of known reactions. The publication *Angew. Chem. Int. Ed.* 2013, 52, 10068 describes the first isolated metallabenzene that contains only CH units apart from the metal center. The acquired knowledge allowed us to expand the reactivity of iridacycles towards small molecules (*Organometallics* 2014, 33, 6431; *Organometallics* 2015, 34, 22, 5438; *J. Am. Chem. Soc.* 2015, 137, 4074) and to synthesize other aromatic iridacycles (*Organometallics* 2015, 34, 177). During my postdoc in Prof. Albrecht's group, firstly at UCD (Ireland) and later at Universität Bern, I was exposed to new avenues of research in the field of catalysis. I contributed to the design of new N-heterocyclic carbene ligands and focused on both the synthesis of organometallic species containing them, and the evaluation of the catalytic activity of new complexes in different reactions (*Organometallics* 2017, 36, 1580, *Catal. Sci. Technol.* 2017, 7, 5766; *Dalton Trans.* 2018, 47, 74).

As a postdoctoral researcher, I underwent a research visit at Prof. Beller's group (LIKAT, Germany) where I learnt about catalytic hydrogenation reactions working under high pressure conditions and I could test the NHC-iridium complexes in different hydrogenation reactions (*ACS Cat.* 2018, 8, 17).

In 2017 I joined the Organometallic Chemistry Group at University of Murcia where I initiated a new research line focused on the photophysics of NHC-platinum complexes (*Chem. Eur. J.* 2019, 25, 6014; *Inorg. Chem.* 2021, 60, 7900; *Inorg. Chem.* 2022, 61, 12033; *Inorg. Chem.* 2024, 63, 24929). I have been awarded with the competitive programs Saavedra Fajardo and Juan de la Cierva Incorporación and I have been sole PI of a project for Young Leader Researchers with contrastable results (*Inorg. Chem.* 2023, 62, 20987; *Inorg. Chem.* 2024, 63, 24929; ChemRxiv 2025, 10.26434/chemrxiv-2025-kc3dz)

I have been deeply committed to mentoring undergraduate, master's, and PhD students, and my ability to lead projects is evidenced by the successful acquisition of three highly competitive grants, providing research funding of over 70,000 euros.

I will develop a project with two main goals:

1 Application of cyclometalated Pt complexes as catalysts for photoinduced reactions; visible-light induced catalysis for the functionalization of heteroaromatic compounds and photooxidation of aromatic hydrocarbons catalyzed by NHC-Pt(IV) complexes.

2 Use of NCC-Pt species for biological applications, such as anticancer drugs and theragnostic agents for neurodegenerative diseases.

Resumen del Currículum Vitae:

I completed my BSc in Chemistry at the University of Murcia (UMU) in 2010. Subsequently, I moved to Seville to pursue my Master's (2010-2011) and PhD studies (2011-2015).

I developed my PhD under the supervision of Dr. Manuel L. Poveda and Dr. Margarita Paneque at the Institute of Chemical Research (CSIC-University of Seville). The results from my thesis led to the publication of 6 research articles in high-impact international journals, and the RSEQ recognized it as Best doctoral thesis of the year 2014-2015.

In May 2015 I joined Prof. Albrecht's group (UCD, Dublin) as a postdoctoral researcher. During this period, and to gain further experience in catalysis, I established a collaboration with Prof. M. Beller (LIKAT, Rostock), and at the end of 2015 I joined his group for a 3-month postdoctoral exchange with a fellowship granted by the European Project COST CARISMA (*ACS Cat.* 2018, 8, 17).

Later in 2015, Prof. Albrecht's group moved to the University of Bern and in January 2016, I joined the group for a two-year postdoctoral fellow. During this period, I was involved in mentoring activities and a review article (*Chem. Rev.*) and 5 research works in high impact journals were published; one of them in collaboration with Prof. Beatriz Royo (ITQB NOVA, Lisbon).

In November 2017, after completing a 29-month postdoctoral stay abroad, I joined the Group of Organometallic Chemistry at UMU where I had the opportunity to initiate a research line based on the luminescence of NHC-platinum complexes. I was awarded a Saavedra Fajardo Fellowship (2018-2021) by the Seneca Foundation, which provided me with funding to lead my research. In 2020, I obtained a Juan de la Cierva Incorporación contract to continue my research at UMU, position that I hold since June 2021, with two maternity leaves (07/2021-01/2022 and 10/2023-04/2024). The scientific output from this period at UMU includes 9 research articles and more than 20 presentations in international and national conferences.

I have also been actively involved in mentoring activities. I co-supervised the doctoral thesis of D. Poveda (defended in June 2023 with international mention), 7 master's theses (TFM), and 7 final degree projects (TFG). Currently, I am supervising one PhD student and three TFG students.

At the beginning of 2023, I received a project as the sole PI, funded by the Seneca Foundation under the 'Young Leader Researchers' call. This project enabled me to hire a postdoctoral researcher, and the obtained results have led to three publications, in which I am a co-corresponding or sole corresponding author (*Inorg. Chem.* 2023, 62, 20987; *Inorg. Chem.* 2024, 63, 24929; ChemRxiv 2025, 10.26434/chemrxiv-2025-kc3dz).

I am involved in an industrial collaboration project with the Kinsy company, I am member of the knowledge transfer group PaCienciaLaNuestra, I actively participate in dissemination activities such as MasterChem and I have been member of the organizing and scientific committee of chemistry congresses (e.g. IIQ-RSEQ 2023).

I count with the positive evaluation from ANECA as Profesor Contratado Doctor and the I3 Certificate from AEI.



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Turno General

I have demonstrated the ability to work in diverse teams across various research fields, with an increasing level of independence over the years, as evidenced by my success in attracting funding, leading projects, and mentoring students.



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Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: ZINOVJEVS, KIRILS
Referencia: RYC2024-051397-I
Correo Electrónico: kirill.zinovjev@uv.es
Título: Enabling simulations of biomolecular machines

Resumen de la Memoria:

I have focused my career on developing novel computational tools to tackle complex biomolecular processes, emphasizing enzymatic reactions and biomachines. My journey began with recognizing the limitations of existing simulation techniques and leveraging my background in chemistry and computer science to address these challenges. I have contributed extensively to computational biochemistry through methodological advances such as the Adaptive String Method (ASM) for reaction path exploration and the Electrostatic Machine Learning Embedding (EMLE) framework, which integrates machine learning into molecular simulations. These methods have achieved widespread adoption and recognition, with ASM incorporated into the Amber software suite and EMLE advancing multiscale modeling.

I have published 34 peer-reviewed articles, 6 of which as a corresponding author. I led independent research, and maintained a commitment to open science by ensuring free access to my software and data. My expertise spans reaction rate theory, multiscale simulation methods, and machine learning. I have collaborated internationally, developed software like Enlighten2 for structural biologists, and contributed to diverse applications, including studying enzymatic mechanisms and protein-ligand interactions.

In the proposed research, I aim to bridge the gap between computational and experimental understanding of biomachines such as F-ATPase, which are pivotal for cellular functions but remain poorly understood at an atomistic level. Using my expertise in free energy calculations, machine learning, and software development, I will develop new tools to simulate the coupling of chemical reactions and conformational changes in biomachines. This will involve designing advanced molecular potentials, hybrid ML/MM schemes, and reaction coordinate discovery techniques. The tools will be validated by uncovering the full mechanism of F-ATPase, addressing key questions about energy conversion in biological systems and enabling broader applications in drug design, synthetic biology, and catalysis.

Resumen del Currículum Vitae:

I have developed a strong foundation in computational biochemistry, machine learning, and software development throughout my academic and professional career. My journey began during my undergraduate studies at Riga Technical University, where I excelled in chemistry and mathematics, leading to collaborative projects such as developing anti-inflammatory drugs using pharmacophore modeling. After earning my Bachelor's degree with the highest marks, I was awarded an Erasmus Mundus scholarship to pursue a Master's in Theoretical Chemistry and Computational Modelling at the University of Valencia, where I specialized in enzymatic reactivity methods development.

I continued my academic journey with a PhD at the University of Valencia, supported by an FPU fellowship. My research during this period focused on statistical mechanics and enhanced sampling methods, culminating in the development of the Adaptive String Method (ASM) for discovering complex reaction mechanisms. This work earned high recognition, including the "Premio Extraordinario de Doctorado." My ASM methodology has been widely adopted internationally, contributing to a range of biomedical studies.

After my PhD, I expanded into software engineering, co-founding a web development startup while applying industry software practices to academia. At the University of Bristol, I developed Enlighten2, a user-friendly simulation tool for protein-ligand systems. This work spurred my interest in machine learning (ML), leading me to develop ML-based potentials for condensed-phase reactivity, including the electrostatic machine learning embedding method (EMLE). EMLE has become the foundation for my current research initiatives, supported by competitive grants and collaborations across Europe, including industrial sponsorship from ExScientia.

In total, I have authored 34 peer-reviewed publications, including 13 as the first-author and 6 as a corresponding-author, in high-impact journals such as JACS and Nature Communications. My research contributions have been cited over 600 times, reflecting a growing impact in computational chemistry. Beyond research, I have contributed to open-source projects, incorporated ASM into popular molecular dynamics codes like Amber, and organized training workshops, such as the EMLE method event at the University of Bristol. Additionally, I have actively engaged in teaching and mentorship, guiding PhD, Master's, and Bachelor's students.

My ongoing efforts focus on advancing multiscale simulations using machine learning potentials and fostering international collaborations to address complex biochemical and biophysical challenges.



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Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: GIL SEPULCRE, MARCOS
Referencia: RYC2024-050678-I
Correo Electrónico: marcosgilsepulcre@gmail.com
Título: From Molecular Catalysts to Hybrid Materials in Artificial Photosynthesis

Resumen de la Memoria:

My research career started in 2012 with my M.Sc. thesis and has been focused on applying sustainable chemistry to generate solar fuels, especially in the field of molecular catalysis. During my M.Sc. thesis in Prof. Abad's group (University of Valencia, UV), I worked on natural products synthesis, which provided me with advanced organic synthetic skills that I have applied throughout all stages of my career. During my Ph.D. at the Seloxcat group with Prof. Sala (Autonomous University of Barcelona, UAB), I synthesized and characterized rationally designed ligands and their complexes and studied their behavior towards water oxidation and proton reduction. I was also a visiting researcher in Prof. Nippe's group (Texas A&M), I developed CO₂ reduction (CO₂R) catalysts. During my first postdoc at the Institute of Chemical Research of Catalonia (ICIQ) in Prof. Llobet's group, I focused on developing water oxidation catalysts based on 1st-row transition metal complexes (1TMC) bearing redox non-innocent ligands. This approach was key to design efficient electrocatalysts and achieve record low overpotentials at neutral pH, a challenge in the field of artificial photosynthesis. Simultaneously, I explored the interplay between homogeneous and heterogeneous catalysis for water oxidation. As a result of this research line, I managed to prepare and immobilize coordination polymers via CH- π interactions; interactions on graphitic substrates, a novel technique to efficiently transfer the high catalytic performance of homogeneous systems onto anodes. Then, as Humboldt and later as a Marie Skłodowska-Curie actions (MSCA) fellow with Prof. DeBeer (Max Planck Institute for Chemical Energy Conversion, MPI-CEC), I led the EU-funded TRUSol project, investigating mechanisms of key reactive intermediates for (photo)catalytic CO₂R using steady-state, operando and time-resolved spectroscopy. I recently started my career as Assistant Professor at the UAB, focusing my research on the preparation of molecular hybrid materials. My ambition is to establish my own research group, combining the rational design of molecular catalysts, electrochemistry, and spectroscopy to drive the development of molecular-based materials toward practical applications in artificial photosynthesis.

Resumen del Currículum Vitae:

After graduating in Chemistry at the University of Valencia (2012), I was awarded a PIF-UAB fellowship to conduct my PhD at the Seloxcat group UAB (2013-2018) under the supervision of Prof. Sala. There, I focused on designing, synthesizing, and characterizing Ru-based complexes and nanomaterials for artificial photosynthetic technologies. During my PhD, I published 7 manuscripts, including 1 as corresponding author. The results also included a JACS paper in Prof. Nippe's group (Texas A&M) derived from a 3-month stay (awarded with PIF-Short PhD stays). After defending my PhD, I joined Prof. Llobet's group at ICIQ to work with a world leader in the design of molecular-based catalysts. There, I focused on designing, preparing, and studying 1st-row transition metal complexes for WO catalysis. I designed the first example of a system capable of accumulating all the oxidative equivalents necessary to perform WO in the ligand framework and a catalyst that has become one of the molecular WO benchmarks since 2020. Moreover, I prepared and characterizing a new family of Ru-based coordination polymers with a strong affinity for graphitic surfaces due to uncharted CH- π interactions. This, generated efficient and robust anodes, and we published the results in high-impact journals (e.g. Nat. Chem., JACS, Adv. Energy Mater., Adv. Mater.), and filed two patents. Afterwards, I joined Prof. DeBeer's group in 2022 (Humboldt and MSCA fellowship) at MPI-CEC, a renowned expert in spectroscopy. There, I led a research line focusing on using static/operando and time-resolved spectroscopy to characterize steady-state and short-lived reaction intermediates. The results of my stay include 6 published manuscripts and 2 under reviewing process. Recently, I joined the UAB as an Assistant Professor, dedicating my efforts to establishing my own research group focused on developing molecular hybrid materials and studying their reaction mechanisms toward artificial photosynthesis.

Overall, I published 39 papers in top journals, including JACS (5), Nat. Chem. (1), Nat. Catal. (1) ACIE (3), Adv. Energy Mater. (2), and Adv. Mater. (2), 9 of them as first author and 6 as corresponding author, and filed two patents. Additionally, I have submitted 3 manuscripts currently under revision (1 as corresponding). The ascending shape of citations over time (H-index, 17; 1126 citations) prove the impact of my contributions in the field of artificial photosynthesis. I have also disseminated the results of my work in 18 scientific conferences (8 poster presentations and 12 oral communications), including an invited talk at the international 3rd COAST conference (Vienna). Additionally, I have editorially contributed by peer-reviewing 24 papers (e.g., ACIE, Chem. Sci., Inorg. Chem.) and evaluated in a Ph.D. committee. I have also supervised a MSc thesis, a PhD thesis and I am currently supervising 3 PhD thesis (now in 4th year, and two of them in 1st year). In addition, I taught undergraduate laboratories and problem-solving sessions at UAB (>267 h) and participated in outreach activities (e.g. open day at MPI-CEC). During my career, I have raised research funds (43 000 €) and salaries (260 745 €) through fellowships. To develop my research, I obtained 11 competitive projects as PI in synchrotrons worldwide (> 1344 h, ca. 926 084 €, based on the hourly cost at the respective facilities).



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Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: CORPAS PARDO, JAVIER
Referencia: RYC2024-050647-I
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Título: Catalytic Functionalization of Organic Molecules under Organometallic and Photochemical Activation
Resumen de la Memoria:

Dr. J. Corpas's research centers on developing and implementing innovative catalytic methods to functionalize and synthesize complex molecules, enabling the production of valuable, socially relevant end-products—a core focus of modern Organic Chemistry. His professional expertise, skills, and experience are effectively highlighted and contextualized. Particular attention is given to his active engagement, impactful contributions, and leadership in diverse roles—a crucial blend that has shaped him into a capable and accomplished researcher, clearly demonstrating his preparedness to take on more advanced professional challenges.

Predoctoral period (2017-2022). His PhD studies (Universidad Autónoma de Madrid) have focused on the development of novel catalytic processes combining organometallic and photocatalytic activation modes for the functionalization of unsaturated molecules. By exploiting tandem catalytic processes, Dr. Corpas was able to describe the first catalytic approaches towards anti-functionalization of internal alkynes (activated and unactivated) using organoboron reagents. In addition, Dr. Corpas's research includes the development of new catalytic asymmetric processes employing 1,3-dipolar cycloaddition and new strategies based on novel directing groups for the functionalization of unbiased alkynes. During this period, he performed a fully funded 3-month predoctoral stay at Princeton University in the group of Prof. Paul Chirik, working on Fe catalysis, and finished his PhD studies with 11 publications.

Postdoctoral period (2022-present). After completing his PhD studies, he joined Prof. Leonori's group at RWTH Aachen University (Germany), first as a postdoctoral researcher and currently as a Marie Curie fellow. Dr. Corpas's interest has been directed toward exploring diverse fields, rather than pursuing incremental advancements in a single research domain. Specifically, his research spans three different fields: (1) the combination of photoredox and desaturative catalysis, (2) applications of photogenerated nucleophilic boryl radicals in synthesis, and (3) the exploration of anti-aromatic basicity of arenes to investigate unconventional reactivity of aromatics. This research has culminated in the publication of 4 papers so far and has included mentoring MSc and PhD students, as well as fostering international collaborations with various chemical companies (AstraZeneca, Sanofi, and Minakem).

Resumen del Currículum Vitae:

I graduated in Chemistry (Extraordinary Award) at Universidad Autónoma de Madrid (UAM) in 2016, receiving the Graduate Award (accésit) from Colegio y Asociación de Químicos de Madrid. I then earned a MSc in Organic Chemistry from UAM (with honors) and joined Prof. Carretero's group as a research fellow, focusing on asymmetric catalysis. In 2017, I obtained an FPU fellowship to pursue a PhD under Profs. R. G. Arrayás and P. Mauleón (UAM), exploring new catalytic activation modes by merging organometallic and photocatalysis. My thesis centered on regio- and stereodivergent synthesis, leading to innovative breakthroughs in anti-functionalization of internal alkynes, multimetallic catalysis, and dynamic multiligand catalysis. This research expanded state-of-the-art catalysis and involved collaborations with Prof. O'Shea (IMDEA-Energy) for photophysical studies and Profs. Corral (UAM) and Durbeej (Linköping) for DFT studies. I also conducted a 3-month stay with Prof. Paul J. Chirik (Princeton University) in 2019, exploring novel Fe-catalyzed approaches to activate inert bonds.

In July 2022, I defended my doctoral thesis with Suma Cum Laude, Extraordinary Award, and International Mention. Subsequently, I joined Prof. Daniele Leonori's group at RWTH Aachen University (Germany), first as a postdoctoral research associate and currently as a Marie-Curie fellow (rating: 98/100). My postdoc research spans diverse fields, including photoredox and desaturative catalysis, photogenerated boryl radicals, and the unconventional reactivity of aromatics. This work has advanced understanding across multiple disciplines, generating cutting-edge knowledge.

My research output includes 8 publications and 3 reviews during my PhD, plus 6 publications from my postdoc (4 published, 2 submitted), many highlighted on platforms like Organic Chemistry Portal and Synfacts. Notably, I am the first author of all and corresponding author of 2 articles and 2 reviews (>380 citations, h-index 9, WoS). I have presented at 15 national and international conferences, including invited lectures. Additionally, I taught 134 hours of courses in UAM's Chemistry Bachelor's program, co-directed 3 Bachelor's theses, and 3 Master's theses (4 of these students are now pursuing PhDs). My postdoctoral work also includes collaborations with industrial partners such as AstraZeneca, Minakem, and Sanofi, and I serve as a referee for journals like ACIE, Org. Lett., and Chem. Comm.

Recognitions for my work include the XX Lilly/RSEQ Award for PhD students (2022), Extraordinary PhD Award in Organic Chemistry (UAM, 2023), M^º Cruz Moreno Bondi Award (RSEQ-STMad, 2023), Best PhD Award (RSEQ-JIQ, 2023), and an honorific mention in the Margarita Salas Research Award (2023, City Council of Madrid). Recently, I was honored with the 2024 BASF-ICIQ Innovation and Entrepreneurship Award, one of Spain's most prestigious prizes for PhD researchers.



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Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: SORIANO LÓPEZ, JOAQUÍN
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Título: Metal-oxo nanoclusters as water oxidation catalysts

Resumen de la Memoria:

With my research, I have delivered new knowledge on the study of metal-oxide nanoclusters and metal-organic frameworks as catalytic materials towards the oxygen evolution reaction (OER). My vision is to analyze from a fundamental point of view the structure/activity relationships of the catalysts that permit the rational design of more effective and durable materials. This work, which is fundamental in nature, has delivered high-impact research outputs that helped firstly the scientific community in the better understanding of the extremely complex water oxidation half-reaction (also known as OER) and secondly, by providing tools for the chemical design of novel materials with improved catalytic characteristics and enhanced stability. This has allowed me to gain a wealth of knowledge, especially in the synthetic protocols, processing, and structure/activity relationships of polyoxometalates (POMs) and other metal-oxide nanoclusters, thus becoming a recognized expert in this area. My work shows my ability to develop new concepts and methodology with high impact in the field, as well as my independence, leadership, and interdisciplinary knowledge. These qualities were recognized in 2023 when I was awarded the R3 Certificate as an established researcher. In addition, I would like to highlight that my proposal was selected for the interview stage of the ERC Starting Grant in 2023, which despite not being awarded, placed me and my project among the top 30% of the applicants in Europe from a total of ca. 2700 applicants.

My research line at ICMol is devoted to combining functional molecular metal oxide clusters (POMs) with 2DMs, particularly those exhibiting electroactivity and/or semiconductivity. By doing this, I intend to tune and improve the properties of the 2DMs through the interfacial interactions established with the molecular system. As molecular species, I employ POMs, which due to their chemical versatility can decorate the 2D surface by different means, e.g. through electrostatic interactions, via covalent functionalization, or with a reductive deposition route. The goal is to induce modifications into the topology (e.g. local structural distortions, symmetry) and the electronic structure (e.g. charge distributions, orbital hybridization, valence states, etc.) of 2DMs. Furthermore, careful selection of the type of POM that can respond to external stimuli (light, electric field, redox processes, etc.) provides an extra pathway for selectively tuning the properties of the 2DMs via these inputs. With my research I deliver new knowledge, not only to gain deep control over the functionalization of 2DMs with POMs, but also to overcome the lack of fundamental understanding of POM-2DM interactions. This knowledge helps in pinpointing the interatomic/interelectronic interactions, thus providing new smart molecular/2D heterostructures pivotal for the construction of novel devices with applicability in hot topic research areas such as biosensing, neuromorphic computing, and energy storage/conversion.

Resumen del Currículum Vitae:

I graduated with a Lic. in Chemistry from UVEG in 2011 and was awarded a competitive fellowship by the URV-ICIQ PhD Fellowship Program to pursue MSc and PhD studies at ICIQ and URV. I became a pioneer in studying cobalt-based polyoxometalates (Co-POMs) as catalysts for the oxygen evolution reaction (OER), gaining expertise in their synthesis, characterization, and catalytic evaluation using photo- and electrochemical techniques, as well as computational methods to investigate their OER mechanism.

During my PhD, I received two mobility grants, enabling research stays at the University of Zurich (resulting in 2 publications) and the University of Glasgow, where I published a key paper in Nature Catalysis on molybdenum doping in Co-POMs to enhance OER activity.

In 2016, I began a postdoc at URV as part of a MINECO-funded project. I published groundbreaking results in Nature Chemistry showing the exceptional stability and OER activity of Co-POMs in acidic media. This work is widely cited and has influenced the development of cost-effective materials for green H₂ production.

I continued my postdoctoral career at Trinity College Dublin in 2017, where I proposed a new chemical descriptor to predict the OER activity of molecular catalysts employing computational methods, which was published in Nature Communications. This work is advancing high-throughput screening of novel OER materials. Additionally, I secured two prestigious fellowships: the Marie Skłodowska-Curie EDGE-COFUND and the Irish Research Council Postdoctoral Fellowship (declined). As PI of the MSCA fellowship, I focused on producing novel POMs and biomimetic clusters for OER.

In 2021, I was awarded two competitive fellowships: Juan de la Cierva-Incorporación (declined) and the CDEIGENT Distinguished Postdoctoral Researcher Fellowship. The CDEIGENT fellowship allowed me to join Prof. Eugenio Coronado's team at ICMol, where I established my own group, which includes a Lab Technician, a PhD student, two MSc students, and an undergraduate student. My research focuses on hybrid molecular/2D materials and nanoparticles for energy, neuromorphic computing, and electrochemical biosensing. I am also the PI of a PERTE-Chip project on semiconducting memristive materials.

I actively mentor students and founded an association for young researchers at ICMol, organizing regular meetings and promoting initiatives such as an annual symposium for the young researchers at ICMol. I was appointed as a member of the ICMol Council and as junior coordinator of ICMol's Sustainable & Environment research line.

In 2023, I received the R3 Certificate, acknowledging the high impact of my work on OER and catalyst design. I have published 24 articles (11 as first author, 6 as corresponding author, 1 as last author) in peer-reviewed journals, contributed to a book chapter, and co-authored a patent application. My publications have garnered 1622 citations (h-index 16), with 15 in the top 25% most cited worldwide. I have presented at 21 international and



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national conferences, 8 as an invited speaker. I am a regular reviewer for JCR-indexed journals, a review editor for Frontiers in Chemistry, and have been a guest editor for a special issue in Water on heterogenization of molecular OER catalysts. I have also reviewed for the MSCA-Martí i Franquès COFUND Doctoral Fellowship Program and evaluated numerous theses.



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Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: HIDALGO CRESPO, TANIA
Referencia: RYC2024-048819-I
Correo Electrónico: tania.hidalgo@imdea.org
Título: Biological bypass and drug delivery performance of engineered MOFs

Resumen de la Memoria:

Her unconventional multidisciplinary background acquired during her professional career has been endorsed from relevant fields such as Materials science, Chemistry, Nanomedicine, Biopharmaceutics & Immunology. Starting with a 1^º Spanish stage with a Molecular Biology BSc in the field of Microbiology (U. Santiago de Compostela-USC), she conducted a Supervised Academic Work by isolating aquatic bacteria. Following her training, she completed a Cellular Immunology MSc in UGR/Granada Hospital, obtaining successful results for 2-european congresses about leukemic HL-A expressions.

The 2^º stage starts abroad, being selected for a Joint-PhD thesis in a complete new area: Material science & Pharmacy with U. Versailles (France) & USC (Spain). Here she was introduced in the Metal Organic Frameworks field by the preparation of engineered systems for diverse administration pathways. Despite the MOF safety & biodistribution was initiated, their drug delivery approach was still in its infancy. Thus, she highly contributed in the field with diverse in vitro evaluations (eg. stability, encapsulation & release, nanosafety, uptake) of successful biopolymer MOF grafting depending on the route (eg. oral, intravenous & cutaneous; Adv.Healthc.Mater.2015; Sci.Rep.2017). Besides, she was crucial in the progress towards MOF immunological impact by cyto/immune/genotoxicity (Chem.Sci.2022; Chem.Comm.2015; J.Mater.Chem.B2015 & 2017).

A 3^º stage is based on her postdoctoral experience, aiming to evaluate the potential MOF antiviral therapy, as a invited visitor at Severo Ochoa Center (Spain). Later, she moved to Ireland with a MedTrain MSCA-COFUND focused on nucleic acids@cyclodextrin delivery to the brain (Mol. Pharm.2019). Here she acquired knowledge on gene therapy & neurological disorders. Since 2019, she returned to Spain at IMDEA Energy with a regional Talento Junior Fellowship with the aim of bringing talented young researchers. Outstanding outcomes were obtained related to the macromolecule@MOF association & toxicological profile (Inorg.Chem.Front.2023, Chem.Sci.2022, ACS Nano2022; 4 as corresponding author 2024/25), evidencing her relevant role in the MOF biomedical field, achieving even to open a new line inside of Horcajada's team based on unveiling engineered MOFs for crossing unexplored mucosal barriers along with their biosafety impact. This relevance has been reflected by her promotion to Senior Research Assistant through the prestigious MSCA-IF (NeuroMOF), addressing the BBB by MOF targeting/motion through macromolecule immobilization. Actively progressing in the new domain (recently enrolled as co-PhD Director and as PI of funded project), she is gaining skills on micro/nanomotors design, 3D in vitro models or attractive engineered nanocarriers. Bearing in mind her transdisciplinary background, achieved MOF features, autonomous motion benefits & the opportunity to explore unexplored administration routes, Dr. Hidalgo propose the synergy of tailored MOF designs with self-propelled devices, resulting in attractive self-propelled tissue penetrating carriers for effective targeted therapy (see section 5).

The prestigious Ramon y Cajal support on this hot topic will encourage the independent career of this junior researcher along with the advance of breakthrough health enabling-technologies.

Resumen del Currículum Vitae:

The scientific interests of Dr. Hidalgo are focused the development of porous materials (Metal-Organic Frameworks, MOFs) for the protection & immobilization of macromolecules (proteins, enzymes, drugs) along with their potential biomedical/environmental application (drug delivery, targeted therapy, nanosafety, decontamination). She's co-author of 29 scientific articles (H-index:18, 5 in 2024, 4 as corresponding author; total cites=2135, 427/year;) in high impact journals (eg. 1 JACS-IF14.5, 1 Coord.Chem.Rev.-IF:20, 1 Chem.Sci.-IF9, 1 ACS Nano-IF17, 1 ACS Appl.Mater.Interfaces-IF9.5, 1 Inorg.Chem.Front.-IF8), being presented at 10-national/16-international congresses (3 Invited, 15 Oral communications). Moreover, she has co-supervised students at different levels (6 PhD stages, 2 research in training, 8 MSc, 3 BSc & 5 technicians), enrolled as official PhD co-director-2021 for water decontamination & brain delivery-2023.

Leadership. She's an experienced junior researcher with an excellent background in Material science, Nanomedicine & Immunology. Biologist by nature, developed her Joint PhD thesis in Material Chemistry & Pharmacy issued by the U. Versailles (France) & the U. Santiago de Compostela (Spain) under the supervision of Dr. Horcajada (H=74) & Dr. Serre (H=124), leaders in the MOF bioapplication, along with Prof. Alonso (H-index:98), internationally recognized galenist. She acquired expertise on the nanocarrier design/characterization & engineering, encapsulation/release of multiple therapeutic molecules, biostability or their physiological barriers bypass (i.v., oral, cutaneous), but also on their nanosafety & in vitro/ex vivo performance. During her short & productive postdoctoral experience (2016/20), she was awarded with a MedTrain MSCA-COFUND under the supervision of Prof. O'Driscoll (H=46, Ireland), focusing on the cyclodextrins to deliver nucleic acids to the brain (identified as "Key Innovator" by the EU's Innovation Radar).

Since 2019, she's integrated at APMU as Senior Research Assistant thanks to regional Talento Junior Fellowship (Mode 2), for bringing talented younger researcher, the prestigious MSCA-IF (NeuroMOF), addressing the BBB by MOF targeting/motion using suitable macromolecule immobilization and her recent funded project on engineered MOF for biological bypass, evidencing her leadership and independency as PI. Her extensive scientific production has been the fruit of strong collaborations with internationally recognized groups, including 1) Prof. Alonso (H=103;USC) for drug release & in vitro assays; 2) Immunotoxicity with Prof. González (H=47;CINBIO); 3) Biological bypass with Prof. Blanco-Prieto (H=58;UNAV); 4) Prof. Battaglia (H=59; IBEC) for MOF self-propulsion; 5) Viral culture with Dr. Alcamí (H=54;CBMSO); 5) Dr. Kentaro (H=31;Stockholm) for cytotoxic studies of ecofriendly MOFs; 6) Dr. Rodríguez/Rojas (H=39&21;UGR) for diverse in vitro/ex vivo performances; 9) Prof. Rosal (H=61;Alcalá) for antibacterial assays; 11) Prof. Quiroga (H=32;UAM) for chemotherapy of metallic NPs; 12) Dr. Devic (H=68;Nantes) for the antioxidant assays; or 13) Dr. Villa (H=27;ICIQ) for the MOF-Au NP nanomotor design; 13) Dr. Paris (H=20; IBIMA) for anti-allergens MOF agents. Besides, Dr. Hidalgo is an active disseminator, participating yearly for the Women in Science, European Researcher Night, Science Week or Madrid+D events.



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Área Temática: Ciencias y tecnologías químicas
Nombre: LUQUE ALLED, JOSE MIGUEL
Referencia: RYC2024-048794-I
Correo Electrónico: jmluquealled@gmail.com
Título: Trayectoria investigadora J. M. Luque-Alled

Resumen de la Memoria:

Mi carrera científica se ha desarrollado en prestigiosas instituciones internacionales, como el MIT (EE.UU.), la Universidad de Zaragoza (Unizar, España), la Universidad de Manchester (UoM, Reino Unido), el Institut Català de Nanociència i Nanotecnologia (ICN2, España) y la Universidad Heriot-Watt (Reino Unido). A continuación, destaco mis principales aportaciones en cada etapa:

2014-2015

Comencé en la Universidad Heriot-Watt, donde realicé mi proyecto de grado bajo la supervisión del Dr. Gareth O. Lloyd, seguido de mi tesis de máster en Unizar con la Dra. María Sierra Jiménez.

2015-2020

Mi doctorado en Ingeniería Química en la UoM se centró en membranas de matriz mixta con materiales de grafeno para separación de gases y tratamiento de agua. Durante este período, publiqué quince artículos, cuatro como primer autor, y presenté mi trabajo en siete conferencias, incluyendo seis internacionales. Trabajé estrechamente con investigadores de renombre como el Prof. Peter Budd, con quien publiqué nueve artículos conjuntos. También participé en proyectos financiados por el EPSRC y la Royal Society, destacando mi contribución al desarrollo de membranas superhidrofóbicas que llevaron a una patente utilizada actualmente por Watercycle Technologies Ltd. Además, acumulé 30 horas de experiencia docente como asistente y demostrador de laboratorio.

2019-2020

Realicé una estancia de seis meses en el ICN2 bajo la supervisión del Dr. César Moreno y el Prof. Aitor Mugarza, investigando grafeno nanoporo para membranas ultradelgadas. Este trabajo generó resultados preliminares que dieron lugar a un proyecto en curso sobre membranas avanzadas para purificación de agua.

2021-2024

En Unizar, lidero proyectos relacionados con la fabricación de membranas de nanofiltración y destilación por membranas utilizando redes metal-orgánicas (MOFs) y materiales 2D. Hasta la fecha, he publicado nueve artículos (tres como autor correspondiente) y una revisión, con otros tres en revisión.

He participado en proyectos internacionales como FREMEM, INNOMEM y un proyecto sobre captura de CO₂, financiados por el Ministerio de Ciencia de España y la Comisión Europea. Mantengo colaboraciones con la UoM en investigaciones sobre Polímeros de microporosidad Intrínseca y grafeno para destilación por membranas, y he iniciado una línea innovadora de caracterización de materiales con técnicas de sincrotrón. Además, he impartido 137 horas de docencia en el grado de Química y el máster Erasmus Mundus.

2024

Durante una estancia de tres meses en el MIT, bajo la supervisión del Prof. Zachary Smith, inicié una línea de investigación independiente sobre MOFs con morfologías avanzadas para mejorar el rendimiento de separación. Esta experiencia me permitió acceder a recursos de última generación y ampliar mi red de colaboración.

Resumen del Currículum Vitae:

Durante mi carrera científica, he trabajado en varias instituciones de investigación de prestigio internacional. Actualmente, estoy llevando a cabo mi investigación postdoctoral bajo un contrato financiado por el Consejo Superior de Investigaciones Científicas (CSIC).

Recientemente, completé una estancia de investigación de 3 meses en el MIT bajo la supervisión del Prof. Zachary Smith. El objetivo principal de esta estancia fue iniciar una línea de investigación independiente centrada en la síntesis de estructuras metal-orgánicas (MOFs). Esta línea de investigación sigue activa y se esperan futuras colaboraciones.

Anteriormente, trabajé como investigador postdoctoral en la Universidad de Zaragoza (Unizar), inicialmente a través de una beca Margarita Salas y posteriormente bajo una beca Juan de la Cierva. Durante mi tiempo en Unizar, he sido miembro del grupo de investigación MECANOS (Membranas y Catálisis con Materiales Nanoestructurados). Mi investigación se ha enfocado en avanzar en las separaciones por nanofiltración (NF) utilizando membranas compuestas de película delgada (TFC) y MOFs.

Soy doctor por la Universidad de Manchester (UoM), Reino Unido. Realicé mi tesis doctoral en el departamento de Ingeniería Química y Ciencia Analítica de la UoM (clasificada en el puesto 22 del ranking QS en 2015) bajo la supervisión de la Dra. Patricia Gorgojo (supervisora principal) y el Prof. Stuart Holmes (segundo supervisor). Como miembro del Instituto Nacional de Grafeno de la UoM (donde trabajan los laureados con el Nobel Geim y Novoselov), tuve la oportunidad de ampliar mi red de colaboraciones y trabajar con investigadores reconocidos en el campo, como el Prof. Peter Budd (co-inventor de los Polímeros de Microporosidad Intrínseca), el Dr. Eric Prestat y el Dr. Aravind Vijayaraghavan. También he participado en varios proyectos junto con grupos de investigación de la UoM (Reino Unido), la Universidad de Edimburgo (Reino Unido) y el Instituto A.V. Topchiev de



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Síntesis Petroquímica (Rusia). Participé junto con Graphene Water Technologies Ltd. en la preparación de novedosas membranas superhidrofóbicas. Además, he presentado mi trabajo en seis conferencias internacionales y dos nacionales.

Mi investigación sobre membranas de matriz mixta que contienen materiales basados en grafeno me ha permitido adquirir una experiencia significativa en varias tecnologías de separación por membranas, como la separación de gases, nanofiltración, pervaporación y destilación por membrana, que serán altamente relevantes para el desarrollo del proyecto descrito en esta convocatoria. También obtuve una beca de viaje (Short Term Scientific Mission) para realizar una investigación en el Institut Català de Nanociència i Nanotecnologia (ICN2) en España. Así, durante las etapas finales de mi doctorado, avancé en estas investigaciones sobre el desarrollo de materiales de grafeno nanoporo a través de la realización de dos estancias de investigación (6 meses en total) en el ICN2 bajo la supervisión del Prof. Mugarza.

Entre mis logros se incluyen 24 publicaciones científicas y una revisión, con más de 1200 citas (h-index 18) según Google Scholar. También he adquirido experiencia docente trabajando como asistente en la UoM (30 h) y en Unizar (137 h)



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Área Temática: Ciencias y tecnologías químicas
Nombre: CALDERON CELIS, FRANCISCO
Referencia: RYC2024-048391-I
Correo Electrónico: mrcalcel@gmail.com
Título: Towards a comprehensive quantitative characterization of biomolecules in Life Sciences and the Environment

Resumen de la Memoria:

I carried out my PhD (2018, cum laude, international mention, Extraordinary Award) at the University of Oviedo, supervised by Prof. A. Sanz-Medel and Prof. J. Ruiz Encinar. My research focused on exploiting the quantitative potential of elemental mass spectrometry (ICP-MS) to measure elements in important biomolecules in the life sciences, ranging from proteins to metabolites and gasoline derivatives. I successfully integrated ICP-MS into proteomics workflows and achieved the absolute and generic quantification of snake venom proteomes.

In 2019 I joined Prof. Ryszard Lobinski's group at University of Pau (France). During this time, I developed my skills in molecular MS (ESI-MS) through my research on the characterization of metallophores (microbial metal complexes) in complex environmental systems. By developing an innovative high-resolution and high-sensitivity approach involving multidimensional SPE-LC enrichment, ESI-MS, and ICP-MS detection, I achieved the most comprehensive characterization of metallophores in complex soil environments. This breakthrough laid the foundation for understanding the dynamics of the environmental community, shedding light on the behavior of these metabolites and their potential applications in bioremediation and agricultural engineering.

In 2022, I was awarded a Margarita Salas Joven fellowship for talent attraction and retention and joined the research group of Prof. José Manuel Costa and Jorge Ruiz as postdoctoral researcher at University of Oviedo. There, I worked on the integration of elemental and molecular mass spectrometry to work in tandem for the quantitative characterization of post-translational modifications of proteins.

My career has had a distinctly multidisciplinary focus, having developed innovative analytical strategies and methodologies applied to fields such as quantitative proteomics, venomics, environmental metabolomics, microbiology, and the study of samples of energy interest, thereby influencing and contributing to the advance of knowledge in these fields.

My current scientific research aims to develop novel analytical strategies for the comprehensive quantitative characterization of biomolecules with profound implications in life sciences and the environmental, built on my acquired experience and knowledge.

Resumen del Currículum Vitae:

I received my BSc from the University of the Basque Country. During this time, I enjoyed a 10-month research internship as an Erasmus fellow at Prof. A. Killian's group at Utrecht University. After my MSc, I joined the research group led by Prof. A. Sanz Medel (University of Oviedo) to carry out my PhD, funded by a FPI fellowship. During this time, I did two short stays: one at Agilent Technologies (Japan), funded by a mobility grant within the framework of the FPI program; and one at the University of Pau, (France), funded by a SEProt fellowship. From my PhD work I received the Extraordinary PhD Award (2020).

After my PhD, in 2019 I joined Prof. R. Lobinski's group at University of Pau, appointed as enseignant-chercheur. In 2021, I was awarded with a competitive Margarita Salas postdoctoral fellowship funded by FICYT and joined the research group led by Prof. J.M. Costa and Prof. J. Ruiz, at Univ. Oviedo. In 2024 I was visiting researcher in Prof. J.L. Capelo's group at NOVA University Lisbon.

I have participated in projects funded by international (2 COST), national (7) and regional (2) calls. I have participated in 9 industrial transfer contracts, 1 as PI (59k€) and 8 as researcher. To carry out my independent research career and ensure my own position, I have been actively looking for funding through different national/international calls, like European funding and infrastructure support calls. I am in the reserve list in Ramon y Cajal 2023, and I have submitted an ERC Starting Grant proposal (2,500,000€), to be resolved in 2025.

Currently, I have coauthored 19 high-quality peer reviewed publications (5 as corresponding author, 8 as first author, 2 as second author), 14 in D1 (10) and Q1 (4), with 2 recent submissions. I have also been invited to write a review and a book chapter. The publications have gathered over 530 citations (h-index=12, i10-index=13, Google Scholar).

Author of 47 national (16) and international (28) congress communications, I am presenting author of 2 invited talks, 14 oral communications and 6 posters. I have been part of the organizing committee of 2 international congresses, and scientific committee of 1 national congress and 1 workshop. I have also been the head organizer of 2 web seminars.

The expertise acquired through my career in multidisciplinary analytical chemistry has allowed me to act actively as reviewer for several scientific journals and served as guest editor for one special issue in Proteomes.

I served as a board member of the Group of Young Proteomics Investigators of the European Proteomics Association (2018-2019), and I am serving as President of the Speciation Group of the Spanish Society of Analytical Chemistry since 2022.

I have delivered 500+ hours of teaching, and I have co-supervised 4 master students, I am currently co-supervising 1 PhD and 1 master student. I have also supervised 1 PhD visiting student and 1 external trainee. I have been part of 1 PhD and 5 master committees. I have led two teaching innovation projects, participate in the coordination of 2 international teaching conferences, and given 3 oral talks at teaching conferences. I have also organized and participated in several outreach activities. I am accredited by ANECA as Profesor Titular de Universidad (2024).



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Área Temática: Ciencias y tecnologías químicas
Nombre: ARCELUS ARRILLAGA, PEDRO MANUEL
Referencia: RYC2024-049980-I
Correo Electrónico: parcelus@gmail.com
Título: Thermochemical and hydrothermal processes to convert unconventional resources into value-added products

Resumen de la Memoria:

Dr. Pedro Arcelus has developed his research career in prestigious institutions such as Imperial College London (ICL), Instituto de Carboquímica-CSIC (ICB), Universidad Iberoamericana (UIA) and University of Bradford (UoB). He did his PhD in ICL, where he developed a unique process that used supercritical water to upgrade heavy oil through partial oxidation and subsequent deoxygenation. His results showed that oxidation reactions start in central positions of the molecule and deoxygenation occurs in the absence of oxidative species. These findings enabled the application of the process to the upgrading of heavy oils with yields comparable to traditional hydrotreating technologies and its later application into biomass upgrading. As a postdoctoral researcher, Dr. Arcelus worked in 2 international research projects (GREEN-CC EU project, funded by the FP7 and UNIHEAT, funded by BP and Skolkovo Foundation) developing catalytic materials for its sustainable application into CO₂ capture and crude oil catalytic hydrotreatment respectively. Dr. Arcelus achieved research independence in UIA where he was appointed Senior Lecturer and continued his work later as Assistant Professor at the UoB (2021-2024) and as Momentum Postdoctoral Researcher in ICB-CSIC since December 2024. He established a strong international collaboration network with researchers from prestigious institutions in Spain, UK, Mexico and Colombia into hydrothermal upgrading of biomass. Results obtained from these collaborations represent major contributions to the state of technological maturity of the hydrothermal processing of biomass technology. Throughout his research career, Dr. Arcelus has participated in 13 funded research projects (2 of them R&D with industry) in areas of catalysis, thermochemical and hydrothermal processing, being a PI in 6 and securing over 500k € for research and lab infrastructure. He led a R&D project between the US based company CultivoLand PBC and UoB into assessing thermochemical treatment of forest biomass to prevent wildfires and create local sources of income. Dr. Arcelus was the academic lead for the development of a new MEng/BEng programme in Sustainable Process Engineering (SPE), first of its kind in the UK. He was also PI of a project that secured 318,969 € for the creation of a SPE laboratory in the UoB. His research contributions represent major breakthroughs in areas such as low carbon energy, waste to value-added products and upgrading of unconventional resources. Dr. Arcelus is a Senior Member of the AIChE since 2014 and was awarded Level 1 within the National Board of Researchers in Mexico in 2020. Dr. Arcelus current line of research focuses on the development of machine learning and AI models to generate deep understanding of thermochemical and hydrothermal processes to convert biomass into value-added products. He is driving his research towards four areas of technological development: 1) Resistant catalysts, 2) Solar heating, 3) Process exergy efficiency and 4) Optimization through digitalization techniques. This with the aim of addressing technological challenges of thermochemical and hydrothermal processing and to increase their TRL and sustainability, in line with the 17 UN Sustainable Development Goals and with the priority areas indicated in the Plan Estatal de Investigación Científica, Técnica y de Innovación 2024-2027.

Resumen del Currículum Vitae:

Dr. Pedro Arcelus has been a Momentum Postdoctoral Researcher in the Instituto de Carboquímica-CSIC (ICB-CSIC) since December 2024. His research line focuses on developing thermochemical processes to transform unconventional resources into value-added products. Currently, his research is centered on the development of machine learning and AI models to generate deep understanding of thermochemical processes and optimize them from a sustainability perspective. He did his MSc and PhD degrees at Imperial College (ICL) funded with two prestigious scholarships by the Foreign and Commonwealth Office UK and CONACyT Mexico respectively. In his PhD thesis, he studied the oxidative cracking of heavy oil in sub and supercritical water. This work was awarded the Townend Prize by ICL for best research work in areas of combustion, fuel production and-or its use. He did a predoctoral research internship in ICB-CSIC as part of the project I-Link 0439 funded by CSIC. After his PhD, Dr. Arcelus worked as postdoctoral researcher at ICL participating in 2 international research projects (GREEN-CC EU, funded by the FP7 and UNIHEAT project, funded by BP and Skolkovo Foundation) working in catalytic reaction systems development. In 2017, he was appointed Senior Lecturer at the Universidad Iberoamericana (UIA), where he started a research line into the hydrothermal processing of biomass and established a strong collaboration network with prestigious institutions (ICB-CSIC, IER-UNAM, CIO Aguascalientes, IMP Mexico, and UNAL Bogota). In 2019, Dr. Arcelus was named Head of Postgraduate Studies at UIA, where he achieved the accreditation of 2 PhD programmes by CONACyT. Dr. Arcelus was appointed Assistant Professor at the University of Bradford in 2021, where he developed a MEng/BEng programme in Sustainable Process Engineering (SPE). He also led a project that secured 318,969 € for the creation of a SPE laboratory. He has participated in 13 funded research projects in his career (2 of them R&D with industry), highlighting the CEMIE-Sol-P120 project (Fondo Sectorial CONACyT-SENER funded), i-COOP BIOCAF (CSIC funded) and a R&D project with the US based company Cultivo Land. He has been the PI in 4 research and 2 infrastructure projects securing more than 500k €. He has been a Senior Member of the AIChE since 2014 and in 2020 was awarded Level 1 within the National Board of Researchers in Mexico. Dr. Arcelus has a strong track record of research in hydrothermal processing co-authoring 31 publications (21 articles in SCI-indexed journals, 4 book chapters and 6 conference proceedings) with 709 citations (h index: 14) in google scholar and 542 citations (h index:13) in Scopus. He has 21 communications to conferences (13 oral and 8 poster) and has delivered 8 distinguished seminars in prestigious research institutions in Spain, UK, and Mexico. Dr. Arcelus has supervised 2 postdoctoral researchers (CONACyT and UIA funded). He co-supervises 5 PhD thesis and co-supervised 15 Master thesis to completion. He also has vast experience in teaching at higher education institutions with over 2500 hours. Dr. Arcelus has been PhD examiner on 5 occasions for distinguished universities in UK, Mexico and Malaysia. He also contributes as reviewer for 5 Q1 journals and has been Guest Editor for Frontiers in Chemistry. In 2023, he was elected Fellow of the Higher Education Association.



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Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: GARCÉS PINEDA, FELIPE ANDRÉS
Referencia: RYC2024-050195-I
Correo Electrónico: fgarcés@iciq.es
Título: Combustibles verdes, Química y Energías Renovables

Resumen de la Memoria:

My scientific career has focused on different fields of material sciences and electrocatalysis. My research can be divided into several stages with international mobility (5 groups in 4 countries). I started my bachelor research work in January 2007 in the group of Prof. Aminta Mendoza (Univ. del Quindío-Colombia) working on magnetic-oxides that finished with a stay in the Complutense University of Madrid (Spain) in the group of Prof. Jacobo Santamaría working on ferrites deposition.

Next step was in 2008 at UNL-Argentina where I performed my PhD in Chemistry. The thesis was based in the study of porous silicon/conductive oxides under the supervision of Prof. Roberto Arce. In this period, I gained experience in semiconductors, and photovoltaics (10 publications).

Then, in 2013, I did my first postdoc in the same research group. My main task was focused on the AAO/lipids templates. In this period, I improved my profile in functional sensors and nanomaterials. At the beginning of 2014 I did my second postdoc in the Sao Paulo University (Brazil), at the research group of prof. Pinto. In this stage I gained experience in tribology and industrial scale-up of hard coatings. This period gave me a wide experience in syntheses and materials characterization.

In 2017, I obtained a Marie-Curie-COFUND fellowship in the group of Prof. Galán-Mascarós in ICIQ (Spain) to work on electrocatalysis. I worked in substrates functionalization to act as catalysts for a seawater electrolyzer. Afterwards, I continued working at ICIQ in two European projects (A-leaf, CREATE, DECADE and SUPERVAL) working in non-critical raw materials for electro- and magneto-electrocatalysis. In this period, I have supervised master, PhD and postdoctoral students, and published around 22 articles. During my career, I received several fellowships and awards (2 PhD fellowships and 3 postdoctoral fellowships and recently a tenure track position in Argentina). I have contributed to 36 conferences, participated in 10 research projects. My high international mobility, scientific production and mentoring show my leadership and capabilities to perform independent research. Regarding to the research line my main tasks will be focuses on two main research areas: Materials design and innovating in photo-electrocatalytic hydrogen production. This research will focuses on developing new materials with exceptional photo-electrocatalytic properties. It entails the production of a next-generation catalytic system capable of withstanding the demanding and harsh conditions associated with reactions related to the water splitting family.

Besides, and to add a added value to the research I will concentrate efforts in spin manipulation, a hot topic that has been evolved in the last years. So, I will combine my expertise in semiconductors processing and electrocatalysis to generate systems that can be easily to manipulate from the spin point of view. To overcome this topic, two strategies can be studied, such as: Spin Diffusion Length in thin film systems and non- an intrinsic-chiral systems.

Resumen del Currículum Vitae:

During this years I got 2 PhD fellowships (ANPCyT and CONICET), three Postdoctoral fellowships (CONICET, FIPAI and Marie Curie COFUND). Recently I was awarded with a tenure track position in CONICET-Argentina. My research expertise has focused on the field of materials sciences during my PhD, and more recently. I have presented my work in 36 conferences and invited lectures and co-authored more than 36 publications in peer-reviewed scientific journals and conference proceedings. Furthermore, I have collaborated with several companies during my scientific career (MAHLE-Metal Leve, Repsol and Enagas).

More recently I secured funding from IGNITE-BIST 2024 program and AGAUR-2024 for both basic science research and industrial comercialization.

I was officially co-directing Doctor Jiahao Yu in his PhD thesis (defended on 2023), and currently the students: Ghazaleh Abdolhosseini, Luis Merchante Gallego and Loghao Li, under my co-supervision at URV-ICIQ program. Besides, mentoring and supervising visiting, master and junior postdocs. Also, I have teaching experience in two countries (Argentina and Spain) in the University of Concepcion del Uruguay and in the Master of hydrogen of the University Rovira I Virgili since 2021. I am highly involved in outreach and disseminations activities intra and with external institutions. Motivating young people and community awareness.

I have participated in 10 national and international projects as PhD and as senior researcher. Since 2017 I was highly enrolled in European projects (A-leaf, CREATE, DECADE and SUPERVAL), gaining experience in renewables ways to save solar energy and producing new generation of materials for energy transformation. In 2020 I received a recognition from SusChem Spain, highlighting my work into the electrochemical field as the best scientific contribution in Chemistry for a young researcher in 2019, in the INVESTIGA category. Currently, I am gaining experience on the oxidation of ethanol and CO₂ reduction to produce energy with novel and non-critical raw materials. In addition, and thanks to my contribution in this European projects I have acquired a rich experience by initiating collaborations with other research groups in France, Israel, Switzerland, Australia, Chile and Canada.

The research scientific projects that I carried out over the last years during my postdoctoral research career have been categorized into three subjects as follows: Material sciences, Electrochemistry and Energy harvesting.

I developed into a scientist with in-depth knowledge from syntheses to the device in my research lines. Since I have received advanced training in electrochemistry and material science, I introduced a new research line in Galán-Mascarós Group. These new lines hold the potential to revolutionize the green hydrogen field generating a high repercussion in the electrochemistry community, due to the outstanding performance of ferromagnetic catalysts in OER. I have earned various commissions of trust by the scientific community which has given me insight into the workings of academia and has begun my maturity into an independent researcher. For instance I have been appointed as external evaluator in Martí-COFUND fellowship. Additionally, I am a frequent reviewer journals such as Nat. Energy, Nat. Comm., Inorg. Chem. Front.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: GOBERNA FERRON, SARA
Referencia: RYC2024-050881-I
Correo Electrónico: sgobfer@itq.upv.es
Título: Advancing Nanostructured Catalysts for Energy and Environmental Sustainability
Resumen de la Memoria:

I began my research career with a Ph.D. at the Institut Català d'Investigació Química (ICIQ) under the supervision of Prof. J. R. Galán Mascarós, where I developed molecular inorganic catalytic materials for water oxidation. In 2014, after earning my doctoral degree, I pursued a postdoctoral position at Oregon State University (OSU, USA), focusing on metal-oxo clusters as precursors for high-quality functional thin films. In 2016, I moved to France for two postdoctoral stays. The first was at the European Synchrotron Radiation Facility (ESRF), where I applied X-ray scattering techniques to study nanostructured materials and disordered coordination polymers. The second was at ISTERRE - University Grenoble Alpes, where I advanced environmental remediation technologies, including the development of silica-coated magnetite nanoparticles for selenium reduction and DNA extraction.

Since 2020, I have established myself as an independent researcher in Spain, securing prestigious fellowships such as the MSCA-IF at the Instituto de Tecnología Química (ITQ) and the Beatriu de Pinós program at the Institut Català de Nanociència i Nanotecnologia (ICN2). My current research focuses on designing nanostructured catalysts for electrocatalytic applications, including CO₂ conversion and energy storage. Demonstrating scientific leadership, I have served as the principal investigator of projects such as PAID-06-22 and as co-PI and work package leader in EU-funded initiatives like ECO2Fuel and REDHY. I have also cultivated an extensive international network, collaborating with leading researchers across Europe and mentoring students at various academic levels.

My contributions to the field include over 30 publications, with an increasing number as corresponding author, underscoring my independence and leadership. My work has been widely cited, reflecting its significant impact, and I have presented my research at numerous international conferences, including invited talks, further consolidating my recognition within the scientific community. By employing interdisciplinary approaches and advanced techniques, I continue to push the boundaries of catalyst design for sustainable energy solutions.

In the future, my research will focus on single-atom catalysts (SACs) as advanced materials for sustainable energy applications, transitioning from nano- and molecular-scale studies to the exploration of single-atom precision on complex supports.

Resumen del Currículum Vitae:

With over a decade of experience in advanced materials and energy-related research, I have cultivated expertise in catalytic materials, inorganic chemistry, electrocatalysts, and environmental applications. My academic journey includes a PhD in Nanoscience and Nanotechnology from the Universitat Rovira i Virgili (2013, Extraordinary Doctorate Award), complemented by six years of postdoctoral experience at leading institutions in the US, France, and Spain.

Currently, as a postdoctoral researcher at the Instituto de Tecnología Química (ITQ), my work focuses on developing metal nanocluster-based electrocatalysts for CO₂ reduction. I have secured competitive funding through MSCA-IF and Beatriu de Pinós program, totaling €317,232. I served as PI of a PAID-06-22 project, and I am co-PI and WP leader in 2 European projects.

Regarding academic achievements, I have authored 33 publications, including a book chapter, a review, and a patent, with an h-index of 18 and >1600 citations. I have presented at 18 international conferences, including 3 invited lectures and 1 award-winning oral presentation. I have extensive experience in synchrotron facilities and advanced scattering methods for material characterization.

Concerning industry and outreach contributions, I have collaborated with bioMérieux on magnetite nanoparticle characterization for DNA extraction. I have provided consultancy for environmental decontamination projects for the Catalan government. Furthermore, I am actively involved in promoting women in science through mentorship, talks, and organizational roles in diversity-focused initiatives.

With respect to teaching and mentorship, I am accredited as a lecturer by AQU, with teaching experience at UPV and UAB, and I have supervised two MSc and two BSc students and am currently co-supervising a PhD student.



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Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: RIVERA CHAO, EVA
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Título: Novel Organometallic and Photochemical Strategies for the Synthesis of Organic Molecules

Resumen de la Memoria:

My research has been focused to the development of innovative catalytic and photochemical strategies for the synthesis of high-value materials. Despite the early stage of my career, I have worked in several prestigious research groups acquiring a comprehensive and versatile background. This has been reflected in my significant contributions and leadership in various projects. My diverse competencies and proven leadership skills have brought me to a high level of professional maturity.

Predocdoctoral period (2016 – 2022): My PhD studies have mainly focused on the development of new catalytic allylboration reactions of alkynes, which have resulted in several high-impact contributions and have opened a new research line in the group. I performed 2 fully funded predoctoral stays in top-ranked international universities. The first stay (3 months) was performed in the group of Prof. Cristina Nevado in the University of Zurich (Switzerland), working in the synthesis of new gold(III) complexes. The second stay (3 months) was performed in the group of Prof. Phil S. Baran in The Scripps Research Institute (USA), working on the development of a novel electrochemical approach for protein labelling. During these stays, I have worked in completely different fields. These enriching experiences contributed to the acquisition of scientific versatility and demonstrated the ability to adapt to different groups and new chemistry areas, showcased by the publication of 2 peer-reviewed articles. I finished the PhD studies in January 2022. It is important to highlight that the work carried out during this period has led to the publication of high-quality 10 research articles and 2 review articles, demonstrating a high level of participation and implication in the group.

Postdoctoral period (2022 – present): I started my postdoctoral period in the group of Prof. Carlos Martí Gastaldo at ICMol (University of Valencia). This group is leader in the synthesis and study of Molecular Organic Frameworks (MOFs). During this stage, I investigated a novel application of MOFs for the development of photocatalytic methods. I had a significant contribution to the group as an expert in organic chemistry, considering that this group is mainly formed by inorganic chemists. Moreover, I led the project while training in organic chemistry to younger members of the group. Notably, I worked in the frontier of organic and inorganic chemistry which has contributed to acquiring more versatile competences. After 5 months in the group, I obtained a postdoctoral fellowship which allowed me to do 2 years postdoctoral stay in the group of Prof. Daniele Leonori. In this postdoctoral period, I became an expert in the field of photochemistry.

My new research line aims to combine my expertise acquired during my predoctoral and postdoctoral periods. This line will be focused on the development of unconventional borylation strategies with the novel photoredox generation of boronate radicals.

Resumen del Currículum Vitae:

I am an organic chemist with a focus on developing novel methodologies in transition-metal catalysis and photochemistry. My education in chemistry started with the BSc in chemistry at the University of Barcelona (2015). Then, I moved to Santiago de Compostela to do a Master in Organic Chemistry at USC (2016). During this time, I was awarded with a Research Initiation Contract from CiQUS for Master students. Then, I joined the group of Prof. Fañanás Mastral, where I did my PhD studies. During my PhD, I secured two competitive predoctoral fellowship (5 years in total). This fellowship also allowed me to perform 2 fully funded predoctoral research stays, which resulted in the publications of 2 research articles.

The work developed at this stage resulted in the publication of 8 research articles and 2 reviews in high-impact journals (80% Q1). For these achievements, I received the Lilly-RSEQ Award in 2021 and the Extraordinary Doctorate Award from USC in 2022.

After completing my PhD with *Cum Laude* distinction, I moved to the group of Prof. Martí-Gastaldo at ICMol, where I was introduced to Metal-Organic Frameworks (MOFs) and their potential applications in photocatalysis.

In 2023, I was awarded a Xunta de Galicia Postdoctoral Fellowship, which enabled me to join the group of Prof. Leonori at RWTH Aachen University. There, I got a deep knowledge in photochemistry, which led to the publications of 2 research articles.

Beyond research, I am deeply committed to education and science outreach. I have mentored 3 BSc, 3 MSc, and 1 PhD visiting students, and I have taught 60 hours of organic chemistry lab courses at USC. These experiences have enhanced my skills in guiding students and fostering their scientific curiosity. I am also involved in outreach activities, such as CiQUS Open Door Days and the *Sociedade Xuvenil Galega de Química (SXGQ)*, where I promoted chemistry education among young people through school visits and science fairs.

To date, I have co-authored 14 peer-reviewed publications in top international journals, with 289 citations and an h-index of 10. As the first author on 5 of these papers, I have demonstrated my ability to lead projects and make significant contributions to the field. I have also presented my work at 7 national and international conferences, further establishing my presence in the scientific community.

Currently, I am back at USC, continuing my postdoctoral research with Prof. Fañanás Mastral, where I am developing my own research project. I am actively applying for funding to start an independent research career.



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Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: CUADROS HUERTAS, SARA
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Título: Métodos sintéticos fotoquímicos

Resumen de la Memoria:

Durante su tesis doctoral, la Dra. Sara Cuadros se especializó en los campos de fotoquímica sintética, fotocatalisis y organocatalisis asimétrica. Concretamente, sus investigaciones se centraron en el uso de estrategias organocatalíticas para la realización de reacciones fotoquímicas enantioselectivas, así como en el entendimiento mecanístico de estos procesos sintéticos. De entre sus publicaciones en esta etapa, destaca el desarrollo de los dos primeros ejemplos organocatalíticos de captura enantioselectiva de ortoquinodimetanos fenólicos generados fotoquímicamente (ACIE 2016, 55, 3313; ACIE 2017, 56, 11875). Ambas publicaciones, fueron destacadas en Synfacts (Synfacts 2016, 12(4), 0419; Synfacts 2017, 13(10), 1086), reconociendo el impacto y relevancia de estas investigaciones. En esta fase de su carrera, adquirió experiencia en el uso de técnicas de espectroscopia de absorción transitoria para la caracterización de intermedios fotoquímicos; así como en el uso de técnicas de experimentación μ high-throughput, utilizadas para la identificación rápida de organocatalizadores quirales óptimos. Al finalizar sus estudios de doctorado, Sara realizó una estancia (8 meses) en la Unidad de Tecnologías Químicas de la compañía Johnson&Johnson Innovative Medicine (Toledo), donde participó en el desarrollo de procesos en flujo continuo para su aplicación en programas de optimización de candidatos a fármaco. Posteriormente, durante su periodo de investigación postdoctoral en la Universidad de Padova (2020-2024), Sara trabajó para el Departamento de Medicina, diseñando y sintetizando inhibidores de CYP11B2 fluorinados, para el posterior desarrollo de sus correspondientes 19F-análogos; así como en el Departamento de Ciencias Químicas, investigando nuevos fotocatalizadores orgánicos para su empleo en reacciones ATRA (atom transfer radical addition). De este periodo, cabe destacar su trabajo en la síntesis y aplicación de fotocatalizadores basados en fenolatos trisustituidos, caracterizados por su alto poder de reducción, reciclabilidad y estabilidad en reacciones radicalarias (ACS Catal. 2022, 12, 4290-4295); así como su trabajo en el desarrollo de una metodología organofotocatalítica para la síntesis de biciclopentanos difluoroalquilados, cuyas estructuras son de gran demanda actual en química medicinal para su uso como remplazamientos bioisostéricos 3D de (hetero)arenos (ACIE 2023, 62, e202303585). En septiembre de 2024, Sara regresó a la Universidad de Alicante como investigadora Junior, donde diseña e implementa nuevos métodos foto-electrocatalíticos para la síntesis y funcionalización de moléculas de relevancia medicinal y sintética.

Resumen del Currículum Vitae:

La Dra. Sara Cuadros es licenciada en Química por la Universidad de Alicante (Premio Extraordinario, 2014). Realizó estudios de doctorado (Cum Laude, 2019) gracias una beca FPU en el Instituto Catalán de Investigación Química (ICIQ), especializándose en fotoquímica sintética, fotocatalisis y organocatalisis asimétrica bajo la supervisión del Prof. Paolo Melchiorre. Durante esta etapa, realizó una estancia de 4 meses en el Institute of Transformative Bio-Molecules (ITbM) de la Universidad de Nagoya (Japón) con el Prof. Takashi Ooi, investigando el uso de catalizadores basados en iminofosforanos en reacciones fotoquímicas enantioselectivas. Posteriormente, se incorporó en la Universidad de Padova (Italia) como investigadora postdoctoral (2020-2024), trabajando con los Prof. Marcella Bonchio, Gianpaolo Rossi y Luca Dell'Amico, en los Departamentos de Medicina y Ciencias Químicas. Además de investigar en el ámbito académico, Sara ha trabajado en la industria farmacéutica, primero realizando una estancia como becaria CITIUS en la compañía Johnson&Johnson Innovative Medicine (Toledo); y posteriormente trabajando como química de escalado de procesos en la compañía Farmhispania Group (Barcelona). Desde 2016, Sara ha participado en 10 congresos internacionales, y ha impartido seminarios en las universidades de Padova, Alicante y Henan (China). Sara también ha colaborado como secretaria en la organización de la primera Escuela Internacional en foto- y Biocatalisis (PHOTOCAT24), celebrada en junio de 2024 en Padova (Italia); y es miembro organizador de la próxima edición PHOTOCAT26. Sara es coautora de 17 publicaciones científicas, incluyendo 14 artículos (>60% adscritos a Q1, 2 como autor de correspondencia) y 3 capítulos de libro; y participa como revisora científica para la revista ChemistrySelect (Wiley). Sus investigaciones, incluyen colaboraciones con académicos de diferentes instituciones internacionales, incluyendo Prof. Giorgio Pelosi (Universidad de Parma, Italia), Dr. Emmanuel Magnier (Institute Lavoisier de Versailles, Francia) y Prof. Giacomo Filippini (Universidad de Trieste, Italia).



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias y tecnologías químicas
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Título: Excited State Dynamics for Organic Electronics

Resumen de la Memoria:

Since completing his Chemistry degree in 2011, Dr. Marin-Beloqui has focused on excited-state transfer dynamics in various materials, particularly for applications in organic electronics, using spectroscopic and optoelectronic techniques.

He was awarded an ICIQ PhD fellowship to study hybrid (inorganic-organic) photovoltaics (PV). During this time, he initiated the perovskite research line in Prof. Palomares' group, adapting existing fabrication and characterisation methods developed for other types of PV to suit perovskite-based systems. Research on perovskites became the primary focus of Prof. Palomares' group for several years thereafter.

Before completing his PhD, Dr. Marin-Beloqui began a postdoctoral position at Imperial College London with Prof. Haque. Notably, his expertise in PV dynamics contributed to improving the efficiency of SnS devices in the group from 1.2% to 5%. During this time, he mentored five PhD students, fostering collaborations that continue to this day.

He then moved to University College London (UCL) to join Dr. Clarke's group, where he studied excited-state transfer dynamics in organic PVs. His work primarily focused on transient absorption spectroscopy (TAS) and Raman spectroscopy. As Dr. Clarke was newly establishing his lab at UCL, Dr. Marin-Beloqui's responsibilities extended beyond research to include setting up and managing the lab. A key task was setting up a back-scattering resonant Raman spectroscopy system. To accomplish this, he learned the technique from scratch during a short visit to Prof. Hayes at Cyprus University, selected the necessary equipment, and successfully installed and configured it in the lab. This equipment has since become a cornerstone of Dr. Clarke's group.

Subsequently, Dr. Marin-Beloqui began applying for fellowships to pursue independent research in Prof. Casado's group. His expertise in transient absorption spectroscopy complements Prof. Casado's research, making his contributions invaluable to the group's ongoing work.

Dr. Marin-Beloqui was awarded an UMA "Incorporación de Doctores" fellowship, followed by a "María Zambrano" fellowship. At UMA, he has established his own independent research program focused on excited-state dynamics using transient absorption spectroscopy. The synergy between his expertise and Prof. Casado's research has led to several high-impact publications in top-tier journals such as ACIE and JACS. He has obtained numerous collaborations within UMA and internationally.

Throughout his career, Dr. Marin-Beloqui has pursued a fully independent research trajectory, carefully selecting his career steps without external supervision. His consistent record of publishing in high-ranking journals like JACS and ACIE across multiple research groups highlights that these achievements stem from his abilities and contributions, rather than the prestige of the groups he worked with.

His independent research and growing international reputation have earned him invitations to deliver talks at institutions like ITQ and ICMA, participate in thesis committees at ITQ, establish international collaborations, and present at an international conference in Japan as an invited speaker. In addition, he is now part of a COST European Consortium, where he is co-Leader of the Gender Equality Plan, to improve his independence and to share the research he is now performing.

Resumen del Currículum Vitae:

Dr. Marin-Beloqui has published 31 articles (5 as corresponding author), 90% of them in Q1 in their fields when they were published, with over 1100 cites and h-index of 17.

His whole career has been defined by the internationality. He has been moving since he finished his Chemistry degree, spending most of his research time in the UK. In all the steps during his research he has published his research results in high impact international journals and disseminated in international conferences. Moreover, he has published and collaborated with people around the world, including some collaborations that were initiated by him, like prof. Casado, Prof. Bronstein and Prof. Schroeder.

He has also been highly involved in teaching and mentoring. He has directed a master thesis in UCL. He has done outreach during his PhD (Bojos per la Química) and during his postdoctoral stages (Open Research Day and Pint of Science among others). He has mentored several master and PhD students, which, after many years, still lead him to collaborations. At the moment, he is currently co-supervising a PhD student, Marcos García. In addition, he has "Profesor Contratado Doctor" and "i3" accreditations and has imparted over 220 hours in UCL and UMA.

He has shown a high degree of leadership. He became an example during his PhD, where he developed Prof. Palomares main research line for more than 10 years. Moreover, people came to Palomares group (and he was even sent to CEA in France) so he showed how to fabricate efficient perovskite solar cells. After that, he has been part of several research committees (PDRA and CLD) where he has organised talks and small conferences (obtaining external funding from, for instance, Royal Society of Chemistry). He was invited to organise a conference in March 2022 (OrgFun22). He also was the UCL chemistry department fluorimeter manager. Also, he setup a back scattering resonant Raman equipment from scratch, a current pivotal stone in Dr. Clarke group. His expertise in TAS also brought the attention of conference company nanoGe to create a tutorial video for their educational resources, where it is the second most viewed video. Moreover, his research has granted him with invitation to give talks in ITQ, ICMA and an invited talk in IPEROP24 in Japan.

Dr. Marin-Beloqui has shown independence along his whole career. He has directed his career path selecting his next positions, instead of being career-wise directed by his supervisors. In his PhD he worked both in PbS QDs or perovskites without any expert in the group on this field, and still obtained astonishing results. Another proof of his independence is he obtained outstanding results in all his career steps despite the different backgrounds (organic synthesis, optoelectronics, materials science and spectroscopy). He is currently using the knowledge in transient absorption and excited state dynamics he has taken abroad to complement the research it was being done in UMA with great results (13 publications in 2 years). In addition, he joined the LUCES COST, where he is co-Leader of the Gender Equality Plan, to improve his independence and create new collaborations. In addition,



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he is work-package leader in the Ministry PID2021-127127NB-I00 and Junta de Andalucía ProyExcel_00328 projects. He is also the PI of a UMA project that he's using to expand his collaborating network, with a manuscript submitted as result of this project.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: LIGUORI, NICOLETTA
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Título: Photon Harvesting in Plants and Biomolecules

Resumen de la Memoria:

Sunlight is a source of energy and photodamage for plants. To harness solar energy safely, plants developed a molecular mechanism controlled by pigment-binding proteins called light-harvesting complexes (LHCs). At low light intensities, LHCs harvest and transport solar energy to the photochemistry sites. Under strong light, LHCs dissipate excess absorbed energy as heat, preventing photodamage. Yet, how do plants activate this photoprotective switch? My research addresses this longstanding question in photosynthesis.

Since my PhD, I demonstrated independence and creativity by: i) introducing advanced computational methods from other disciplines into my supervisor's lab and the photosynthesis field, developing new force fields, and producing the first microsecond-scale atomistic dynamics of LHCs, correlating structural and energetic switches under the computational microscope; ii) combining ultrafast spectroscopy and molecular dynamics (MD) simulations for the 1st time to uncover how distinct photosynthetic organisms activate photoprotective mechanisms; iii) mastering in vitro protein engineering, independently designing photosynthetic protein variants to pinpoint protein regions sensitive to the microenvironmental changes which trigger photoprotection.

My work led to breakthroughs well-received by the photosynthesis, chemistry and biophysics fields:

-21 peer-reviewed publications often in multidisciplinary journals, plus 1 preprint and 1 paper under review, with multiple press releases.

->940 citations, H-index of 15

-I presented at >40 international conferences and seminars and won 3 best poster prizes at major international conferences, also outside my field.

With this RyC Fellowship, I will build on this foundation and tackle the next challenge: pioneering the experimental study of plant LHC nanomechanics and their real-time environmental responses. I will enable the experimental study of the nanomechanics of the LHCs, and of their real-time response to the environment. To do so, I will introduce in photosynthesis a novel toolkit of advanced optical methods, integrated with cutting-edge MD tools. Thanks to these tools, I will identify LHCs' (sub)nanometer conformational changes, how these tune their energetics, and how the environment controls them.

As a recently-established group leader at ICFO, I have built my research program on the strong interdisciplinarity required for this project, as my group hosts international talent from physics, chemistry, and biotechnology. With my team and starting with an empty lab, I rapidly established the key resources for this project, including building a state-of-the-art ultrafast multipulse spectroscopy setup, a fully equipped lab for protein engineering and reconstitution, and securing competitive national and European funding. Crucially, we obtained proof of principle for all experimental tools proposed, which I will integrate with advanced MD tools another core expertise of my group. Such unique combination of tools and expertise places me in a privileged position to achieve the proposed objectives.

With this project, I will advance our understanding of how plants regulate light harvesting at the nanoscale while establishing a novel framework in photosynthesis and photobiology to explore how structure and environment control the function of photosensory proteins across life domains.

Resumen del Currículum Vitae:

I am a physicist with experimental and computational expertise in biophysics, especially photosynthesis. I graduated with the highest distinction (cum laude) in physics from University of Roma Tre (IT) after completing an MSc thesis in molecular dynamics (MD) simulations at UC Berkeley (US) in Head-Gordon's group. For my PhD, I joined Croce's group at the VU Amsterdam (NL), where I combined ultrafast spectroscopy with MD simulations to study how photosynthetic proteins avoid photooxidation.

In 2018, I won a competitive national grant (VENI) from the Dutch Research Council NWO, which allowed me to start leading my independent research line at VU Amsterdam. I studied photoprotection in prokaryotic and eukaryotic photosynthetic organisms and implemented new MD methods in photosynthesis. At the VU Amsterdam, I was also Project Leader of multiple awarded NWO grants to run MD simulations on the national supercomputer.

In October 2022, I was appointed Tenure-Track Professor and Group Leader at ICFO (ES) through the CELLEX NEST fellow program and later received a La Caixa Junior Leader Fellowship.

At ICFO, I built a fast-growing, interdisciplinary group that develops and applies spectroscopic and computational tools to study photoactive systems' functional responses to changes in structure, light, and environment. I started the group during my maternity period (Zoe Liguori, 01/08/22). I currently supervise 2 postdocs, 4 PhD students, and 2 MSc students and have supervised an additional postdoc and 11 BSc/MSc students.

I strongly support the next generation of scientists: most MSc students that I supervised and that already graduated, enthusiastically continued in academia in competitive PhD programs in Spain (ICFO, UB, ICIQ) and abroad (ETH, PSI, MSCA DN at Interference, AMOLF, VU Amsterdam).

I attracted and supported international talent: most of my postdocs received prestigious national and European fellowships to work in my group, i.e., two MSCA Postdoctoral and one Juan de la Cierva Fellowships.

I quickly secured national and European grants: I am PI on a La Caixa Junior Leader fellowship, an MSCA doctoral network on computational photosynthesis, a Generación de Conocimiento 2023, and previously on a BIST-Ignite grant (in collaboration with ICIQ) and a national grant for computational time, selected as RES Success Story in 2024.

Since early in my career, I am a recognized member and have actively contributed to my field:

-I organized 3 international conferences, including the Gordon Research Seminar Photosynthesis 2023, where I was elected chair. I secured funding from top-tier organizations and sponsors for all events.

-I regularly engage in outreach activities, including Science & Art collaborations, talks, and interviews at international outreach events.

I am a member of international boards in editorial, science-policy, and faculty roles, including:

-Elected Fellow of the Young Academy of Europe (2024) and elected member of its Board.



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- As a PhD student, elected Chair of the international PhD and Postdocs organization at VU Amsterdam.
- Early Career Editorial Advisory Board Member of ACS Photonics
- Guest Editor of two special issues in representative photosynthesis journals.
- Reviewer for multidisciplinary journals and international funding agencies.
- Member of several Faculty committees.
- Co-organizer and lecturer in international schools.



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Área Temática: Ciencias y tecnologías químicas
Nombre: ALBALAD ALCALÁ, JORGE
Referencia: RYC2024-049314-I
Correo Electrónico: jorge.albalad@gmail.com
Título: Transforming Porous Materials Chemistry: Innovating Synthetic Paradigms towards Sustainable and Applied Materials

Resumen de la Memoria:

My scientific career has been driven by a passion for redefining synthetic chemistry and bridging fundamental science with real-world applications. With a foundation in organic and materials chemistry, my work has focused on pushing the boundaries of traditional synthetic methods and pioneering innovative post-synthetic modification (PSM) pathways for the creation of functional porous molecules and materials, mainly Metal-Organic Frameworks (MOFs) and Polyhedra (MOPs), and more recently purely-organic Covalent Organic Frameworks (COFs).

One of my most significant contributions of my PhD has been setting the foundations for Clip-off Chemistry, a novel synthetic paradigm based on bond-breaking reactions that enables the selective excision of molecules and materials from solid, ordered structures. This groundbreaking approach has allowed access to complex targets, such as macrocycles, cages, or clusters, which are traditionally difficult or impossible to synthesize. Through this method, I have demonstrated the potential to unlock previously inaccessible chemical space, revolutionizing how the synthesis of porous reticular materials is approached, while opening avenues for novel applications in catalysis, molecular recognition, and advanced materials.

My research has recently shifted towards exploring the vast potential of porous organic materials, particularly covalent organic frameworks (COFs), as platforms for sustainable innovation. By using COFs as sacrificial precursors, I have not only advanced our understanding of their structural and functional properties but also demonstrated their utility in generating high-value macromolecules such as functional macrocycles. This work reflects my dedication to integrating sustainability into chemistry by addressing challenges such as selective synthesis, scalability, and resource efficiency.

This commitment to sustainability extends to exploring greener synthetic methods, such as Spray-Drying Chemistry, or an ongoing industrial collaboration where I lead efforts to transform textile waste—a growing global environmental concern—into valuable chemical precursors for metal-organic framework (MOF) synthesis. This project exemplifies my ability to bridge industrial needs with cutting-edge science, combining recycling innovation with the potential to develop smart textiles capable of adsorbing contaminants.

Throughout my academic journey, I have consistently sought to challenge norms and explore uncharted scientific territories. My contributions to reticular chemistry have revealed new phenomena, such as self-healing frameworks, or crystallographic MOF platforms with dynamic structural reorganizations, highlighting the transformative power of PSM methodologies applied to porous materials. I have published extensively in high-impact journals and demonstrated a capacity to lead pioneering research programs that integrate synthetic chemistry, materials science, and sustainability.

Looking ahead, my vision is to continue advancing Clip-off Chemistry as a versatile tool for organic synthesis while fostering interdisciplinary collaborations to address global challenges. By combining creativity with rigorous scientific inquiry, I aim to translate revolutionary synthetic methods into tangible benefits for society, positioning myself as a leader in the fields of organic and materials chemistries.

Resumen del Currículum Vitae:

I hold a Bachelor's (2014) and Master's (2015) degree in Chemistry from the Universitat Autònoma de Barcelona (UAB). My passion for advancing science led me to pursue a PhD at the Catalan Institute of Nanoscience and Nanotechnology (ICN2) through a FI-AGAU fellowship. My doctoral thesis, an innovative exploration of post-synthetic modification (PSM) in porous materials, earned the "PhD in Chemistry Extraordinary Award" (UAB, 2019/20).

During my PhD, I pioneered transformative PSM techniques to create functional porous materials, such as MOFs and MOPs, tailoring their structures for catalysis and molecular recognition. Key breakthroughs included water-triggered hetero-bimetallic insertion in MOFs (Chem. Commun. 2016), and solid-gas ozonolysis to achieve unparalleled structural precision in MOFs (J. Am. Chem. Soc. 2018 x2). Later, I extended these methods to MOPs, leveraging Rh(II)-based cages for the controlled assembly of unprecedented porous frameworks and gels (J. Am. Chem. Soc. x2; Angew. Chem. Int. Ed. 2021; Adv. Sci. 2022).

In 2020, I joined the University of Adelaide (Australia), where I expanded my expertise in catalysis and crystallography. My research stabilized reactive Cu(I) intermediates within MOFs, mimicking homogeneous catalytic processes (Inorg. Chem. 2021; Chem. Sci. 2021). I also led independent projects, mentoring early-career researchers and producing impactful publications (Chem. Commun. 2022; Inorg. Chem. 2023).

Returning to ICN2 in 2022 as a Senior Researcher, I now lead groundbreaking initiatives under the ERC Advanced Grant CLIPOFF-CHEM. This project builds on my PhD work, establishing Clip-off Chemistry as a paradigm-shifting approach to selectively excise molecular subunits—clusters, cages, and macrocycles—from reticular frameworks. My leadership has led to molecules and materials unattainable by traditional synthesis (Angew. Chem. Int. Ed. 2023; J. Am. Chem. Soc. 2024 x2; ChemRxiv 2024), and one patent (Ref EP 24382846.4).

As principal investigator, I also secured funding for an industrial collaboration with Aitex (Spain), focusing on recycling textile waste into chemical precursors for MOF synthesis. Building on these results, we aim to incorporate MOFs into textiles to develop smart materials capable of adsorbing



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contaminants. My dedication to sustainable innovation is further reflected in co-developing Spray-Drying (SD) technologies for green organic synthesis, including a patented paracetamol production process (Ref EP 24383065.0).

In addition to research, I serve as an Associate Professor of Organic Chemistry at UAB, where I coordinate and teach advanced courses for undergraduate and master's students. I have mentored 7 undergraduate projects, 2 master's theses, and currently supervise 2 PhD and 2 postdoctoral researchers at ICN2.

To date, I have authored 27 high-impact publications (8 as first author, 5 as corresponding author) with over 660 citations (h-index: 11) and co-authored two patents. My collaborative network spans global leaders, including Prof. Omar M. Yaghi, Profs. Sumbly and Doonan, and others, and I have presented my work at 10 national and international conferences.

Finally, I am deeply committed to science outreach, inspiring young minds through initiatives like ESCOLAB, Joves i Ciència, and international programs, including the O²Week Programme at the University of Adelaide.



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Área Temática: Ciencias y tecnologías químicas
Nombre: SAURA SANMARTÍN, ADRIÁN
Referencia: RYC2024-048259-I
Correo Electrónico: adrian.saura@um.es
Título: Metal-organic frameworks with redox- and photoactive rotaxane linkers as smart materials
Resumen de la Memoria:

Adrián Saura Sanmartín has demonstrated mobility and international engagement throughout his career, contributing to cutting-edge research projects in different countries, and through collaborations across four continents. His ability to integrate into diverse academic environments while driving impactful research underscores his capacity to lead and collaborate on an international scale. Indeed, he worked in the research groups of professors: (i) Martín (Universidad Complutense de Madrid, Spain); (ii) Alajarin (Universidad de Murcia, Spain); (iii) Gunnlaugsson (Trinity College Dublin, Ireland); and (iv) Schalley (Freie Universität Berlin, Germany). Additionally, he has collaborated with Professors Martins (Universidade Federal de Santa Maria, Brazil) and García Cánovas (Universidad de Murcia, Spain) on projects focused on enzymology.

The applicant has demonstrated independence and leadership throughout his academic career, exemplified by his editorial role, successful supervision of students, and groundbreaking research contributions in supramolecular chemistry.

Undoubtedly, the greatest proof of his independence and leadership is his new position as a [la Caixa](#) Foundation Postdoctoral Junior Leader, which he has held since 1 July 2024. This prestigious international award is a significant milestone, recognizing his potential to lead independent research. In addition to the competitive salary, it is accompanied by a funded research project for 3 years, with an allocation of 115500 €. The candidate is the sole principal investigator of this funded research project. This project reflects his ability to conceptualize high-impact research, as evidenced by the recruitment of a researcher who will start her doctoral thesis next semester, to expand the project, marking the beginning of his independent research group.

The main goal of the main research line is the preparation of metal-organic frameworks (MOFs) having redox- and photoactive rotaxanes as linkers that operate as smart materials in different applications. For this purpose, the work has been divided into three defined objectives: (i) synthesis of redox- and photoswitchable rotaxane-based ligands; (ii) preparation of MOFs using rotaxane linkers; and (iii) application of the prepared MOFs as smart materials. This project aims to transfer the dynamics of these molecular machines in solution to the solid state, allowing their integration into complex devices.

Resumen del Currículum Vitae:

Adrián Saura Sanmartín is an independent [la Caixa](#) Foundation Postdoctoral Junior Leader. His main research line is focused on the preparation of smart materials by integrating molecular machines within metal-organic frameworks.

The main research achievements of his research career are: (i) development of on/off photoactive diastereoselective catalysts, (ii) development of rotaxane-based metal-organic frameworks, including nanodispensers which release a target molecule when light is applied; (iii) preparation of macrocycle-based metal-organic frameworks for the selective separation of related carbon allotropes; (iv) synthesis of rotaxanes having mechanically planar chirality and their use in the enantioselective preparation of molecules having biological activity; and (v) preparation of scratch-resistant hydrophobic coatings for corrosion protection.

He has published 29 scientific articles indexed in Journal Citation Reports (JCR): 21 from the first quartile (10 from the first decile), 7 from the second quartile and 1 from the third quartile. Additionally, he has published 1 book chapter published by Wiley-WCH publishing house.

He has contributed 26 communications in scientific congresses: 1 invited lecture, 11 oral communications, 13 poster communications and 1 conference paper.

The applicant has received several awards: 3 research awards granted by the section of Murcia of the Spanish Royal Society of Chemistry, 2 doctoral thesis awards independently granted by Universidad de Murcia and Villapharma Research, and 1 award on scientific dissemination granted by the section of Murcia of the Spanish Royal Society of Chemistry.

He has been awarded several research fellowships: 2 research fellowships during doctoral studies granted by Fundacion Seneca-CARM, 1 research fellowship to conduct postdoctorate awarded by Ministerio de Universidades of the Spanish Government (jointly financed by the European Commission), and 1 Postdoctoral Junior Leader fellowship granted by [la Caixa](#) Foundation.

He is academic editor of the Journal of Chemistry (ISSN: 2090-9071) since January 2022. This journal is indexed in the category "Chemistry, multidisciplinary" of the Web of Science Core Collection (Science Edition), ranking 92/178 of this category in the Journal Citation Reports 2022.

The applicant has participated in activities to introduce high school students to chemistry research in 2018, 2019, 2021 and 2024.

Currently, he is the principal investigator of a research project funded by [la Caixa](#) Foundation. Additionally, he was part of the research team in five research projects funded by different national and European funding entities.



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Área Temática: Ciencias y tecnologías químicas
Nombre: PACHECO FERNÁNDEZ, MARÍA IDAIRA
Referencia: RYC2024-048814-I
Correo Electrónico: idaira.p.f@gmail.com
Título: Design of materials for microextraction in the analysis of complex samples

Resumen de la Memoria:

My multidisciplinary career focus on analytical methods using microextraction and new materials as extraction phases. Divided in 4 research lines with 45 months as predoc at Universidad de La Laguna (Spain), including 4.2 months as PhD visiting student at Iowa State University (USA), 26 months as postdoc at Kyoto University (Japan), and 17 months (total of 24) as postdoc at University Medical Center Groningen (Netherlands).

Line 1 (predoc, Analytical Chemistry). Funded by national projects, 2 predoc contracts.

Liquid-phase microextraction (LPME) and ionic liquids (ILs). ILs based on guanidinium cations were used in LPME methods. This research points out the importance of ILs toxicity. The low cytotoxicity of the ILs was demonstrated compared with widely used ILs. I also evaluated aqueous biphasic systems (ABS) with these ILs, leading to sustainable preconcentration methods. A new collaboration with the ICIA for extracting natural compounds using ILs was initiated. I got 3 articles as CA in this line. Collaboration with international scientists (Portugal, Italy and Czech Republic).

Solid-phase microextraction (SPME), polymeric ILs (PILs) and metal-organic frameworks (MOFs). In collaboration with Prof. Anderson (USA), PILs were designed as SPME coatings to outperform commercial devices. Selectivity can be tuned by modifying the PIL structure: specific anions target polar compounds, functionalized cations preconcentrated DNA, and zwitterionic PILs showed zero matrix effect. The two last projects were carried out in Prof. Anderson's group. I was responsible of developing SPME fibers based on MOF, which led to a licensed patent. The MOF is grown on the support and avoids polymers and glues. Stability allowed the application in complex samples and outperformed commercial fibers for challenging analytes, with international collaborators (Portugal).

Line 3 (postdoc, Materials Science). Design and application of porous materials. Funded by JSPS and Margarita Salas postdoctoral fellowships. A new type of membranes was made of interconnected metal-organic polyhedra fillers to create porous membranes due to filler gelation ability, homogeneous distribution and controllable extrinsic pores. We transferred this configuration to MOFs that outperforms typical MOF membranes. I evaluated the membranes for the selective extraction of pollutants in water at trace levels. 1 published article as CA & 1 in preparation. PhD students are testing the membranes in pollutant removal to continue this line.

Line 4 (postdoc, Biomedicine). Bioanalytical applications of MOFs. Project under development funded by MSCA postdoctoral fellowship. It aims to develop a bioanalytical method based on metabolomics for the diagnosis and monitoring of liver diseases. It combines MOFs with SPME for the preconcentration of metabolites from plasma. I am the leader of the "MOFs team" with secondary projects involving the design of MOFs for myocardial therapy and immunotherapy, which has led to 1 publication (+1 submitted).

The new line to be developed will combine the knowledge acquired in the different stages and will involve the preparation of microneedles loaded or coated with MOF gels for the in-situ microextraction of metabolites from dermal interstitial fluid for disease monitoring. This technology has not been applied for multi-analyte detection, being this the first time.

Resumen del Currículum Vitae:

I completed my PhD in Chemistry at Universidad de La Laguna (ULL) in 2021 under the supervision of Dr. Verónica Pino and Dr. Juan H. Ayala. It achieved Cum Laude qualification and was awarded with International and Extraordinary Mentions, and 3 national (SEQA, SECyTA, RSEQ) and 2 regional (RSEQ, ULL) prizes for best PhD Thesis. The PhD focused on the development of preconcentration methods for the analysis of complex samples using materials based on ionic liquids and metal-organic frameworks.

I was beneficiary of a collaboration scholarship during my master studies, and a specialization scholarship in the Agri-Food Research Service at ULL for 5 months. I was beneficiary of predoc contracts (competitive concurrence) from the ULL-La Caixa for 1 year and the Canary Research Agency for 3 years. I completed a predoc stay of 128 days in the group of Dr. Jared L. Anderson at Iowa State University (Ames, USA). From 07/2021 to 08/2023 (26 months), I was a postdoc researcher at Kyoto University (Japan) in the group of Prof. Shuhei Furukawa. I was beneficiary of two postdoc fellowships (competitive concurrence): Japan Society for the Promotion of Science 2-year Standard, which was interrupted because I obtained a Margarita Salas postdoctoral grant (ULL and Ministry of Universities). I worked on fabricating pore-networked membranes for trace-level extraction of pollutants from water. Since 09/2023 (until 08/2025, 24 months), I am a postdoc researcher in the group of Prof. Hélder A. Santos at the University Medical Center Groningen (UMCG, Netherlands) with an individual project/fellowship (M4Liver) within the Marie Skłodowska-Curie Actions (MSCA 2021, competitive concurrence in the area of Life Sciences, top 4%). The project aims to develop a bioanalytical method based on metabolomics for the monitoring and diagnosis of liver diseases.

I have published 26 articles (+1 submitted), 18 of them Q1, being the CA of 4 of them, 54% of them with international collaborators and 63% in open access; 12 book chapters in international publishers. I have presented 26 communications at international conferences, 5 of them oral, 1 invited, and 2 of them awarded by the scientific committee. I have presented 22 communications at national conferences, both oral and poster, 1 oral invited, several of which were awarded. I have participated in 7 research projects as researcher (researcher & working team), 3 of them national and 4 regional. I was PI of the project during my postdoctoral period in Japan, and I am the PI of my current MSCA project. I am a regular reviewer for high-impact journals in the field of Analytical Chemistry, with > 270 completed reviews. I am Editorial Advisor of *Analytica Chimica Acta* (Q1 Anal Chem), Academic Editor of *Journal of Analytical Methods in Chemistry*. I have evaluated 2 international projects (NSC, Poland), 1 book proposal (Taylor & Francis) and 2 PhD thesis (Kazakhstan and Spain).

I have 226 h of teaching experience at ULL and 30 h at UMCG. I have supervised 4 undergraduate students (ULL), 2 international master students (UMCG) and 6 international PhD students. I have participated in an educational innovation project, > 25 h in teaching courses, and in numerous dissemination activities with general audience.



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Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: ÁLVAREZ FERRERO, GUILLERMO
Referencia: RYC2024-050116-I
Correo Electrónico: gui.a.ferrero@gmail.com
Título: Sustainable porous carbon materials for energy storage and conversion technologies

Resumen de la Memoria:

The increasing growth of the world population in combination with the development of a global and a more technological economy has accelerated notably the energy consumption. In parallel, the use of fossil fuels to supply this demand has followed a constant upsurge during the last decades, so that 70 % of the energy production came from fossil fuels in 2018. This has been accompanied by an increase in greenhouse emissions that are estimated to be risen to almost double by the year 2050. For this reason, the development of clean, efficient and sustainable energy storage and production technologies is essential to facilitate the implementation of renewable energies and full electrification of the transport sector. Unlike supercapacitors and batteries, hybrid-ion capacitors (HICs) combine a capacitor-like electrode with a battery-type electrode to attain high energies at high power densities with a long cycling performance. However, the limited resources of lithium on the earth's crust in addition to the increasing costs limits the applications of lithium devices specially for large-scale uses. In search of new alternative technologies, sodium-based electrochemical devices have emerged as potential candidates. On the other hand, the main bottleneck hindering the development of high-performance sodium-ion capacitors (NICs) is the sluggish kinetics of the battery-type electrode that impedes matching the fast processes occurring in the capacitor-type one. Thus, it is necessary to develop sustainable and cost-effective materials that can be used as high-performance battery-type electrodes for NICs. In this regard, carbon materials have gained increasing attention due to their high capacity, excellent chemical stability and low cost. Ultimately, it is of vital importance to design new, sustainable and low-cost synthesis routes to produce the required advanced carbons so that the technological advances do not come at the expense of further environmental deterioration.

I am currently working as postdoctoral researcher at the Humboldt University of Berlin, as part of an ERC Consolidator project, where I am dedicated to the investigation of SIBs. In addition, I have vast experience on the preparation and analysis of carbon electrodes for supercapacitors and electrocatalysts for the oxygen reduction and evolution reactions, as part of my PhD and my previous post-doctoral position in the Max Planck Institute for Chemical Energy Conversion. Moreover, I have a wide knowledge on different synthesis methods, especially HTC which is an economic and environmental-friendly technique to harness cheap and renewable biomass precursors. Thus, in this presented proposal I will develop my own research line, combining the different topics I have been working on. Hence, I will focus on the synthesis of sustainable nanostructured carbon materials for HICs, which is a hot current topic, essential to achieve our sustainable development in the energy transition

Resumen del Currículum Vitae:

My research career started in 2014 after joining Prof. Fuertes and Dr Sevilla group at the Instituto de Ciencia y Tecnología del Carbono (INCAR-CSIC) in Oviedo where I earned my PhD degree through an FPI fellowship. My PhD thesis focused on preparing porous carbon materials doped with heteroatoms and transition metals for electrochemical applications, particularly supercapacitors with various electrolytes, resulting in 4 publications. I also worked on sustainable carbons from biomass to create high-surface-area materials. During my PhD, I was hosted by the Sustainable Materials Group at the Queen Mary University of London under the supervision of Prof. Titirici during a period of 4 months. During this stay, I developed carbon-based catalysts for the oxygen reduction reaction (ORR), publishing 3 articles. I also designed graphene materials for flexible, free-standing supercapacitors, though this was not part of my thesis. I successfully defended my PhD thesis with a Cum Laude distinction and international doctorate mention. I continued researching iron/nitrogen co-doped porous carbons for electrocatalysis, publishing 2 articles. Simultaneously, I worked on biomass-derived carbon materials for supercapacitor electrodes and began exploring carbon materials for Li-S batteries.

In 2018, I began postdoctoral research at the Max Planck Institute for Chemical Energy Conversion with Prof. Schlögl, focusing on porous binderless carbon pellets as electrocatalysts for the oxygen evolution reaction. I presented 2 works at international conferences and contributed to the Maxnet Energy Project, collaborating with institutes like the Fritz Haber Institute, University of Virginia, and Colorado School of Mines.

Since 2020, I have been a postdoctoral researcher at Humboldt University of Berlin (HU) with Prof. Adelhelm, serving as a co-leader of an ERC consolidator grant project alongside another postdoc. We manage the project, guide PhD students, and coordinate research activities. I have also collaborated with institutions like Helmholtz-Zentrum Berlin, CIC Energigune, and Helmholtz Institute Ulm, conducting experiments at synchrotron Bessy II to study energy storage mechanisms. Regarding the transfer of knowledge, I am currently supervising 2 PhD students and I have already supervised one bachelor student, two master students and 2 short stays of master students. I also give laboratory courses for students in their third semester of the chemistry bachelor's degree. In this stay, I have been able to participate in the publication of 8 articles. I have also been appointed as Guest Editor of the Sustainable Energy & Fuels themed collection. Furthermore, I was awarded second place in the Forum Junge Spitzenforschung 2022 with 8000€ with the work about solvent co-intercalation batteries. Finally, I have obtained a project as the principal investigator funded by SALSA - School of Analytical Sciences in Berlin.

My track record includes 36 scientific publications and 1 book chapter and I possess a h-index of 24. I have also 51 contributions on international conferences with 21 as corresponding author (11 oral presentations and 2 Invited talks). During my research career, I have participated in other dissemination activities for a general audience such as Semana de la Ciencia in INCAR-CSIC, and Lange Nacht der Wissenschaften in Humboldt University of Berlin.



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Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: RODRIGUEZ JIMENEZ, SANTIAGO
Referencia: RYC2024-050187-I
Correo Electrónico: sr893@cam.ac.uk
Título: Next-Generation Biohybrids for Green Chemical and Fertiliser Production
Resumen de la Memoria:

I am a Senior Postdoctoral researcher and a former Marie Skłodowska Curie Fellow (06/2021-05/2023) in Prof Erwin Reisner's group (University of Cambridge) developing bacteria and molecular hybrid systems for sustainable chemicals production using water, CO₂ and waste as feedstock. These roles have broadened my expertise in biological systems and materials science, enabling me to work independently, manage my research and research budget, and supervise 5 PhD and 1 MSc students, while developing a research line in the field of energy production and biotechnology. This interdisciplinary work serves as the basis for my future independent career, leveraging biohybrid systems.

Previously, as a FET OPEN postdoctoral research in the same group (06/2019-05/2021), I worked in an international consortium, leading the development of new CO₂ reduction photocatalytic self-assembled molecular systems. I applied my skills in molecular synthesis and (spectro)electrochemistry to design new catalysts and gain new insights into these fuel-forming systems.

Before this, at the Otago University (New Zealand), I did my PhD under Prof Sally Brooker and subsequently worked as postdoc in the same group. My PhD research centred on developing new switchable molecular materials and understanding their chemical sensing properties. As a postdoc I worked on modifying conductive polymers with molecular electrocatalysts for H₂ evolution, expanding my scientific knowledge, establishing collaborations, and supervising a PhD student.

In my career, I have performed synthesis, catalysis and studied CO₂ reduction reaction mechanisms, fuels/chemicals production with molecular systems and bacteria. My achievements are evidenced by my ability to work on different topics (22 publications, 1 pre-print). I have also disseminated my results via 26 conferences, 4 invited talks, and many outreach activities.

Title: Next-Generation Biohybrids for Green Chemical and Fertiliser Production

With the global population projected to exceed 10 billion by 2050, increasing the energy efficiency of chemical and fertiliser production is critical to reducing resource use and environmental impact. Biohybrid systems, which interface inorganic materials—such as electrodes—with bacteria, offer significant promise as they can transform low-value substrates like CO₂ with greater efficiency and product selectivity than modern electrolyzers. This approach could be integrated with renewable electricity, ultimately reshaping sustainable production of chemicals and fertilisers using cheap, abundant gaseous substrates. Despite this potential, the electrical coupling of materials with the internal catalytic capabilities of bacteria remains one of the most critical bottlenecks, and our understanding of these interfaces is still extremely limited. These challenges greatly hinder the widespread implementation of biohybrid chemical production systems.

My research aims to advance the understanding of bioelectrosynthesis of chemicals and fertilisers in biohybrids and its applicability for chemical and food production, paving new avenues in biotech and materials science.

Outcomes will provide a transformative method for greener chemical and food production, and a better understanding of biohybrid interfaces. The findings will influence multiple research fields and redefine research frontiers in microbial applications.

Resumen del Currículum Vitae:

I have conducted interdisciplinary research in Spain, New Zealand, and the UK, resulting in 22 publications (11 as first author, and 1 as corresponding author), 1 pre-print, 2 manuscripts under revision, and 4 manuscripts under preparation. My articles have been published in high-profile journals such as Nat. Energy, Nat. Synth, JACS, and ACIE. These works have garnered over 990 citations and an h-index of 12. Additionally, I have presented at 26 conferences and workshops, including 11 invited talks and seminars, and 7 oral contributions. My funding achievements, totalling over £530k, include a predoctoral Otago scholarship, a Marie Skłodowska-Curie Fellowship, an Ikerbasque Research Fellowship and Neutron beamline time at ISIS. Throughout my career, I have gained Chemistry and Biology expertise that I leveraged to contribute to the fields of artificial photosynthesis, and CO₂ and waste valorisation. During my MSc and PhD at the Universities of Barcelona and Otago, I developed my skills in molecule and materials synthesis through the development of new switchable molecular sensing materials, resulting in significant publications (2 x J. Am. Chem. Soc., Angew. Chem. Int. Ed.).

As a postdoctoral researcher at Otago University, I led the development of conductive polymers modified with molecular H₂ evolving catalysts, managing and establishing collaborations with experts like Prof. Jadranka Travas-Sedjic and Keith Gordon. This work, investigating the polymers' electrochromic and vibrational behaviour, was published in ACS Appl. Mater. Interfaces in 2021, where I am the first and co-corresponding author.

At Cambridge University, within the pan-European Sofia consortium, I developed new light-driven molecular colloidal systems for CO₂ reduction. My unique approach to studying these molecular systems was published in J. Am. Chem. Soc. 2022, and has led to impactful collaborations in artificial photosynthesis published in Chem. Eur. J. 2021, Nat. Energy 2020, Chem. Soc. Rev. 2021, 2 x J. Am. Chem. Soc. 2024.

The Marie Skłodowska-Curie Fellowship, which I commenced in 2021, allowed me to explore bacteria-inorganic biohybrid systems, aiming to produce ethanol and acetate sustainably. This research, available as pre-print, has promising implications for future biohybrid systems.

As a senior postdoctoral researcher, I have managed and led collaborations across the UK and internationally, contributing to fields like CO₂ reduction and waste upcycling, with publications in Nat. Synth. 2023, Green Chem. 2023 and Angew. Chem. Int. Ed. 2024.

My role as an expert in molecular systems and catalysis is recognised through 18 invited lectures and presentations at international meetings. Committed to public engagement, I have participated in online outreach and educational activities at the Cambridge Science Festival.

I serve the scientific community by peer-reviewing for journals and organising academic events, such as the Biophotoelectrochemical Systems Conference in Cambridge and the Otago Future Fuels Workshop. My collaborations extend to industrial partners, like Johnson Matthey, for developing future independent research programmes.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

In supervision, I have co-supervised 5 PhD, 1 MSc, and 3 undergraduate students, and mentored 3 postdocs, and 5 PhD and 1 MSc students, while teaching 5 courses at the Universities of Otago and Cambridge.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: MOYA CUENCA, ALICIA
Referencia: RYC2024-050552-I
Correo Electrónico: aliciamoyacuenca@gmail.com
Título: Development of organic-inorganic hybrid materials for photocatalytic applications

Resumen de la Memoria:

Dr Alicia Moya has experienced in the material chemistry field for 12+ years, combining the principles of inorganic and organic chemistry and surface science to create novel functional hybrid materials. Her career evidence her curiosity and capacity to move from chemistry to material science, surface physics and geochemistry, developing alternative approaches for their exploitation as functional materials.

During her PhD at IMDEA Materials (2013-2017), she conducted a new research line on developing complex hybrid materials based on hierarchical assemblies of mesoporous metal oxides and nanocarbons for photocatalytic water splitting and CO₂ reduction. Furthermore, her enrollment on the FP7 European project provided her with a wide network of academic and industrial collaborators. The PhD was a great opportunity for her to develop experimental skills related to the materials synthesis and characterization, in their processing and photocatalytic applications. Her PhD work led to 7 publications (4 as first author).

During her first post-doctoral stage at UAM (2017-2019), she started a new line of developing COF-based catalytic materials and their hybridization with CNTs. After achieving control on the synthesis of hybrid nanotubes, she started a collaboration with Dr. P.J. de Pablo from Condensed Matter Physics department at UAM to perform single-molecule studies on these hybrid nanotubes. By using atomic force microscopy (AFM), she established a new nanotube manipulation methodology using the lateral force of the AFM and explored the nanotribological and electrical properties of such hybrids. She revealed useful insights into the role of the interface and the structure-property relationships. The works led to 5 publications (3 as first author, 1 as corresponding author).

In 2020, Dr. Moya moved to ISTERre-Université Grenoble-Alpes, increasing her internationalization. She led the management of an industrial project with TotalEnergies SE. As AFM expert, she studied the nano-wettability properties of natural rock surfaces, unraveling that the presence of inorganic-organic structures (biominerals) controls the nanoscale wettability behavior. During this period, she acquired remarkable experience in management, task planning, communication and leadership skills. Further, direct contact with scientific and industrial partners allowed her to expand her research scope, ranging from basic research in the laboratory to industrial production for practical and commercial purposes. This work led to 4 publications (1 as first author, 1 as corresponding author) and 2 publications (1 as first author, 1 as corresponding author) are in preparation. She participated in 5 synchrotron experiments at Soleil and ESRF. Notably, Dr. Moya was the principal investigator for Soleil Synchrotron.

Upon being awarded the Maria Zambrano grant for attracting international talent in 2022, she began her own research project at UAM developing new COF-based materials for photocatalytic water remediation. She has obtained a total funding of 326.014 €, supervised 5 students, published 5 articles as corresponding author, reviewed articles from JCR journals and evaluated H2020 projects. In summary, Dr. Moya has the potential to lead new research lines as principal investigator, from her chemistry perspective but with potential impact in different scientific fields.

Resumen del Currículum Vitae:

Dr. Alicia Moya graduated in Chemistry from the Complutense University of Madrid (2012) where her research career started awarded with the Collaboration scholarship. Then, she pursued her PhD (2013-2017) under the supervision of Dr. J.J. Vilatela at IMDEA Materials. She engaged in the frame of 7FP-EU and ERC projects, developing inorganic-nanocarbon hybrid materials for photocatalytic applications. The PhD work developed for four years led to 7 full-length articles, 4 international congress, and a short stay of 1.5 months at WWU-Universität Münster (Germany) in 2015.

Her experience in materials synthesis and characterization was further strengthened during her post-doctoral studies in Dr. Alemán's group at Autonomous University of Madrid (UAM). She led a new research line to hybridize nanocarbons with Covalent Organic Frameworks (COFs). This research culminates with her incorporation in Dr. de Pablo's group to conduct single-molecule studies on these innovative materials using Atomic Force Microscopy (AFM), elucidating the role of the hybrid interface in dictating structure-property relationships. A total of 5 full-length articles were published.

The fruitful postdoctoral stage at UAM allowed her to embark on a postdoctoral stay at ISTERre-Université Grenoble-Alpes (France). She moved to Grenoble and established a pioneering methodology to investigate the nano-wettability properties of natural rocks at their water interfaces. During this international stage, Dr. Moya acquired high maturity as an independent researcher coordinating an industrial collaboration project with TotalEnergies while publishing 4 full-length articles (one as first and corresponding author) and 2 more are in preparation.

In 2022, she was awarded the Maria Zambrano Atracción de Talento grant to join UAM as a senior postdoctoral researcher and with Junta de Andalucía postdoctoral fellowship (declined). Since 2022, she has been developing her own research line at the Department of Inorganic Chemistry at UAM, developing new COF-based photoactive materials for water remediation. During this time, she has had a oncological medical leave that has stopped her career for a while. Yet, she has published a total of 4 articles (3 as corresponding author) and 3 more are already submitted. Dr. Moya also achieved 4 projects as PI, receiving a total funding of 326.014 €.

In summary, Dr. Moya has 12+ years of research experience on synthesis, characterization and application of materials, coauthoring 20 articles (8 as first and 5 as corresponding author). 18/20 articles were published in Q1 journals with high impact index (2 PNAS, 1 ACS Appl. Mater. & Interfaces, 2 J. Appl. Cat. B: Environ, 1 J. Mater. Chem. A, 1 JCIS, 1 Carbon, 2 Nanoscale). The total number of citations is 576 (403 since 2020) and 2 highly cited articles, >100 citations (h-index = 10). During her career, she has participated in 10 research projects and has presented 10 oral and 7 poster talks at international and national scientific congress. She has achieved funding (326.014 €) for Soleil synchrotron, French embassy in Spain and Facultad de Ciencias at UAM. She has been serving as a reviewer for JCIS, ChemElectroChem, Toxics and external evaluator of H2020 projects. She has also supervised 3 TFM and 2 TFG students and participated in the formal teaching of the Inorganic Chemistry department at UAM and in outreach activities. She has been accredited as Profesor Contratado Doctor (ANECA).



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Ciencias y tecnologías químicas
Nombre: DÍAZ FERNÁNDEZ, ANA
Referencia: RYC2024-050861-I
Correo Electrónico: anadfdez@gmail.com
Título: Aptamer-based electrochemical sensors for clinical diagnosis: revolutionizing healthcare through precision medicine

Resumen de la Memoria:

My research career has focused on contributing to the improvement of early disease detection through the development of aptamer receptors and electrochemical sensors. A key strength of my scientific journey is its multidisciplinary nature, as I have worked in areas such as analytical chemistry, molecular biology, computational chemistry, DNA nanotechnology and medicinal chemistry.

Throughout my career, I have successfully initiated new lines of research and contributed to the three core stages in the development of sensing technologies: the selection of novel receptors, development of new electrochemical sensors and the clinical validation of the new diagnosis methods. Notably, I was pioneer in the selection of aptamers with binary recognition for glycoproteins, reporting the first aptamer with this characteristic. Additionally, I developed multiple sensors targeting various types of cancer and introduced a new diagnostic index for prostate cancer, with better performance and predictive power than ELISA (both in diagnosis and prognosis). Furthermore, I presented for the first time ELIDIS (enzyme-linked DNA displacement assay) a revolutionary approach for the electrochemical detection of antibodies. For the clinical validation and development of the sensing devices, I have collaborated closely with national and international public hospitals (Spain, Denmark) and industry partners (Merck, Arquimea) in translational projects.

My academic journey has taken me to five different institutions across Europe (Spain, UK, Denmark and Italy) where I have consistently secured independent funding at every stage of my career, including an AECC predoctoral grant, a Margarita Salas postdoctoral grant and competitive research contracts.

As an early-career researcher, I have acquired a strong multidisciplinary background in various fields and have been productive in all of them. All in all, I have demonstrated independence, maturity and leadership skills, positioning me as an ideal candidate for a Ramón y Cajal grant. With this opportunity, I am confident I can establish myself as an exceptional young group leader. My goal is to develop a sensing technology for health monitoring, focusing on disease diagnosis and drug monitoring, aiming to advance in precision medicine. This technology, which will employ aptamer-based electrochemical sensors, has the potential to address the current challenges hindering full translation to the biosanitary field through in vitro diagnostic (IVD) tests and directly within the human body using wearable devices. This will contribute to advance in fundamental and applied research in chemical sensing and contribute to better global health and lower healthcare costs.

Resumen del Currículum Vitae:

I have a BSc in Chemistry and a MSc in Analytical and Bioanalytical Sciences from UniOvi. Then, I obtained a PhD in Chemistry (International Mention, Cum Laude 2020) at the same university under the supervision of Prof. Lobo-Castan and Prof. de-los-Santos-Ivarez. During this period I completed a 3-month predoctoral stay in the Biosensors group of Prof. Estrela (University of Bath). As a postdoctoral researcher, worked in the group of Prof. di Lorenzo (University of Bath, 3 months), in the group of Dr. Ferapontova (Aarhus University, 1 year), and with Prof. Ricci (University of Rome, 1 year). This allowed me to further improve my knowledge and skills in the development of electrochemical sensors and DNA nanotechnology. In July 2023, I came back to Spain to joined Prof. Lobo Castan's lab where I am working with a ISPA senior postdoctoral contract.

My passion for science has always guided me to confront very challenging and risky projects. The high-level of my research career is supported by my scientific productivity, with 14 peer-reviewed articles. My h-index is 9 and I have >320 citations. I have participated in 24 (inter)national conferences and participated in the organization committee of one international conference (I Workshop on Electrochemical Devices. II Workshop Electrobionet). I have been independently funded at every stage of my career (7 grants/contracts). As a PhD student I was awarded the AECC predoctoral fellowship (3 years) and a Santander Bank mobility grant (3 months). As a postdoc, I received three competitive contracts (UK, Denmark and Spain), a Margarita Salas grant in 2022 (2 years) from Ministerio de Universidades, and a postdoctoral grant from ISPA (2025).

I have received 8 awards for my PhD (Extraordinary PhD award, best PhD thesis of the ISPA and San Alberto Magno Award), for my research (San Alberto Mago), at congresses (2 to the best poster) and for my dissemination activities (best poster and Con Nombre de Mujer award). Moreover, I was awarded with 3 finalist distinctions: science and technology researcher of the year (2024, Leadinggirls and Fundación Margarita Salas), 2021 Outstanding Scientific Article and SUSCHEM 2024 award in the category a investiga

I am a Volunteer for Science of the AECC and have participated in several activities for the general and specialised public: Week of Science, Concelas (ASEICA), lectures in high schools/public schools, responsible for dissemination workshops, European Researchers Night and poster presentations.

I am part of the review panel of Elsevier, Springer, Wiley, Frontiers and MDPI, and have experience as a reviewer in international journals (16 articles/year) such as Electrochimica Acta, Scientific Reports, Biosensors and Chemistry Select. I am guest editor for Sensors, Molecules and JoVE. I am a member of international committees such as the Portal Expert Database and the Slovak Research and Development Agency.

I have taught a total of 400 hours and I have the Profesor ayudante doctor accreditation by ANECA. I have supervised 15 students (BSc, MSc, PhD and Erasmus+) and I have 100 h of mentoring in the immersion days.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Cultura: filología, literatura y arte
Nombre: IBÁÑEZ ARISTONDO, MIGUEL
Referencia: RYC2024-049862-I
Correo Electrónico: mibarizt@gmail.com
Título: Ecological Humanities and Colonial Legacies in the Iberian World: 17th to 19th Centuries

Resumen de la Memoria:

Doctor por la Universidad de Columbia en Nueva York (2018), Profesor Contratado (Tenure-Track Assistant Professor) en el Departamento de Estudios Hispánicos de la Universidad de Villanova (Pensilvania, EE. UU.) (2019-diciembre 2023) e investigador con contrato María Zambrano en el Departamento de Historia Moderna e Historia Contemporánea de la Universidad Complutense de Madrid (enero 2023 - diciembre 2024), mi trayectoria académica se centra en los estudios coloniales y poscoloniales y las humanidades ecológicas. Mi investigación aborda el impacto de la expansión colonial y la mundialización ibérica en la temprana modernidad y el siglo XIX.

Mi vocación internacional ha sido una constante en mi carrera. En Francia, llevé a cabo una estancia en la ESCP Europe (2007-2009) que se prolongó al ser contratado como lector en el Institut d'Études Ibériques et Latino-Américaines de Paris IV Sorbonne (2009-2011). Posteriormente, en los EE. UU., completé un máster (2012) y un doctorado (2018) en la Graduate School of Arts and Sciences de la Universidad de Columbia en Nueva York. En el ámbito docente, he acumulado más de 1.700 horas de enseñanza en París (2009-2011), en Columbia (2011-2019), en Villanova (2019-2022) y en la Complutense (2023-2024), coordinando, diseñando e impartiendo cursos en historia, literatura, lengua y comunicación. Además, obtuve una beca para diseñar y desarrollar un curso sobre historia ambiental centrado en el contexto transatlántico (siglos XVI-XIX), que impartí desde 2020 en el programa Sustainability Studies de Villanova.

Hasta la fecha, he publicado ocho artículos revisados por pares, dos capítulos de libros y una monografía recientemente editada por Amsterdam University Press. Estas publicaciones abarcan una amplia gama de temas interdisciplinarios, combinando humanidades ecológicas, colonialismo, cultura y escritura en zonas de contacto, cultura visual. He presentado mi trabajo en 25 congresos y simposios, y he impartido conferencias invitadas en universidades como Cambridge, Ginebra, Uppsala y Barcelona. Asimismo, he organizado cuatro conferencias con profesores invitados, coorganizado un simposio internacional (Printed Afterlives, 2021), un ciclo de conferencias (Decolonial Ecologies, 2021) y una conferencia internacional (Defending the Land, 2022). En su conjunto, mi recorrido académico refleja un compromiso continuo con la investigación y la enseñanza interdisciplinaria. Mi experiencia internacional y mi enfoque en temáticas transversales como el colonialismo, la ecología humana, el capitalismo racial, y la globalización ibérica no solo amplían los horizontes de mis estudios, sino que también conectan tradiciones históricas y culturales diversas, abriendo nuevos caminos para el diálogo y la reflexión crítica.

Resumen del Currículum Vitae:

Obtuve mi doctorado en la Universidad de Columbia, Nueva York, en 2018, donde participé activamente en proyectos de investigación y docencia que enriquecieron mi formación académica. Durante mis estudios doctorales, impartí más de 500 horas de enseñanza en el Departamento de Estudios Latinoamericanos e Ibéricos (2011-2018), contribuyendo significativamente a la formación de estudiantes en este campo. Tras completar mi doctorado, trabajé como Lecturer en la Universidad de Columbia (2018-2019) antes de ser nombrado Profesor Asistente tenure-track en la Universidad de Villanova, una institución de prestigio cerca de Filadelfia. En Villanova, lideré iniciativas docentes e investigadoras innovadoras, acumulando otras 490 horas de enseñanza y desarrollando cursos interdisciplinarios como el primer módulo sobre Humanidades Ambientales en América Latina para el programa Sustainability Studies. Igualmente, he sido Investigador Visitante María Zambrano en la Universidad Complutense de Madrid hasta diciembre de 2024, desarrollando un proyecto sobre la Segunda Esclavitud en España y Cuba y participando como docente en el programa internacional Bachelor of Arts in European Studies (BAES).

Mi estancia en Francia (2007-2011) también fue fundamental en mi formación: completé un máster en la École des Hautes Études en Sciences Sociales (EHESS), una de las principales instituciones de investigación en Europa, y acumulé 410 horas de enseñanza como Lecteur en el Departamento de Estudios Latinoamericanos e Ibéricos de la Universidad de la Sorbona.

Más allá de las publicaciones enumeradas en mi CV, incluidas ocho revisadas por pares, capítulos de libros y mi disertación disponible en acceso abierto en Columbia Academic Commons, he publicado recientemente una monografía titulada Ecological Imperialism in Early Modern Spanish Narratives: Excavating the Environmental Footprint of Political Ideas in the Iberian Globalization. Asimismo, he presentado mi trabajo en más de 25 congresos y simposios, y he tenido el honor de impartir conferencias en instituciones de renombre como la Universidad de Harvard, Princeton, Cambridge y Ginebra.

En el ámbito de la organización académica, he dirigido cuatro conferencias con profesores invitados de prestigio, coorganizado el simposio internacional Printed Afterlives (2021), una serie de conferencias titulada Decolonial Ecologies (2021), y el congreso internacional Defending the Land (2022) en la Universidad de Villanova. Además, he obtenido tres financiaciones competitivas para el desarrollo de iniciativas pedagógicas en las universidades de Columbia y Villanova, reflejo de mi compromiso por integrar la investigación con la enseñanza y promover recursos educativos abiertos.

Mi trayectoria internacional y enfoque interdisciplinario no solo demuestran mi capacidad para generar impacto en diversos contextos académicos, sino que también subrayan mi compromiso con la innovación, el rigor investigativo y la colaboración global. Estos valores constituyen la base de mi motivación para contribuir de manera significativa a la comunidad RyC, aportando perspectivas diversas y enriquecedoras en los campos de la historia, la ecología y las humanidades.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Cultura: filología, literatura y arte

Nombre: HAVAS, ADAM

Referencia: RYC2024-048878-I

Correo Electrónico: adam.havas@ub.edu

Título: PhD

Resumen de la Memoria:

All migrations that cross state borders reconfigure existing structures of knowledge, collective identities and socially conditioned hierarchies of taste. This is especially true for diasporic music communities that develop context-sensitive strategies to navigate their positions of in-betweenness and multiple belonging. This is a comparative ethnographic project that recalibrates debates on the role of diasporic musics in shaping Europe's cultural fabric amidst the rise of right-wing populism, geopolitical tensions and climate crisis. By bridging ethnomusicology and cultural sociology, this multi-regional endeavor introduces a novel framework for understanding diasporic musical practices from a comparative perspective that has not been applied before: Afro-Latin Iberia and the Balkans. Based on a creative combination of relational, multi-sited and visual ethnographic techniques, biographical interviews and critical discourse analysis, the project explores how diaspora musicians within postcolonial Western and postimperial Southeastern Europe respond to new geopolitical realities and create diverse forms of artistic production. In doing so, it proposes a transperipheral perspective of the racial politics of various diasporic music scenes and how they reflect complex dynamics of social mobility, assimilation and marginalization. Although diasporic music is often celebrated for its cultural diversity and artistic innovation, such top-down narratives can obscure the historically and regionally rooted racial hierarchies and intersecting systems of structural inequalities that shape the lives of diaspora and migrant artists and condition their social, political and aesthetic agency. This research will reshape our understanding of how Europe's racial color lines are articulated and innovate debates on music's role in navigating geopolitical tensions, challenging essentialist views of migration, belonging and cultural production in Europe. The systematic comparison in will revolve around the following fundamental research domain, which synthesizes scene-based relations and geocultural stakes: Diaspora musicians' social, political and aesthetic agency in navigating intersecting systems of structural inequalities and their role in articulating and challenging Europe's racial color lines.

The research objectives related to this key domain aim to:

- ☐ Bridge cultural sociology and ethnomusicology to explore patterns of social mobility, marginalization and scene-based dynamics in an interdisciplinary framework;
- ☐ Analyze the impact of cultural policies and institutions on diaspora musicians' prospects;
- ☐ Compare music diasporas in Afro-Latin Iberia and the Balkans revealing how geocultural distinctions related to blackness, whiteness, otherness and Europeanness are expressed across multi-ethnic diasporic scene dynamics.

The project's breakthrough lies in recalibrating critical thinking on the cultural constructions of Europe from a transperipheral perspective, addressing racialized cultural distinctions rooted in Europe's colonial and imperial East-West divide, and reinscribing subaltern artistic and political epistemologies into sociological understandings of Europe's cultural dynamics. As such, it not only expands my research profile but elevates it to the next level by focusing on new genres (rap, salsa, batida) from a comparative perspective.

Resumen del Currículum Vitae:

Dr. Havas is a popular music scholar and sociologist, currently International Fellow at the Kulturwissenschaftliches Institut Essen, where his research explores the connections between popular music, globalization, and migration. His postdoctoral research as a Marie Curie Postdoctoral Fellow at the University of Barcelona, Department of Sociology (2022-2024) explored the cultural politics of musical diasporas in Europe with particular emphasis on of musicians with Afro-Latin, Black British and Romani backgrounds. Before joining The Center for the Study of Culture, Politics and Society (CECUPS), he was Head of Social Science Division at the Budapest-based Milestone Institute, a college of advanced studies ranked by the Telegraph as TOP 10 schools for getting to Oxbridge. He was Chair of IASPM-Hungary (2018-2020) and is currently a member of IASPM-AL, the editorial board at Jazz Research Journal (Equinox) and is managing editor of Replika social science quarterly. He co-edited with Bruce Johnson a special issue at Popular Music & Society on global jazz diasporas and co-edited the Routledge Companion to Diasporic Jazz Studies (Havas, Johnson and Horn 2025), a collection of 45 entries from over 50 authors from around the world. He is also co-editor of the forthcoming Bloomsbury Encyclopedia of Popular Music of the World (with John Shepherd and David Horn). His book, The Genesis and Structure of the Hungarian Jazz Diaspora (Routledge, 2022), lauded as "a courageous renewal of the Bourdieusian dialect of sociology, from the sidelines of European bourgeois modernity" and "a sparkling allegory for semiperipheral east-central Europe" by József Böröcz (Rutgers). It was shortlisted for the best monograph in 2023 by IASPM and received remarkable reviews in Popular Music & Society, Hungarian Studies (Penn State UP) and the journal of the Czech Academy of Sciences, Hudební věda. He gave numerous guest lectures at international institutions including The New School, Rutgers University, Central European University, Jazzinstitut Darmstadt, ERC-funded lecture series "Past and Present Musical Encounters Across the Strait of Gibraltar", University of Bristol, University of Manchester, Kunstuniversität Graz, University Carlos III, Complutense University of Madrid, Institut d'Estudis Catalans. His publications appeared in Popular Music (CUP), Jazz Research Journal and Jazz Research News among others. He gave guest lectures in various universities and research centres including The New School of Social Research, Rutgers University, University of Music and Performing Arts Graz, Universidad Complutense de Madrid and Birmingham City University. His has wide teaching, mentoring and supervising track record (currently he supervises a PhD project on salsa and musical globalization at UB). In 2019 he was the recipient of the Ferenc Erdei Price awarded to the most outstanding young sociologist of the year in Hungary. Adam is a keen advocate for academic autonomy and for a global perspective on structural inequalities and social change: This is evidenced by an essay published in LeftEast (2020) cited by highly ranked journals (Sociological Forum [Q1], East European Politics & Societies [Q2], Eastern Journal of European Studies [Q1], New Review of Academic Librarianship [Q1]) and a Palgrave volume. It has been presented at conferences (CEU, UniWien) and its reworked version has been accepted for publication at a Brill volume on global academic freedom.



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Turno General

Área Temática: Cultura: filología, literatura y arte
Nombre: CORDO RUSSO, LUCIANA
Referencia: RYC2024-048442-I
Correo Electrónico: lucordorusso@gmail.com
Título: Medieval Welsh Translations and their European Contexts

Resumen de la Memoria:

For the past fifteen years I have pursued a coherent research path devoted to the study of medieval Welsh translations as nodes of cultural transfer: points of intersection between languages (Latin, Anglo-Norman, Welsh), literary traditions, and cultural identities. Firmly based on the analysis of medieval texts, my work crosses several linguistic, cultural, and disciplinary boundaries. In this regard, my dissertation (2015) was pioneering in placing the textual analysis of two translations into Middle Welsh into a new larger conceptual framework of translation theory, which allowed for a more nuanced description of the now visible layers within the process of translation and of translation strategies, revealing different attitudes in the appropriation of French narrative matters in thirteenth-century Wales and common tendencies of translation across Europe. From this research stems a pervasive interest to situate medieval Welsh literature within the broader insular and European contexts, challenging the marginalisation of Welsh literature in current scholarly and popular understandings of European cultural heritage. In addition to formative and research stays at Cardiff University and KU Leuven, I have been working abroad since 2019: as Alexander von Humboldt Postdoctoral Researcher at the University of Marburg, as Lecturer in Celtic at Utrecht University in 2022/2023, and as British Academy Newton International Fellow at the University of Bristol since 2023. My most recent research projects describe a trajectory from the study of individual translations and careful comparison with their source texts (e.g. Welsh Charlemagne texts) to a comprehensive and transnational overview of an entire narrative matter. In effect, my Newton Fellowship, *Charlemagne in Wales: The Transmission, Reception, and Translation of Charlemagne Narratives in Medieval Wales*, studies for the first time all the Charlemagne material produced in Wales, creating new knowledge at the intersection of medieval Welsh, French, English, and Latin, using an innovative multidisciplinary methodology and theoretical developments within the fields of comparative medieval literature, linguistic approaches to translation, and translation studies. This has given my work a broader scope and a pan-European perspective. The results of these projects, published in internationally recognised journals and books, create new consensus about the Welsh Charlemagne texts, advance our understanding of the dissemination of the Charlemagne legend in the north of Europe, and break new ground on the role of Welsh translators and their varied strategies of translation.

The Welsh Chronicle of the Pseudo-Turpin will be the focus of my next project. Building on my preliminary work, I aim to create a scholarly digital edition of the Welsh version of the twelfth-century Latin chronicle and to provide new knowledge about the circulation and transmission of the Charlemagne legend in medieval Britain and Europe. This project will be the first to investigate how a particular version of the Latin chronicle *the C-recension* was transmitted, (re)interpreted and translated in medieval Wales, simultaneously comparing the Welsh and the other vernacular versions of the Latin C-recension (Middle English, Anglo-Norman, French, Irish). This will also lead to a reassessment of this important insular Latin version.

Resumen del Currículum Vitae:

I am a literary scholar specialising in medieval Welsh translations. My work, at the intersection of medieval Welsh, Anglo-Norman, Latin, and Middle English, crosses several linguistic, cultural, and disciplinary boundaries. I graduated from the Universidad de Buenos Aires (Licenciada en Letras, Profesora en Enseñanza Media y Superior en Letras, PhD in Literature) and I have been working abroad since 2019: first as Alexander von Humboldt Postdoctoral Researcher at the University of Marburg (hosted by Erich Poppe), then as Lecturer in Celtic at Utrecht University in 2022/2023 (where I obtained a Basic Teaching Qualification) and since 2023 as British Academy Newton International Fellow at the University of Bristol (hosted by Helen Fulton).

My doctoral dissertation was pioneering in comparing the strategies of translation of two thirteenth-century Middle Welsh translations of French-language narratives (the Welsh versions of Chretien de Troyes' *Yvain* and of *Chanson de Roland*) using a new larger conceptual framework of translation theory. I discussed partial results of my dissertation and the productivity of my methodology in five journal articles appearing in the period 2014-2019. As a postdoctoral researcher I focused on a largely understudied but important corpus: the Welsh Charlemagne material. My Humboldt fellowship was dedicated to the study of *Otuel* (the Welsh *Chanson d'Otinel*) whilst my current Newton Fellowship takes a global and transnational approach to the Charlemagne legend in Wales. The results of these projects have informed seven publications in prestigious journals and books, and a monograph in preparation: *Charlemagne in Wales: The Reception of the Charlemagne Legend in Medieval Wales*.

Publications that I have co-edited and co-authored and my participation in many projects demonstrate my ability to build successful collaborations. Moreover, I supervised, mentored, and participated in examination committees during my time in Utrecht, where I was also part of the organising committee of the XVIIth International Congress of Celtic Studies, attended by more than 300 delegates. The number of positions to which I have been elected or appointed, for example, in the Argentine Society of Medieval Studies or as Field Bibliographer for the Modern Language Association, demonstrate my contribution to the wider research community. I have also served as peer reviewer for prestigious journals and publishers, including University of Wales Press and SELIM. Lately I have served as reviewer for the British Academy. The invitations that I have received to be plenary lecturer and to give talks and deliver invited papers at international events attest to the recognition that I have attained in the field of Celtic Studies. My work furthermore promotes Welsh cultural heritage and minority languages by creating, for example, new readerships for medieval Welsh literature via books such as *Mabinogion. Relatos galeses medievales*, the first direct translation into Spanish of the eleven Middle Welsh prose tales.

My unique international background, both in teaching and research, and the ambition of my latest publications have greatly expanded my academic profile, giving me new visibility within Welsh and Celtic Studies, and positioning me as an innovative researcher and team player, an emerging research leader and mentor for more junior colleagues.



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Turno General

Área Temática: Cultura: filología, literatura y arte

Nombre: BLASKOVIC, MARIJA

Referencia: RYC2024-050408-I

Correo Electrónico: mar.fil.blaskovic@gmail.com

Título: Dr. phil. (Romance Studies)

Resumen de la Memoria:

I am a specialist in medieval Spanish literature and culture, although my research and teaching interests include post-1492 developments and New Spain around 1800, as well as their contemporary representations. Much of my work is linked by an interest in cultural memory and identity construction, the history of mentalities, and the notions of power, knowledge, violence, and gender.

In my PhD thesis, I rejected the established yet simplistic reading of the *Cantar de Mio Cid* as a contrast between low and high noblemen. Instead, I mobilized different European traditions and trends to read the poem, on the one hand, as an early example of a multifaceted curialization of heroic tradition and, on the other hand, as indicative and reflective of the changes experienced by the lay nobility associated with the court of Alfonso VIII and Leonor Plantagenet. Iberoamericana published my monography *Potenciales polifónicos: la nobleza del Cantar de Mio Cid* in 2020.

Due to long lockdowns, I was unable to conduct my project on gender and materiality in New Spain in 1800s. However, thanks to a self-initiated and intensive exposure to digital humanities, I conceptualized a project on women in Iberian chronicles to be explored via digital methods, for which I received the Beatriu de Pinós fellowship. Based on an elaborated version of the project, titled *FEMiber*, which included collaborations with the GLAM sector, I was awarded the Marie Skłodowska-Curie Actions postdoctoral fellowship (2023-2025). Hosted at the Univ. Pompeu Fabra, under the guidance of Prof. María Morrás, I published an innovative prosopographical database of all women mentioned in the *Crónica de Castilla* (ca. 1300), and I adapted it into an interactive research and educational platform. In the second phase of my project, I am preparing a historical network research of the Portuguese genealogy *Livro de Linhagens do Deão* (ca. 1343) while collaborating with Brown's project *Stolen Relations* on their (museum) storytelling based on the records of enslaved Indigenous people. In the future, I would like to continue to advance the field of Medieval Iberian Studies but also carry out a diachronic analysis of Indigenous representations, as well as study the roles of the Middle Ages in modern-day media.

I am strongly committed to Open Science: 8 out of my 9 articles are open access, next to publishing the database and its guidelines online and on open repositories. I have published studies in Q1 journals *Studia Historica*, *Historia Medieval*, *Anuario de Estudios Medievales*, *Bulletin of Hispanic Studies*, and *Journal of Medieval Iberian Studies*, as well as in two Q3 journals: *Medieval Encounters* and *Digital Studies/Champ numérique*.

Resumen del Currículum Vitae:

After a four-year diploma program at the University of Belgrade, I completed the MA in Languages and Cultures of Iberoromania (2013) and PhD studies in Romance Studies (2018) with highest honors at the University of Vienna. Throughout my student years, my progress was externally funded and internationally acknowledged, and I was the only Iberianist chosen to be a Fellow of the Viennese Doctoral Medieval Academy (2016-2018). I secured a postdoctoral contract at the Department of Romance Studies at the University of Vienna in 2019 but, due to the pandemic, I was unable to conduct my research in museums and libraries in Mexico and Spain. I reoriented my research toward new topics and materials from the Middle Ages, and I immersed myself in the world of digital humanities. Due to this significant shift, I was awarded two highly competitive postdoctoral fellowships: the Catalan Beatriu de Pinós fellowship and EC's Marie Skłodowska-Curie Actions fellowship (March 2023 – August 2025). Ever since mid-2022, I have been working at the Humanities Department at the University Pompeu Fabra, where I carry out my prosopography-centered research and teach courses in Literary Studies and Digital Humanities. Within these two fellowships, I have also contributed to major international projects, such as Fordham's *Medieval Londoners* and *Stolen Relations* (Brown Univ.). With ample teaching experience in Vienna and Barcelona (since 2016) and supervision of five BA theses, I also coordinate the seminar *Premodern Digital Textualities* and conduct an 8M workshop on medieval women and data at the UPF's Center for Digital Humanities. From March to September 2025, I will be placed at a company DIGIBIS, whose training in digitization of cultural heritage will boost my cross-sectoral profile.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Cultura: filología, literatura y arte
Nombre: DEBEUSSCHER, JULIANE MARIE
Referencia: RYC2024-048825-I
Correo Electrónico: juliane.debeusscher@gmail.com
Título: Exhibition practices and strategies in the Spanish state from 1972 to 1992. Spaces, scales and fractures.

Resumen de la Memoria:

I am an art historian, currently associated researcher in the Laboratoire de Recherche Historique Rhône Alpes (Research unit of the CNRS, France). Between 2022 and 2024, I was a Juan de la Cierva postdoctoral researcher in the Dept. of Art History and Theory at the Universidad Autónoma de Madrid. In the Fall 2024, I held the position of Visiting Research Fellow at the Centre for Modern Art & Theory at Masaryk University in Brno, Czech Republic and led the project "Drawing exhibitions in and from Czechoslovakia during the Cold War". My academic and professional trajectory has developed at the intersection of art history (20th and 21st c.), social history and cultural and visual studies, which I approach from a resolutely transnational perspective. I have contributed to expand this field with my research centered on cultural circulation and exchange across Cold War Europe, with a focus on relations between Southern Europe (Spain, France, Italy) and Eastern Europe (Poland, Czechoslovakia and Hungary) that is unique in the Spanish academic context and beyond. It is exposed in my forthcoming book *Negotiated Encounters in Cold War Europe: Networks and Exhibitions 1965-1981* (Liverpool University Press, end 2025), which contributes to fill an important gap by examining lesser-known visual and critical interactions between the two regional art scenes in the 1970s. Contributions to outstanding international journals (*Stedelijk Studies*, *Römisches Jahrbuch der Bibliotheca Hertziana*, *Journal of Contemporary Central and Eastern Europe*, *Revista de Estudios Globales y Arte Contemporáneo*, *ArtMargins* online and *Afterall*) and edited books (*Revolver*, Palgrave Macmillan, *INHA/Les Presses du Réel*, *Brumaria*, *Tirant Lo Blanch*, Eds. *Complutense* (forthcoming), *De Gruyter* (forthcoming)) have contributed to forge a solid and coherent line of work, recognized by my peers in the field of contemporary art history. The history of exhibitions has been a constant thread running through my work and I have gained recognition in this field as a project leader (4 individual research projects funded by the French Ministry of Culture, 2010; Max Planck and Max Weber Foundations, 2021; Spanish Ministry of Science, Innovation and Universities, 2022-2024 and Masaryk University 2024) and by developing individual lines of research as a member of competitive international and national projects including *Decentralized Modernities* (HAR2017-82755-P and HAR2014-53834-P), *Confrontations. Sessions in European Art History* (Getty Foundation U.S.A./UCL, U.K.) and *Equipo Comunicación: edición, crítica cultural y antifranquismo, 1969-1979* (322-MD-2023). Over my research, I have gathered a unique corpus of archival, documentary and oral sources I shared in publications, public activities and teaching. Thanks to my linguistic skills, I have contributed to their transmission to new academic and general audiences. I am committed to increasing accessibility through different formats and digital humanities resources, and the organization of scientific and dissemination activities (seminars at Autonomous University of Madrid, University of Barcelona, Université Grenoble Alpes). My current line of research will shed new light on exhibition practices in the Spanish State (1972-1992) in relation to local, national and international dynamics and spaces.

Resumen del Currículum Vitae:

I received my PhD from the University of Barcelona and the University of Grenoble Alpes (international cotutela, 2021) and was supported by a FPI grant from the Spanish Ministry of Economy and Competitiveness. My research focuses on the history of artistic relations and exhibitions in Cold War and post-1989 Europe, from a transnational and multidisciplinary perspective. I study personal, critical and institutional networks and their dynamics, with particular attention to exchange and circulation between Eastern and Southern Europe, with occasional forays into South and North America. I have contributed to the field with my publications (1 forthcoming book, 1 coedited journal issue, 7 peer reviewed articles in international journals, 12 book chapters, more than 20 articles of dissemination, interviews and reviews, 4 translations) and the participation in more than 25 international and national conferences and seminars. Between 2004 and 2016, I worked in cultural public and private organisations in Italy and Spain, alongside freelance research, curating and translation. These years of extra-academic experience have enriched my career by exposing me to the challenges of cultural production and to other professional sectors, and they nourish my current approach to academic research and its relationship with society. As a project leader, I have been awarded prestigious grants and contracts by national and international institutions, including a Juan de la Cierva fellowship at the Universidad Autónoma de Madrid (2022-2024), a Paris x Rome Fellowship (2021), a FPI grant (2016-2020), a Grant for authors and art critics from the French Ministry of Culture (2010). My career has developed internationally between Spain, France and Italy and I have realized funded research residencies at Masaryk University in Brno, Czech Republic (2024), the German Centre for Art History in Paris (2017 and 2021), the Bibliotheca Hertziana in Rome (2021), the MACBA in Barcelona (2015) and the Open Society Archive in Budapest (2010-2011). I have participated in 8 national and international competitive research projects (4 as a PI), and I am a member of research groups and networks including the Laboratoire de Recherche Historique Rhône Alpes and the Red Española de Investigación sobre Europa Central y Oriental. I have lectured, participated in innovative teaching projects and organized scientific activities at the Autonomous University of Madrid, the University of Barcelona and the University of Grenoble Alpes, many of them addressed to young researchers and focused on methodological issues. I was invited to give conferences in Spain and abroad and to moderate conference panels, I have participated in PhD juries and selection committees, and I have been a peer reviewer for academic journals (including *Anales de Historia del Arte*, *Boletín de Arte*) and publishers (CSIC editions and *Ca' Foscari* editions). In 2022, I was qualified by the Centre National des Universités (France) for the position of "Maître de conférence".



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Cultura: filología, literatura y arte
Nombre: RANGEL DE LÁZARO, GIZÉH
Referencia: RYC2024-051368-I
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Título: "Global Museums and Collections"

Resumen de la Memoria:

My cross-disciplinary expertise, museistics, study of the past, and education applied to the study of anthropological, archaeological, and natural sciences museum collections sets me apart from other researchers. I have explored the value of museum collections and digital heritage using cutting-edge technologies. My publication record includes 19 peer-reviewed articles in international journals and edited books (h-index of 6 and 82.5% of my publications in the top 25% of journal percentiles). My research focuses on transparency, replication, and open data, and I take pride in my contribution to creating open research. I have designed and delivered high-quality teaching integrating virtual collections and natural sciences museums. I have collaborated with end-users of research results, including students, industry partners, and researchers, to facilitate knowledge exchange and apply research outcomes outside academia. I have secured external grants from recognised institutions and generated substantial income to support research and knowledge exchange.

The research line "Global Museums and Collections" I will develop during the grant investigates how anthropological, archaeological, and natural science museum collections can be curated to construct and convey universal narratives. Its goal is to bridge diverse chronologies and geographies, highlighting the interconnectedness of human history and the natural world. Acknowledging that museum objects and specimens have multiple meanings shaped by various contexts, this proposal integrates innovative technologies such as 3D modelling, XR, and AI to develop new curatorial and research methodologies. Incorporating these technologies will significantly enhance visitor engagement, democratise heritage access, and foster interactive learning experiences.

Resumen del Currículum Vitae:

Through the lens of these disciplines, I explore anthropological, archaeological, and natural sciences museum collections using cutting-edge technologies to uncover new perspectives for understanding heritage. I integrate these methods in my lectures, empowering learners with interdisciplinary approaches, fostering critical thinking, and promoting collaborative knowledge. Currently, I serve as a Senior Lecturer (professor titular) in Museum Studies and the Programme Director for the Master and Postgraduate Diploma in Museum Studies at SOAS, University of London. My track record includes securing competitive public grants from the Wenner-Gren Foundation, the Leverhulme Trust, and the Erasmus Mundus program from the European Commission. Furthermore, I have obtained funding to incorporate extended reality (XR) resources in the design of museum spaces. As the deputy leader of a work package representing the European Distance and E-Learning Network in a project funded by the European Commission, I have introduced artificial intelligence (AI) tools into educational programs. The research lines I will develop comprise the holistic curation of anthropological, archaeological, and natural science museum collections to construct and convey universal narratives. This research aims to integrate cutting-edge technologies, including 3D modelling, XR, and AI, to create new curatorial and research methodologies. The outcomes will not only challenge established museum practices by improving visitor engagement, democratising access to heritage, and encouraging interactive learning experiences, but they will also facilitate a deeper appreciation of the complexities within contemporary society, highlighting the multiplicity, fluidity, and co-creation of meaning.



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Turno General

Área Temática: Cultura: filología, literatura y arte
Nombre: RENEDO MIRAMBELL, CLARA
Referencia: RYC2024-049737-I
Correo Electrónico: clararenedo@gmail.com
Título: The Latin Hagiographic Textual Tradition in Medieval Catalonia

Resumen de la Memoria:

My research trajectory started with the TITULUS project, developing a pioneering encoding model for medieval epigraphy, publishing an encoding manual and organizing training workshops, and being invited to participate in key international projects like BIBLISSIMA+ (12M €) and Graff-IT (2.5M €) given my expertise in Digital Humanities. In my PhD I studied a Carolingian hagiographic manuscript and prepared a praised digital scholarly edition of it. Finally, as a postdoctoral fellow, I studied a corpus of hagiographic manuscripts from the Barcelona Cathedral, highlighting the many research opportunities offered by the current under exploration of Latin hagiographic sources in the Iberian Peninsula. My multidisciplinary approach, combining Classical Philology, Medieval Latin Hagiography, and Digital Humanities, has enabled me to apply innovative research methods and contribute valuable insights to the field.

The proposed research line focuses on a comprehensive study of the Latin hagiographic textual tradition in Medieval Catalonia. It aims to systematically examine and analyse manuscript sources, many of which are unexplored. This will be followed by critical editions of key texts. Using a mixed-methods approach, combining philological techniques with palaeography, codicology, and Digital Humanities, the study seeks to understand the context of manuscript creation and circulation, and how these factors shaped the texts.

The research is structured around two main axes: the study of the manuscript tradition and the critical edition of selected hagiographic texts. The first axis aims to fill a significant gap in existing scholarship by examining the transmission of Latin hagiographic texts in Medieval Catalonia. This involves evaluating how hybrid collections influenced the choice, order, length, and final form of hagiographic works. The research will focus on office lectionaries containing the sanctorale and supplemented copies of authorial hagiographic collections, such as the *Legenda aurea*. This will involve systematic philological identification of texts and full manuscript analysis, with particular attention to the configuration of each collection. The second axis will build on the findings of the first, identifying hagiographic dossiers and textual versions that remain unpublished, insufficiently studied, or unknown to researchers. The objectives include uncovering previously unknown texts and textual versions, particularly those with local or regional significance. The research will highlight the weight of the Catalan and Spanish tradition in the circulation of certain texts, leading to the creation of new critical editions and studies. Prioritization will be given to texts with significant local interest or those representing groundbreaking steps in understanding their tradition. The critical editions will be prepared in XML-TEI format, ensuring longevity and accessibility.

The expected results include journal articles, critical editions, translations of Latin hagiographic texts, and a monograph. The research will be shared through academic and public presentations. Scientifically, it will enhance understanding of Latin hagiographic text circulation in Catalonia and advance methodologies for studying these texts. Societally, it will valorise national patrimony and engage the public in discussions about saints and regional identities.

Resumen del Currículum Vitae:

I have developed my career in Latin Philology and Medieval History, focusing on Latin Hagiography, Manuscript Studies, and Digital Humanities. After having graduated in Classical Philology at Universitat de Barcelona (2013, extraordinary prize), I first pursued a master's degree in cultural heritage at ENSIB in Lyons (2014), the leading grande école in France for library curators. In 2014 I was admitted to the highly selective master's degree "Technologies numériques appliquées à l'histoire" at École nationale des chartes in Paris, one of the world's leading institutions in the field of heritage conservation. I graduated in 2016 with a "Mention Très Bien" (top grade), and 1st in my class. During my PhD (2016-2021) and after winning the single competitive contract offered at École nationale des chartes, I focused on the study and electronic critical edition of Reims, BM, Ms. 1395, a Carolingian manuscript from the Hincmar scriptorium in Reims, containing a unique hagiographic collection. This was the first thesis in France on a medieval Latin hagiographic collection and was praised by the jury for its solid philological analysis, and for its innovative application of quantitative methods. This work is under review for publication and has generated multiple outputs.

As a postdoctoral fellow at Universitat Autònoma de Barcelona (2021-2024), supported by the Jean-Walter Zeldidja scholarship and Margarita Salas grant, and later at the Austrian Academy of Sciences (2024), I researched the circulation of Carolingian manuscripts between southern Gaul and Catalonia. I contributed to the "Carolingian Culture in Septimania and Catalonia" international project, of which I was a member, presenting findings at international conferences, already submitted for publication. I also developed an independent research line on Barcelona Cathedral's hagiographic manuscripts, fostering international collaborations with institutions in France and Germany. In 2024 I was a visiting scholar at FOVOG - TU Dresden. This research stay helped me lay the groundwork for a longer and deeper international collaboration.

Additionally, throughout my whole career I have made significant contributions to the Digital Humanities. In 2016 I co-founded the project TITULUS, which I have co-led since, at the Centre d'études supérieures de civilisation médiévale (CESCM) in Poitiers. It is a highly innovative and unique project designed to make all Medieval epigraphic sources in France accessible online [<https://titulus.huma-num.fr>]. As part of the project, I developed a pioneering encoding model for the scientific edition of medieval epigraphy, now recognized as a reference in the field and with published guidelines. This work allowed me to establish prestigious international collaborations in large-scale Digital Humanities projects like BIBLISSIMA+ and Graff-IT.

Finally, since starting my research career I have also actively engaged in teaching Latin Philology and Digital Humanities in five different universities, nationally and internationally. Furthermore, I have held several research workshops in electronic edition and Medieval Latin Philology and participated in the organization of national and international conferences.

This overall trajectory has earned me the French "Maître de conférences" accreditation (equivalent to "acreditación de profesor titular" in Spain).



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Turno General

Área Temática:

Cultura: filología, literatura y arte

Nombre:

GRANDÃO VALÉRIO, MIGUEL FILIPE

Referencia:

RYC2024-048319-I

Correo Electrónico:

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Título:

New ways in undeciphered scripts from the Aegean and Cyprus

Resumen de la Memoria:

With 18 years of research experience across three countries, I have built a strong academic trajectory, marked by over 60 publications, participation in several funded R+D projects, directing fieldwork, and receiving the III National Prize of Archaeology (2023). The competitive María Zambrano "Attraction of International Talent" grant (2022-24) further highlights the importance of mobility and internationalization in my career.

My work has primarily focused on early and undeciphered writing systems, with additional forays into the archaeology of Bronze Age early state societies. Through the Ramón y Cajal Ayudas, I aim to address crucial questions of origins and decipherment, concentrating on three undeciphered scripts from the Aegean and Cyprus that feature prominently among my contributions: Cretan Hieroglyphic, Linear A (Minoan Crete), and Cypro-Minoan (Late Bronze Age Cyprus).

Objective 1 is "The Nature of Cretan Hieroglyphic". While traditionally classed as a logo-syllabic script, my recent research suggests that Cretan Hieroglyphic (ca. 2000-1700 BCE) may lack a system of fully developed phonetic signs. This hypothesis requires systematic testing through internal, distributional, and statistical analyses of signs through an updated corpus, as well as comparisons with the patterning of phonetic and non-phonetic notations. A non-phonetic classification would reshape our understanding of the origins of writing in Crete, its relationship with Linear A, and the emergence of phonetic writing in the Aegean.

Objective 2 is "Making Progress with Linear A Vocabulary". Linear A (ca. 1700-1425 BCE) remains undeciphered because its language is obscure, but it is widely accepted that its signs can be read approximately through the values of Mycenaean Linear B. Building on previous research, I aim to systematically map and categorize its vocabulary from ca. 1,500 inscriptions into functional groups such as transaction terms, personal and place names, designations of people, etc. This unprecedented approach, guided by contextual analysis, will lay a rigorous foundation for understanding Linear A texts.

Objective 3 is "Refining Cypro-Minoan Phonetic Values". In previous work, I proposed phonetic values for most Cypro-Minoan signs, supporting identifications of personal names known from (external) cuneiform sources, as well as one grammatical suffix. The next phase involves testing these phonetic values through more sophisticated statistical methods and by exploring new comparative evidence.

As regards feasibility, my background equips me to handle the methodological challenges of undeciphered scripts: (1) rigorous methodological training under I.-X. Adiego, a renowned co-decipherer of the Carian alphabet; (2) first-hand epigraphic experience in the autopsy, digitization and drawing of inscriptions at institutions like the museums of Heraklion and Knossos and the Louvre Museum; (3) proven track record in identifying and re-publishing Cypro-Minoan inscriptions.

In addition to the scientific impact in terms of advancing our knowledge of these undeciphered scripts, the foreseen output is at least two monographs and 15 peer-reviewed articles. Dissemination plans (in commitment with open science) include organizing an international conference on writing and decipherment, participation in academic events, popular science writing, and digital outreach.

Resumen del Currículum Vitae:

Trained as an archaeologist in his native Portugal, Miguel Valério later specialized in Aegean prehistory, Bronze Age archaeology, undeciphered scripts, and the origins of writing. He earned a full 4-year scholarship from the Portuguese Ministry of Education to pursue his predoctoral studies at the University of Barcelona (2012-2016). With his PhD, he has contributed groundbreaking research on the Cypro-Minoan script from Bronze Age Cyprus, providing significant evidence that it is a single script system, and proposing phonetic readings supported by onomastic identifications.

His more than 8 years of postdoctoral trajectory include competitive positions such as a Juan de la Cierva Formación contract (Spain), a Junior Assistant Professorship at Università di Bologna as part of a European Research Council project (Italy), and a prestigious EU-funded María Zambrano "Attraction of International Talent" fellowship (Spain). In addition to being a holder of these grants, Valério has also been a team member of several R+D projects funded through competitive public calls. He has published numerous articles in high-impact peer-reviewed journals and chapters in books by prestigious publishers such as Oxford and Cambridge University Press. His main postdoctoral contributions include groundbreaking work on the undeciphered Linear A and Cretan Hieroglyphic scripts, novel hypotheses on Anatolian Hieroglyphs and the Rongorongo script from Easter Island, and insights into Bronze Age state formation.

Valério has over 700 hours of mentoring students and teaching Aegean Civilizations at the University of Bologna. He has supervised dissertations and organized international conferences and seminars. His practical experience spans directing excavations in Spain and conducting fieldwork in Syria. Additionally, he founded the peer-reviewed journal Kubaba and has actively collaborated in other initiatives, including advising for encoding ancient scripts in Unicode format. As a testament to his leadership and expertise in knowledge transfer, he served as the Legal Entity Representative for the lead partner in an EU-funded cooperation project (CRAFTER) under the Creative Europe program (2018-2019).

His excellence has been recognized with honors such as the III National Award of Archaeology and Palaeontology (Fundación Palarq, €80,000), and he is a sought-after speaker at global conferences, regularly invited to present at institutions like the University of Cambridge, or the Institute of Education in London. He has significantly contributed to public archaeology and cultural heritage dissemination through appearances in the media, documentaries, popular science writing, and contributions to exhibitions. Currently, he remains an active member of the Arqueoecologia Social Mediterrània (ASOME) research group at the Universitat Autònoma de Barcelona (a distinguished SGR group). He is also an external member of the Institute of Near Eastern Studies (IPOA) at the Universitat de Barcelona.



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Turno General

Área Temática: Cultura: filología, literatura y arte
Nombre: SÁNCHEZ GARCÍA, MANUEL
Referencia: RYC2024-049087-I
Correo Electrónico: manuel.sagarcia@upm.es
Título: #NETLAWSCAPES - NETworking LAWSCAPES: Colonial Law and Urban Landscapes in the Spanish Empire
Resumen de la Memoria:

NetLawscapes comes preceded by three previous stages, including the PhD dissertation "Siblings Overseas" at Politecnico di Torino Siblings Overseas (2018-2022) and the candidate's first postdoc appointment at Dumbarton Oaks (Harvard, 2022-2023), where the project's narrative was re-defined under the concept of Lawscape. At the present time, the candidate is developing "The Lawscapes Survey project" under the JdC program, which spread the scope to new case studies and serves as a solid foundation for this RyC proposal.

NetLawscapes is its natural next-step, focusing on cities founded by Spanish colonists in America, which followed strict planning instructions from as early as 1502. Spanish foundational protocols for new towns required a thorough written record for every action taken, duly signed by officials and witnesses so cities could be officially acknowledged overseas and justify claims over land property, nobiliary titles, and native forced workers. Many of these documents featured foundational plans and maps of which only a handful survive, often separated from their original documental context of notarial nature. Consequently, while these plans are crucial sources for Spanish colonial history, their study is usually disjointed or just barely connected to their much wider set of supporting manuscripts. Acquiring a deeper knowledge about this connection is urgent in terms of heritage conservation and cultural memory, specially in the cases of former colonial capitals now approaching the 500th anniversary of their foundation: Santa Marta (1525), Maracaibo (1529), Puebla (1531), Quito (1534), Lima (1535), Buenos Aires (1536), Bogotá (1539), and Santiago (1541), among many others.

The NetLawScapes project's main objective is to heal this divide between legal records and foundational plans "between law and landscape" through a new hybrid research methodology and a network of specialized emerging scholars. To achieve this, the project has been structured into four key actions. It will first seek the further development and consolidation of the Lawscapes methodology, including advanced research in order to combine techniques from the architecture field with early modern history methods, including visual analysis, paleographic analysis, text-mining, and close readings. Simultaneously, the Lawscapes survey advanced in previous research stages will be expanded through new case studies, archival visits, and field work. This set of innovative methods will be implemented at the project's host institution through a Lawscapes research training group, including activities with undergraduate, graduate, and PhD students of architecture and other disciplines. Finally, the project will expand its reach by creating the first International Lawscapes Network, gathering emerging scholars specialized on connecting law and landscape across a diverse range of geographies and time periods. The outcomes of these 4 actions will be made publicly available through an Open Access Lawscapes digital platform and specific communication activities.

As a result, this research will establish a groundbreaking transdisciplinary approach for early modern urban studies, while providing a new historical perspective on the agency of Spanish colonial administrators in terms of urban planning, social regulation, policy making, racial control, gender, and environmental change.

Resumen del Currículum Vitae:

Juan de la Cierva fellow at Universidad Politécnica de Madrid, Escuela Técnica Superior de Arquitectura, since January 1, 2024. Accredited by ANECA for the figures of Profesor Ayudante Doctor (PAD), Profesor Contratado Doctor (PCD) and Profesor de Universidad Privada (2023).

PhD of Architectural History (Politecnico di Torino, 2022), PhD of Art History (Universidad de Granada, 2022), Masters in Architecture (Universidad de los Andes, 2016) and licensed Architect (Universidad de Granada, 2013). Research Fellow at Dumbarton Oaks, Harvard University (2022-23). Adjunct Prof. at Universidad de los Andes (2016-2018) and TA at Politecnico di Torino (2020-22).

Associate Editor of Architectural Histories, the journal of the European Architectural History Network (2021-24). Member of research groups GIPC (UPM) and HUM-813 (UGR).

Manuel's scientific career spans over more than a decade. His main scientific contributions deal with the history of early modern architecture, landscape, and urbanism in the Spanish Empire. His work interrogates cartography and legal sources through the concept of Lawscape, combining graphic-based methodologies with paleographic analysis and close readings of original notarial records. He has presented this methodology in Open Access journals such as *Studia Historica: Historia Moderna* (2022) [SJR Q2] and *EGA* (2023) [SJR Q1]. His forthcoming monograph "Lawscapes", in development for Princeton Univ. Press, is built upon these precedents. Today, he continues his research as JdC fellow at ETSAM-UPM, participating in teaching/mentoring activities, chairing sessions at the most relevant conferences in his field (SAH, EAHN), and developing a special issue proposal for *Colonial Latin American Review* [SJR Q1]. He has also published chapters in vols. edited by Sevilla Univ. Press (2024) [SPI Q2, Open Access] and Routledge (2025) [SPI Int. Q1]. In April 2024, he received the EU Commission Horizon-Europe Seal of Excellence for a MSCA-PF proposal on this line of research. Awardee of the 2025 RSA-Samuel H. Kress Research Fellowship in Renaissance Art History by the Renaissance Society of America.

In parallel to this work, he also develops research on 20th-c. architecture magazines and virtual architectures in the video game industry. This last topic has led to several peer-reviewed articles and vol. chapters, an edited special issue for *Culture&History Digital Journal* (2020) [SJR Q2], and keynote lectures at scientific events.



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Turno General

His research and communication activities translate to society through his digital brand “Manuel Saga” and media such as National Geographic Historia. His work translates to teaching programs developed during COVID19, including the Open Access module Roots of Global Hispanic Urbanism funded by GAHTC (MIT), and the MOOC Historia global de la Arquitectura Islámica with 5.000+ students in EdX.

Since 2017, he has co-supervised 1 Master dissertation and 13 undergraduate dissertations, leading to the creation of a new TFG focus group on Architecture and Game Studies at UGR in 2019, the first of its kind in Spain. He has participated in evaluation panels for TFG/TFM at Spanish, Colombian and US institutions, and one PhD dissertation panel at Pontificia Universidad Católica de Chile, while spreading his mentoring efforts through networks such as DocTalks in collaboration with MoMA’s Ambasz Institute (NY).



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Turno General

Área Temática: Cultura: filología, literatura y arte
Nombre: BARBERINI, FABIO
Referencia: RYC2024-051085-I
Correo Electrónico: fbobarb@gmail.com
Título: Cultural Relations in 13th C. Iberian. A Study of the Crown of Aragon, Castile and Portugal (DB and Map)

Resumen de la Memoria:

This research "Cultural Relations in 13th C. Iberian. A Study of the Crown of Aragon, Castile and Portugal (DB and Map)", funded by the RyC contract, aims to study the cultural relations between the Crown of Aragon and the Kingdoms of Aragon, Castile and Portugal in the late 13th C. This period was crucial in shaping Iberian identity, yet there is no comprehensive study of the interactions between Iberian cultural and political centers. Previous work has focused on Occitan-Catalan and Galician-Portuguese lyric poetry, but their mutual influence remains understudied, particularly in the context of the Catalan-Aragonese courts.

The project will analyze multilingual poetry circulating in the 13th and 14th C, focusing on key rulers' courts, such as those of James I of Aragon, Alfonso X of Castile, and Alfonso III of Portugal. These courts were centers of cultural exchange, and poetry played a role in political alliances and royal legitimacy. The study will integrate philology, history, art history, and diplomacy to uncover the political subtexts in these texts and challenge the view of Galician-Portuguese poetry as a homogeneous tradition.

The research will include several actions, such as examining manuscript traditions in libraries and archives, creating a digital edition of the texts for long-term preservation and accessibility, and using geospatial visualization to explore the political, cultural, and literary dynamics of the period. Comparative literature analysis will extend to other medieval literary genres, offering a more comprehensive understanding of medieval Iberian and European literary traditions. Collaborations with experts from various universities will support a multidisciplinary approach.

The project will disseminate its findings through international colloquiums, workshops, journal articles, and a monograph. Collaboration with institutions such as the University of Toulouse will extend the project's impact and support the application for an ERC Synergy Grant. A detailed timeline outlines the project's progress, with key activities focused on analyzing lyric poetry, organizing symposia, and publishing results over five years.

In conclusion, this research will provide valuable insights into the cultural and political dynamics of medieval Iberia, enhancing our understanding of Iberian and European identity formation and the role of poetry in shaping political, religious, and cultural exchanges. The combination of sustained funding and international collaboration will significantly increase the project's impact.

Resumen del Currículum Vitae:

As a Romance philologist, my research spans a broad range of interests within Romance literature, focusing on three main areas: 1) Occitan and Catalan troubadour poetry and its manuscript tradition; 2) Galician-Portuguese poetry; 3) Modern and contemporary Portuguese literature. My work integrates literature and manuscript studies, exploring both medieval and contemporary Romance cultures to illuminate textual problems, exegetical challenges, and the dynamics of cultural transfer and influence. I focus especially on political and religious textualities, as well as contexts of cultural conflicts and power struggles.

In Occitan and Catalan studies, I have analyzed the political poetry of the troubadours, investigating how ideological discourse is constructed, and I have proposed a re-evaluation of medieval propaganda. Drawing on tools from Romance philology and European political, cultural, and social history, I offer new interpretations of lyrical texts. My research also focuses on lesser-known troubadours and aspects of manuscript traditions, publishing the first critical edition of Rostainh Berenguier de Marseilha's work. Additionally, I have explored Catalan treatises on troubadour poetics, which offer insights into the Occitan sources circulating in Catalan regions, and I have initiated research on non-lyrical troubadour texts transmitted exclusively by Catalan MS.

In Galician-Portuguese studies, my work has concentrated on two areas: 1) authorship issues in the Ajuda songbook and 2) the codicological study of the Colocci-Brancuti and Vatican songbooks. My methodology combines philological analysis with codicological studies, producing innovative results, including new attributions and hypotheses about the MS copying traditions. I have reconstructed the lost source of these songbooks and contributed to reopening significant debates within the field.

For modern and contemporary Portuguese literature, my research includes Eugénio de Andrade's poetry, the reception of Federico García Lorca in Portugal, and Portuguese literature of the 16th century. In studying Andrade, I have applied genetic philology and translation studies while considering the cultural and political context of Lorca's influence on intellectuals opposing the Salazar regime.

Currently, as PI of a Beatriu de Pinós fellowship, I lead the Trob-IB project, which investigates Catalan courts as places of literary production and reception, using digital humanities tools to map literary networks and political influence. I also coordinate the Iberian sector of the international EPOC-S project, which focuses on the Occitan epic and its cultural intersections.

I have demonstrated leadership in research and organization, including co-organizing international conferences and co-directing scholarly publications. I have held teaching responsibilities at the Univ. of Toulouse and Girona, and I have been an invited professor at the Univ. of Salamanca and Toulouse. I have participated in international seminars and conferences in Italy, Spain, Portugal, France, and the USA.



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I regularly assume academic responsibilities, such as peer reviewing for international journals, and I have been an external rapporteur for doctoral theses. I co-founded and co-direct the journal *Revue d'études médiévales et de philologie romane* and co-founded JCDO, the junior researchers' section of AIEO.



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Turno General

Área Temática: Cultura: filología, literatura y arte
Nombre: DIJKSTRA, MARIJE
Referencia: RYC2024-051402-I
Correo Electrónico: marije.hristova@gmail.com
Título: Transnational Memory Studies: Exhumations and Democratic Resilience in Europe

Resumen de la Memoria:

Dr. Marije Hristova is a cultural theorist whose research lies at the intersection of Memory Studies, anthropology, and cultural history. Her work focuses on the representation of violent and traumatic pasts, particularly the Spanish Civil War and post-conflict societies in Eastern Europe. Combining transnational memory studies, new materialism, and empirical fieldwork, she examines how collective memories are shaped through material remnants, cultural narratives, and political practices.

Her doctoral research, funded by the Marie Curie Initial Training Network Sustainable Peace Building (SPBUILD) and completed at Maastricht University (NL), analyzed the cultural afterlife of the Spanish Civil War, showing how transnational human rights narratives influenced its memory and representation. As a postdoctoral researcher in the EU Horizon 2020 project UNREST, she conducted comparative research on mass grave exhumations in Spain, Poland, and Bosnia, exploring their cultural and political dimensions. This work established her as a leading voice in Memory Studies, particularly in the politics of forensic memory and the materiality of contested pasts.

During her Marie Skłodowska-Curie Postdoctoral Fellowship at the University of Warwick (2018-2020), Dr. Hristova developed an innovative line of research on the "voice" of non-human agents in memory processes. Using new materialist theory, she examined how graves and cultural artifacts reflect the material presence of the past. Her work has consistently emphasized societal impact, from advising policymakers in Euskadi to collaborating with artists and cultural institutions on mnemonic interventions.

Her future research will expand on these themes through three interconnected lines of inquiry:

Politics of Time and Democratic Resilience: This line explores how mass grave exhumations generate future-oriented narratives and activist networks that strengthen democratic resilience. By comparing bottom-up exhumations in Spain with top-down initiatives in Poland, it will analyze how artistic representations foster new forms of mnemonic self-identification and democratic engagement.

Environmental Memories of the Grave: This line investigates the environmental dimensions of graves, focusing on their ecological impact and cultural imaginaries. Drawing on new materialism and environmental humanities, Dr. Hristova will explore how graves function as ecological and cultural markers, connecting memory practices to broader debates on sustainability and environmental justice.

Memories of Mining: Uranium and Nuclear Memory: Building on her expertise in forensic and cultural memory, Dr. Hristova will examine the legacies of uranium mining in Bulgaria and Spain. This project will analyze how the material and cultural remnants of uranium extraction shape local and national narratives, contributing to the emerging field of Nuclear Memory.

These research lines extend Dr. Hristova's expertise into new interdisciplinary fields while maintaining her focus on societal relevance. Leveraging her international network, comparative approach, and innovative methodologies, she aims to address pressing global challenges at the intersection of memory, materiality, and social transformation.

Resumen del Currículum Vitae:

Marije HRISTOVA Dijkstra is a distinguished interdisciplinary researcher and educator with expertise in memory studies, literature, and human rights. Her career is marked by extensive international experience, leadership in high-profile projects, and impactful contributions that bridge academic research and societal engagement.

Hristova has an exceptional record of scientific output, including 23 peer-reviewed articles in journals such as *Memory Studies* [Q1] and *Culture & History Digital Journal* [Q1], and 14 book chapters published by renowned academic presses like Palgrave Macmillan and Routledge. Her monograph *Reimagining Spain: Transnational Entanglements and Remembrance of the Spanish Civil War since 1989* (2016) is a key reference in the field, with 22 citations in Google.

She has played pivotal roles in major international research projects, including the European Union's Horizon2020-funded UNREST project (€2.49 million) [postdoctoral contract 2 years, CSIC]. She was a co-author and co-applicant of the project and co-led the CSIC based Work Package on exhumations in Spain, Poland, and Bosnia. She has been awarded with two prestigious Marie Curie Fellowships: the Marie Skłodowska-Curie Postdoctoral Fellowship/WIRL-COFUND at the University of Warwick (IP, contract, 2018-2020) and a Marie Curie Initial Training Network Fellowship under the SPRINT Program at the Spanish National Research Council (contract 2011-2013). She was also a researcher in three Spanish National Research-funded projects. These initiatives underscore her ability to lead transnational research and secure substantial funding.

Beyond her academic contributions, Hristova-Dijkstra is deeply committed to public engagement and societal impact. Her expertise has been featured in over 20 media outlets, including *El País*, *El Diario.es*, *La Sexta*, and *Radio Nacional de España*. She has also contributed to Dutch media, such as *Trouw* and *Eén Vandaag*. Her collaborations with cultural institutions, including the Amsterdam City Archives, Matadero Madrid, and the Born Cultural Center, have resulted in impactful exhibitions and educational programs that connect academic research with public audiences.

Hristova-Dijkstra has taught over 25 courses at institutions such as Radboud University, UNED, and Maastricht University, focusing on cultural memory, literature, and human rights. She has supervised 8 undergraduate, master's, and doctoral theses, emphasizing innovative and socially



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relevant research. Her commitment to public education is evident in her participation in workshops and lectures, including contributions to the Museo Nacional de Antropología and the Museo de la Paz de Gernika.

Hristova-Dijkstra's leadership is reflected in her organization of over 10 academic events, including the Third Annual Memory Studies Association Conference (2019), which attracted 1,300 participants from 45 countries. She has also contributed to academic governance as chair of the Department of Hispanic Studies at Radboud University and as a member of advisory boards such as the Memory Studies Association. With 55 conference presentations, 37 international publications, and collaborations with institutions worldwide, she exemplifies academic leadership and transnational impact, solidifying her position as a leading scholar in memory studies.



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Área Temática: Cultura: filología, literatura y arte
Nombre: BRAITO, SILVIA
Referencia: RYC2024-049202-I
Correo Electrónico: silvia.brait@gmail.com
Título: El papel histórico-filológico de los textos epigráficos: los espacios escénicos como reflejo de la sociedad romana

Resumen de la Memoria:

Mi principal línea de investigación se centra en los campos de la epigrafía latina, filología latina, historia romana, literatura latina y griega, tradición clásica, historia social y económica del mundo antiguo. Mi especialización se centra en la cultura escrita romana y el papel de los textos epigráficos como fuente histórico-filológica. He desarrollado excelentes competencias en esta área gracias a las oportunidades que logré durante mi carrera académica.

También me he centrado en el campo del papel social y económico de las mujeres pertenecientes a la aristocracia en la antigua Roma, estudiando las fuentes literarias y epigráficas para determinar su entidad y su influencia en algunas de las empresas financieras y comerciales más influyentes de la economía romana. Hoy en día, esta línea de investigación demuestra la importancia de estudiar el papel de la mujer en la sociedad antigua no solo desde un punto de vista familiar, religioso o social, sino también desde una perspectiva económica, centrándose en el papel que desempeñaban en la administración de la riqueza y las propiedades como factor esencial para la promoción social y política de sus familias.

Seguiré desarrollando esta línea de investigación, cambiando pero el enfoque y centrándome en la participación de las mujeres en actividades económicas fuera de la Italia romana, un campo de estudio que hasta ahora se ha centrado principalmente en las fuentes epigráficas monumentales, teniendo en cuenta sólo parcialmente la vasta perspectiva que ofrecen los textos epigráficos latinos inscritos en todas las categorías de soportes epigráficos, y especialmente objetos comercializados en la economía romana antigua.

Me continuaré centrando en el papel de la cultura escrita epigráfica como fuente para el análisis social y económico. El objetivo principal de mi proyecto será preparar un estudio sobre el papel social de los espectáculos romanos, específicamente el teatro, a través de la documentación epigráfica y de los edificios a ellos dedicados. Esta línea de investigación tiene por título "Los espacios de representación escénica como reflejo de la sociedad romana: la epigrafía teatral de las provincias occidentales romanas". Se estudiarán las inscripciones presentes en los teatros romanos, con el fin de comprender el paisaje epigráfico en que estaban inmersos estos edificios y su importancia social y política. La interacción entre espectáculos y público es vehiculada a través de un mensaje lingüístico que debe ser analizado no solo con parámetros históricos, sino también filológicos. Un aspecto de la cultura escrita romana estudiado a través de los textos epigráficos como fuente histórico-filológica es una nueva línea de investigación que tiene un potencial extraordinario, que se adecua perfectamente al Programa Ramón y Cajal.

Con nuestro proyecto esperamos conseguir unos resultados equivalentes, mutatis mutandis, a los obtenidos por los estudios epigráficos sobre los anfiteatros, para constituir una base sólida para desarrollar una epigrafía teatral romana, que desborda el ámbito de los edificios, y cuya necesidad urgente han puesto en evidencia estudios recientes, para lo cual se ha de tener en cuenta la singularidad de la información que poseemos, que comporta textos literarios representables, que determinan el contenido, representación y programación del espectáculo en su integridad.

Resumen del Currículum Vitae:

Mi dedicación a los estudios clásicos tiene su inicio en la formación del Liceo Classico, y tuvo continuidad en los cursos de Grado y Master subsiguientes. En 2012 obtuve por concurso una beca predoctoral de 3 años en el Programa de Doctorado "Estudios Históricos, Geográficos, Antropológicos" de la Escuela Interuniversitaria de Doctorado de las universidades de Padua, Ca' Foscari Venecia y Verona, donde defendí mi tesis en Epigrafía Latina e Historia Romana, "Donne imprenditrici nell'Italia Romana", el 18.02.2016 que recibió la máxima calificación y el título de Doctor Europaeus. En 2014 y 2015 fui visiting PhD en la Université Paris-1 Panthéon-Sorbonne y en la Universidad de Barcelona. De 2016 a 2021 fui investigadora del proyecto Corpus Inscriptionum Latinarum (CIL), liderado por la Academia de Ciencias de Berlín. He colaborado hasta ahora en tres volúmenes de CIL pertenecientes a CIL I12 y CIL XVII y continuo en la redacción del mismo.

Entre 2022 y 2024 he tenido un contrato como Investigador Juan de la Cierva-Incorporación en la Universidad de Barcelona en el del Departamento de Filología Clásica, Románica y Semítica y del Grupo de Investigación LITTERA, al cual sigo perteneciendo. Durante este periodo, he impartido docencia, he participado en actividades de innovación docente y he dirigido TFM.

Mis campos de investigación son la epigrafía latina, la literatura y filología latinas y la historia romana, como se refleja en los libros, ediciones de libros y más de 30 artículos o capítulos de libros publicados. Quiero destacar el primer libro *Inscripciones Romanas de Ruscino* (2019); el segundo *L'imprenditoria al femminile nell'Italia romana: le produttrici di opus doliare* (2020) y una segunda parte del mismo ha sido ya aceptada por el editor, y es consecuencia de un proyecto post-doc otorgado por el Istituto Italiano per la Storia Antica.

He participado en más de 20 congresos internacionales. También he sido investigador invitado en varias Universidades o Instituciones internacionales, para impartir cursos de doctorado, seminarios o workshops. Soy miembro integrante de 10 proyectos de investigación, financiados y coordinados por instituciones internacionales. Entre otros, soy investigadora senior en el proyecto CIL desde hace 10 años, así como investigadora en los proyectos *EscRit* y *EPICOM* (UB) y miembro del comité científico del proyecto *LATERES 2.0* (Università di Torino-ICCD). También me ocupo de las humanidades digitales, con un papel de liderazgo como Director de uno de los Grupos de Investigación para el *Epigraphic Database Roma*. También soy miembro de 4 networks científicos actualmente en desarrollo.

He organizado 4 congresos internacionales y actividades de divulgación como seminarios o presentaciones de libros.

A la experiencia docente en la UB, se suma el haber sido también teaching assistant en la Universidad de Verona y en la Universidad de Macerata, donde impartí seminarios para estudiantes de grado, master, doctorandos y profesores, y me he ocupado fundamentalmente de formar a jóvenes investigadores, codirigiendo 10 tesis de grado y master en Filología Latina, Historia Romana y Epigrafía Latina.

Pertenezco al consejo editorial de la Revista *Puteoli, Cumae, Misenum*, y a la Secretaría Científica de la Revista *Sylloge Epigraphica Barcinonensis* y actúo como revisor para otras 9 revistas internacionales.



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Área Temática: Cultura: filología, literatura y arte
Nombre: BRUNA PÉREZ, PAULA
Referencia: RYC2024-051028-I
Correo Electrónico: pbp1278@gmail.com
Título: Addressing ecological crisis by incorporating approaches to non-human perspectives. A transdisciplinary research between art and science

Resumen de la Memoria:

During the Ramón y Cajal fellowship, my aim is to consolidate my unique position as an artistic-scientific researcher, with a specific focus on non-anthropocentric perspectives in ecology. My research line revolves around deeply and transdisciplinarily hybridizing scientific knowledge with artistic practice. This unique approach, grounded in ecocriticism, seeks to critically analyze and challenge human narratives embedded in scientific disciplines such as botany and ecology. Through aesthetics and art, my goal is to explore non-human points of view, thus contributing to generate new discourses on the relationship between humanity and the rest of nature.

Objectives:

- Approach non-human perspectives through a combination of artistic practice, speculative fabulation and scientific basis, fostering empathy and a shift to more ecocentric worldviews.
- Understand the environment through non-human life forms, emphasizing non-anthropocentric subjective perspectives. This approach is presented as a contrast to the purported scientific objectivity often claimed in research.
- Critically analyze human narratives present in scientific disciplines, especially in botany and ecology, by means of artistic research.
- Establish connections between science, art, and society, aiming to address the global ecological crisis and transition towards alternative models of ecological coexistence.
- Collaborate closely with scientific research groups and incorporate the latest advances in botany and ecology into my artistic research, enriching artistic perspectives with updated scientific knowledge.
- Actively participate in research projects, provide a transdisciplinary perspective, and take on leadership roles.
- Integrate artistic research into the projects of the receiving research groups collaboratively.
- Provide references for reciprocal collaboration between art and science, considering art not merely as a disseminator of science but as a source of knowledge that can dialogue, complement, inspire, and enhance scientific knowledge, and vice versa.
- Contribute to transdisciplinary education in university programs, promoting the hybridization of disciplines.

Innovations and main expected impacts:

As an innovator in the interdisciplinary approach to artistic practice, the Ramón y Cajal fellowship will allow me to strengthen my unique profile in the country, increasingly in demand in scientific, artistic, and academic domains, setting a precedent in this matter. Deeper integration of art and science in my research will add significant value, generating impacts in both society and research, particularly in the ecocritical perspective. This singular approach has the potential to modify how ecology is perceived, contributing to the necessary shift in the human-nature paradigm. The transfer of knowledge and the incorporation of artistic research into scientific centers will be crucial to broaden perspectives and effectively address ecological crises.

Resumen del Currículum Vitae:

I am a researcher positioned at the intersection of art, ecology, and environmental science. I have a transdisciplinary background, including a Bachelor's and Master's in Environmental Science, a Bachelor's in Fine Arts (extraordinary award) completed in Barcelona, Athens, and New York, and a PhD in art and political ecology (Cum Laude). Until November 2024, I was a Margarita Salas Postdoctoral Fellow, where I held a unique position as an artistic researcher in scientific centers, solidifying my role in fostering synergies between art and science. A key contribution is coining the term "Plantocene," a critical concept that has sparked transformative discussions in both artistic and scientific realms. This conceptual framework has inspired numerous artistic works, contributing to a renewed focus on the interaction between art and environmental issues.

My work represents an innovative exploration of non-human realities, combining scientific foundations, speculative fiction and artistic practice. My research has been supported by several grants such as the prestigious Leonardo BBVA Scholarships for Researchers and Cultural Creators 2023. As Principal Investigator of 4 research projects, I have secured over €100,000 in funding and lead a team of 10+ researchers. I am involved in 3 national projects at UB and UAB (two of them ongoing) and one European project (UAB). My leadership includes leading the art-science line of the research project TRACES (UAB), co-directing two PhDs (UB, BAU-UVIC), mentoring awarded artistic research projects, serving on defense committees and international scientific committees, reviewing journals, and organizing seminars in artistic institutions. I also co-founded the Ecotons art-science group and an artistic residency at CREA, and I am now curating the next artistic residency.

With 20+ peer-reviewed publications, which accumulates more than 450 citations (Google Scholar), my research significantly contributes to this interdisciplinary field. I have presented at 15+ conferences (9 international; 6 as a guest speaker) and received an award for best poster (International Botanical Congress 2024). My work has been showcased in over 30 exhibitions (many documented in catalogs) across countries like Portugal, Austria, Colombia, the USA and Spain, and I've completed 8 art residencies in Spain and Portugal. I emphasize that exhibitions and artistic practices are powerful research devices. They are not only means of knowledge transfer but also vehicles for shaping how we think and relate, particularly in addressing the societal changes needed for ecological crises.

My dual perspective as an environmentalist and artist has led to meaningful societal contributions. In addition to close collaborations with the scientific community, my projects involve partnerships with environmental management entities. I have delivered 20+ public lectures and conducted 8 workshops in academic and artistic institutions. My work has received extensive media attention, including over 25 citations and a recent feature in



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Caixaforum+ documentary. I have taught over 400 hours at universities (UB, UAB, UPC, BAU-UVIC) and internationally (UTalca, Chile), designing transdisciplinary curricula that bridge science and art. My teaching integrates artistic and scientific themes, fostering a new generation of interdisciplinary researchers.



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Turno General

Área Temática: Cultura: filología, literatura y arte
Nombre: GONZÁLEZ GÓMEZ, SOFÍA
Referencia: RYC2024-050157-I
Correo Electrónico: glezgomezsofia@gmail.com
Título: Literature, media and book market

Resumen de la Memoria:

I am a postdoctoral researcher at the University of Bern (Switzerland), with a background in History of Literature, Sociology of Literature and Cultural Studies. My PhD (2021) at the Spanish National Research Council and the University of Alcalá focused on the 20th Century Spanish literary field and book market through the newspaper El Sol and its founder Nicolás M. de Urgoiti. My work shed light on debates about literary reviews, the capitalization of the publishing market and the role of writers in the public sphere. My research seeks to uncover fresh perspectives on literary history, focusing on the interplay between publishers, critics, and writers.

I have a demonstrated track record in high-impact international publications and cross-borders collaborations. My PhD research has been recognized with several awards, including the CSIC Relevant Thesis Award. I have delved deeply into the dynamics of the Spanish 20th-century literary landscape. My work includes analyses of contemporary authors and the publishing industry, such as Miguel Delibes, María Luz Morales and Ramón Gómez de la Serna. I co-coordinated 2 journal issues (one of them forthcoming in 2025 in the most important journal of Romance literature in Switzerland, Versants), a dossier for Ínsula and a co-edited a volume of articles of Manuel Machado (Renacimiento, 2019). In 2022, I published the monograph La vida por un periódico. El Sol (1917-1931) de Nicolás M. de Urgoiti (Visor), further solidifying my expertise in this field.

My academic profile has opened doors to numerous international collaborations, including invitations to participate in five projects. These opportunities have not only expanded my professional network but also allowed me to present my work at international conferences. My involvement in a Sorbonne Université project on the sociology of literature in the Hispanic field has solidified my expertise on this field. As a postdoctoral researcher, I have demonstrated strong leadership skills, which I have further developed at the University of Bern in Switzerland. My responsibilities have included active roles in scientific and evaluation committees, fostering knowledge transfer, and driving initiatives to elevate my research to an international stage. My postdoctoral years have strengthened my independence, intellectual maturity and enthusiasm as a researcher.

A RyC fellowship represents a unique opportunity for me to return to Spain, bringing with me the skills, knowledge, network, and international experience I have acquired throughout my academic career. This fellowship would enable me to deepen my research on Spain's Transition to Democracy, focusing on the role of media and writers in shaping new cultural directions during this pivotal period. Building on this foundation, I aim to expand my line of research into a large-scale project exploring the concept of "cultural transitions" in other political contexts. This interdisciplinary approach would examine how culture evolves during moments of political transformation, fostering a comparative perspective. My goal is to establish and lead a dynamic research team in Spain, leveraging competitive funding to advance this line of research while contributing meaningfully to the global academic discourse on cultural transitions.

Resumen del Currículum Vitae:

I completed my doctoral thesis at the Institute of Language, Literature and Anthropology of the CSIC thanks to a FPU fellowship, while serving as a teaching assistant at the University of Alcalá. I had previously enjoyed a JAE-Intro grant (CSIC) and two introductory research grants (UAH). My doctoral experience was complemented with a stay at the University of Cologne and another at the Pompeu Fabra University; both experiences substantially nurtured my research training. My thesis has been recognized with several awards, including the CSIC Relevant Thesis Award, the Condueños Society Award for Best Doctoral Thesis in the branch of Arts and Humanities, and the Extraordinary PhD Award.

My research career has a proven track record of mobility, independence and leadership. I have secured international funding from prestigious institutions. During my PhD I was awarded a DAAD fellowship for a research stay in Germany. As a postdoc, I obtained an Ernst Mach Grant Worldwide, which allowed me to develop a project at the University of Graz (Austria). I was also awarded a Humboldt Postdoctoral Fellowship and a Margarita Salas Fellowship, which I declined in favor of my postdoctoral position in Switzerland. In January 2022, I joined the Department of Spanish Language and Literature at the University of Bern. I was also shortlisted for an Ambizione Fellowship from the Swiss National Science Foundation, which proves my experience on applying for highly competitive grant proposals.

My experience in Switzerland has fostered international collaboration through several projects, publications and academic activities. My career has a strong international orientation, as demonstrated with my postdoc research and teaching stays at Ghent University and the University of Bologna. Moreover, I have participated in international projects in France (Sorbonne Université), Spain (Carlos III University, CSIC), and Austria (TU Graz) and I am an active member of the Swiss Society for Hispanic Studies. From January to April 2025, I am a visiting scholar at the Department of Hispanic Studies at the University of California Riverside thanks to a "Short Travel Grant for (Post)Docs" (University of Bern), which will also include a short stay at UC Irvine and collaboration with California State University.

In the academic year 2023/24, I was selected as one of 20 scholars for the COMET Career Programme at the University of Bern. This competitive programme focuses on female academic leadership. Furthermore, I have presented my research at several institutions in +5 countries, and working in a multi-lingual environment as Switzerland is a boost to engage with interdisciplinary and international audiences. I have offered several invited talks, I have a wide experience in knowledge transfer (from the collaboration in a documentary about Nicolás M. Urgoiti to the collaboration in cultural magazines, such as El Ciervo), and I have developed scientific responsibilities, such as my role as coordinator of the SEMP/Erasmus stays at the



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Department of Spanish Language and Literature (University of Bern) and the invitation to be part of a PhD committee, external evaluator of a PhD and of a postdoc call, and to be part of the committee of two academic journals.

A RyC Fellowship represents the key to continue achieving my goals and take a step further as an academic leader.



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Turno General

Área Temática: Cultura: filología, literatura y arte
Nombre: TOFIÑO QUESADA, IGNACIO
Referencia: RYC2024-049658-I
Correo Electrónico: ignaciotq@yahoo.com
Título: Estudios postcoloniales en español

Resumen de la Memoria:

He dedicado más de 20 años a investigar en la intersección de los estudios literarios, culturales e históricos, trabajando en EE. UU., Reino Unido y España. Como pionero en los estudios postcoloniales hispánicos, he explorado el impacto del colonialismo africano en el imaginario hispano. Mi investigación, reconocida internacionalmente, incluye 13 monografías, más de 30 artículos en revistas destacadas y presentaciones en más de 20 congresos internacionales.

Mi artículo "Spanish Orientalism" (2003) marcó un hito en la reflexión sobre el colonialismo español en África subsahariana, siendo referencia clave en los estudios afro-hispánicos. Mi libro "Guinea. El delirio colonial de España" (2021), basado en una exhaustiva base de datos propia de más de 200 obras literarias y 2000 referencias, es una historia cultural de la Guinea Española, revelando su carácter transnacional y conectándola con el concepto de Global Hispanophone. El texto ha sido muy bien recibido por la academia y la prensa.

Mi producción reciente incluye trabajos que combinan historiografía y estudios literarios, como el análisis de la descolonización en las literaturas guineoecuatoriana y saharauí o la historia literaria de Andorra. También he estudiado la manipulación de literaturas africanas por editores europeos y la representación de la mirada colonial en la prensa española del siglo XX.

He contribuido con capítulos en publicaciones internacionales, como "The Black Atlantic's Triple Burden", donde colaboré con Gustau Nerín para analizar las continuidades del colonialismo en África y América. Destaco el valor de publicar en editoriales africanas, descentralizando la producción académica fuera de Europa y Estados Unidos.

Otros estudios relevantes incluyen la recuperación de autores olvidados, como el matrimonio polaco Stefan Szolc-Rogozicki y Helena Janina Pajzderska, cuya obra sobre la Guinea Española revela su carácter liminal en términos coloniales. Asimismo, he reflexionado sobre la noción de "literatura colonial española" y su relevancia para entender el dominio colonial y sus consecuencias.

Además de mi investigación académica, he traducido más de 20 obras de autores como Amitav Ghosh, Jhumpa Lahiri y Thomas Pynchon, promoviendo la difusión de literatura global. Como editor de la sección de literaturas subsaharianas en "Postcolonial Text" y colaborador frecuente de la prensa, mi trabajo ha impactado tanto en el mundo académico como entre el público general.

En resumen, mi labor ha explorado áreas históricamente ignoradas, consolidando los estudios postcoloniales hispánicos y estableciendo las bases para futuras investigaciones sobre el colonialismo español y su legado literario y cultural.

Resumen del Currículum Vitae:

A lo largo de más de dos décadas, he trabajado en la intersección de los estudios literarios, culturales e históricos. He desarrollado mi investigación pionera en los estudios postcoloniales hispánicos en EE. UU., Reino Unido y España. Mis investigaciones han abordado el impacto del colonialismo africano en el imaginario hispano, con contribuciones clave como el artículo "Spanish Orientalism" y el libro "Guinea. El delirio colonial de España", ambos ampliamente citados y reconocidos.

Formado en literatura comparada en la City University of New York, donde enseñé lengua y literatura españolas y estudié con académicos destacados como André Aciman y Eve Kosofsky Sedgwick, también gestioné la sección de literaturas hispanófonas y lusófonas en la MLA International Bibliography. Posteriormente, como docente en el sistema público catalán, enfoqué mi investigación en la inclusión LGBTQ+ en la educación, produciendo guías didácticas y artículos innovadores sobre literatura LGBTQ+.

Mi trayectoria incluye una sólida labor en investigación y docencia. Durante mi doctorado, compilé una base de datos de más de 200 obras sobre la colonización de Guinea Española, base para una historia cultural de la colonia dirigida por María José Vega. Tras una estancia docente en Reino Unido, defendí mi tesis en 2021 en la UAB con mención internacional.

Como investigador Juan de la Cierva (2023-2024), publiqué numerosos artículos y capítulos en revistas de alto impacto. Con una beca Barcelona Crea, realicé una estancia en Guinea Ecuatorial, compilando una base de datos de más de 400 obras literarias sobre el país, que planeo publicar como herramienta de referencia y base para un segundo libro.

Actualmente, como profesor asociado en la UPF y acreditado como profesor lector por la AQU, estoy a la espera de resoluciones en convocatorias internacionales. Mi investigación sobre Guinea, ampliamente reconocida, incluye la publicación de 13 monografías, más de 30 artículos de acceso abierto en revistas de prestigio y presentaciones en más de 20 congresos internacionales. Además, colaboro como editor con revistas como "Postcolonial Text", reviso para editoriales como Iberoamericana Vervuert y he trabajado junto a destacados académicos como Gustau Nerín.

Mi producción científica se complementa con más de 20 traducciones de autores relevantes como Amitav Ghosh y Thomas Pynchon, contribuyendo a la difusión de obras literarias de gran relevancia internacional.



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Turno General

Área Temática: Cultura: filología, literatura y arte
Nombre: NAVARRO RAMÍREZ, SERGIO
Referencia: RYC2024-048994-I
Correo Electrónico: snavarro.139@gmail.com
Título: Poesía en sentido cosmopolita: La globalización y la poesía contemporánea

Resumen de la Memoria:

Mi línea de investigación principal desarrolla nuevas formas de comprender las relaciones entre poesía y comunidad, atendiendo especialmente a las vinculaciones socio-políticas que el texto poético genera y trabaja. Para ello, he propuesto un nuevo paradigma estético: el neo-humanismo que, elaborado a partir de un concepto de la filosofía estética de Jacques Rancière, caracterizaría la producción poética de finales de siglo XX y principios del XXI, tanto en España como en Latinoamérica. En las monografías "Actos de poesía todavía posibles. Disensos en el régimen de lo sensible postmoderno (Pr-Textos, 2025) y "Como gotas en un océano de belleza y capital. Eros después del 68 y la poesía española del siglo XXI", (Comares: 2024) replanteo además la manera de entender la relación entre poesía y mundo, más allá de las nociones canónicas de compromiso y conciencia crítica, hacia una elaboración teórica inédita que considera los giros afectivos, comunitarios y ontológicos. Más allá de las estéticas neo-humanistas, mi segunda línea de investigación se interesa por la escritura poética de vinculaciones políticas e imaginarios comunitarios en la poesía española e hispanoamericana del siglo XX, X, interesándome por autores peninsulares (Unamuno, Aleixandre, Cernuda, Claudio Rodríguez) y latinoamericanos (Blanca Varela, Ernesto Cardenal, Juan Gelman, Watanabe). Mi trabajo más importante en este sentido es una monografía "La comunidad inasible. La poesía española de la Transición en la crisis del humanismo" (Universidad de Valladolid y Universidad de León, 2023), donde se estudia el pensamiento y las imágenes de comunidad en la poesía de la Transición española. En la actualidad, quiero iniciar un proyecto de investigación que se propone los siguientes objetivos de alto impacto tanto en mi disciplina, como esperamos, en aquellas áreas de las Humanidades interesadas en el tema:

1. Realizar el primer estudio que, desde una perspectiva Transatlántica, considere la poesía actual en español en un contexto globalizado del que se derivan rasgos estéticos y con el que se dirimen poéticamente dilemas éticos y estéticos.
2. Pensar por primera vez la globalización desde un punto de vista poético y acceder a una nueva perspectiva de los procesos macropolíticos globalizados mediante experiencias micropolíticas accesibles mediante el análisis de los poemas.

Resumen del Currículum Vitae:

Sergio Navarro (1992) es docente en la UNIR y Profesor Contratado Doctor acreditado por la ANECA. Obtuvo una beca Santander para cursar el máster en investigación en Literaturas y Culturas Europeas y Comparadas en la Universidad de Cambridge (2016) y se doctoró con sobresaliente cum laude, mención internacional con estancias en Friburgo (4 meses) y Burdeos (3 meses) y Premio Extraordinario de Doctorado en la Universidad de Navarra, a la que estuvo vinculado con un contrato ADA. Su tesis doctoral estudia en la poesía española del siglo XXI un nuevo paradigma con que se dirimen las relaciones político-estéticas del poema con el mundo: el "neo-humanismo" como discurso artístico que genera vinculaciones en busca de un mundo común. Durante su período posdoctoral primero como investigador visitante en la universidad de Burdeos [6 meses dentro del grupo de investigación internacional E.R.P.I.L], luego como contratado postdoctoral Juan de la Cierva en la Universidad de Granada [liderando una línea de investigación en el Proyecto I+D Letral "Letral"] expandió el concepto desde una perspectiva trasatlántica y profundizando en sus dimensiones sociales, políticas e históricas. Fruto de esta investigación son los numerosos artículos aparecidos en las más importantes revistas nacionales e internacionales: Bulletin of Hispanic Studies, Romanische Forschungen, Nueva Revista de Filología Hispánica, Bulletin Hispanique, Acta literaria, Revista de Literatura, Dicenda. Además, dos monografías analizan la vigencia del Neo-humanismo poético en la literatura española: Como gotas en un océano de belleza y capital: Eros después del 68 y la poesía española del siglo XXI (Comares, 2024) y Actos de poesía aún posibles: Disensos en el régimen de lo sensible postmoderno (Pre-Textos, 2025), que mereció el prestigioso reconocimiento internacional otorgado a un trabajo de investigación y divulgación, el XXI Premio de Investigación Literaria Amado Alonso. Una línea de investigación complementaria, desarrollada en estancias en Córdoba, Málaga, Exeter [3 meses] y Murcia [6 meses], estudia las relaciones entre poesía y comunidad en etapas literarias del siglo XX. Destaca aquí su primer monográfico, que estudia desde esta óptica la poesía de la Transición española: La comunidad inasible: La poesía española de la Transición en la crisis del humanismo (Universidades de León y Valladolid, 2023). Ha publicado, en total, más de 20 artículos (entre ellos, 8 Q1 y 7 Q2) y 8 capítulos de libro en editoriales de primer nivel como Peter Lang, Dykinson o Prensas de la Universidad de Zaragoza. Perteneció al grupo de investigación Hybris. Literatura y culturas latinoamericanas (Hum- 980) y es miembro del equipo de trabajo del Proyecto I+D Letral Políticas de lo común en las literaturas del siglo 21. Estéticas disidentes, circulaciones alternativas (PID2019-110238GB-I00). Ha liderado congresos e iniciativas como VII Jornadas Doctorales Letral: Literatura y comunidad, el seminario Nuevas miradas sobre la poesía española del siglo XXI, I Jornadas de Poesía Poesía sin Nombre y las Jornadas Los Novísimos leen a Pablo García Baena. Actualmente, dirige 15 TFM's en la UNIR.



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Turno General

Área Temática: Derecho
Nombre: BENDEL, JUSTINE
Referencia: RYC2024-049989-I
Correo Electrónico: justine.bendel@gmail.com
Título: International law and the protection of the environment

Resumen de la Memoria:

My research sits in the field of international law, specifically on environmental and climate change issues. I focus on the implementation gaps in global environmental governance, from judicial enforcement to treaty implementation. The prism through which I analyse such issues in my current work is the protection of forests. In this line of research, I have published in Review of European, Comparative and International Environmental Law (RECIEL) about the role of international courts in protecting the Amazon rainforest. I also published in Nordic Journal of International Law, Questions of International Law on issues of environmental dispute settlement.

Two papers are currently under review, one on the limitations of Environmental Impact Assessments in forested lands with Leiden Journal of International Law and another on the role of forests in rights-based climate litigation with Transnational Environmental Law. Targeting these high impact journals shows my commitment to the best standards of academic publishing, as they are two of the most reputed journals in the field.

Additionally, I published two books. First, my monograph with Edward Elgar Publishers entitled "Litigating the Environment: Process and Procedure before International Courts and Tribunals" in 2023. It focuses on the tensions between the system of international adjudication and the nature of environmental disputes. Second, an edited collection with Routledge, entitled "Public Interest Litigation in International Law", published in 2023, which I co-edited with Dr Yusra Suedi (Manchester). It discusses the different facets of what public interest litigation means in the international legal context.

My research interests are not solely focused on doctrinal legal analysis and I have training in empirical qualitative interviewing. As an example, I wrote a chapter published with Cambridge University Press in a book edited by Professors Christina Voigt (Oslo) and Caroline Foster (Auckland) where my co-author and I resorted to elite interviews with negotiators of the Paris Agreement Implementation and Compliance Committee.

Moreover, I have experience in knowledge exchanges activities around the just transition during my time at the University of Copenhagen. As a member of the Crown Princess Mary Center, I was directly engaging with policymakers from the Ministry of Environment, where we exchanged ideas on how to improve climate and forests-related policies and laws of Denmark. This shows the possibilities of impact of my current research, and the interests national policymakers, such as the Danish government, have in creating links with academic partners that can carry on in the future. I also have experience in international litigation, including intervening in cases before the International Court of Justice and the International Tribunal for the Law of the Sea.

Resumen del Currículum Vitae:

I am an international environmental law specialist. I obtained my undergraduate and postgraduate degrees at the University of Geneva (Switzerland) and obtained my PhD at the University of Edinburgh (UK) under the supervision of Professors Boyle and Harrison. I have then worked as a lecturer in universities in the UK (Sheffield, Exeter and Leeds, my current employer), as well as in Austria (Diplomatic Academy, Vienna) where I completed a postdoctoral research and Denmark (Copenhagen) where I conducted a Marie Curie Fellowship.

As evidence of grant capture, I was a Marie Curie Fellow at the Centre for International Law and Governance at the University of Copenhagen, conducting my EU-funded project entitled "INTERFOR: Implementation Issues in Global Environmental Law – The Case of Forests". This is a very competitive funding, which had just above 10% success rate in the last call and is worth more than €200,000.

I also obtained another grant that led to the publication of my edited collection with Routledge. The project "Public Interest in International Law" has been funded by the GenEx Fund, as a collaboration between the University of Exeter and the University of Geneva, for a total amount of £10,000. This shows my research leadership, as I was able to secure funding to realise this project with my co-editor and gather a dozen of researchers from around the world to participate in a workshop and ultimately contribute to the edited collection.

I also have undertaken many leadership responsibilities. At Leeds, I am now the coordinator of the Works in Progress seminar series of the Centre for Law and Social Justice and the study abroad coordinator. While at Edinburgh Law School, I acted as convenor of the Postgraduate research student board, entrusted with up to £10,000 per year to organise research-related events. More importantly, I am now Associate Editor of the Review of European, Comparative and International Environmental Law (RECIEL), in charge of the case notes submissions. RECIEL is a leading international journal in my area of specialization (JCR first quartile).



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Turno General

Área Temática: Derecho
Nombre: GOENA VIVES, MARIA BEATRIZ
Referencia: RYC2024-049847-I
Correo Electrónico: beagoena@gmail.com
Título: Inteligencia artificial y Derecho penal: Análisis de los límites subjetivos de la pena en la interacción humano-máquina

Resumen de la Memoria:

The project explores the transformative impact of artificial intelligence (AI) on criminal liability, focusing on the subjective limits that should guide punishment. It analyzes two core questions: 1) how AI use can aggravate or mitigate personal culpability, and 2) whether harmful outcomes caused by AI should be criminally punished and, if so, how. This topic is particularly relevant following the recent approval of the EU Artificial Intelligence Regulation and other international regulatory initiatives.

MAIN OBJECTIVES

- (1) Determine if individual responsibility can be diminished or aggravated by AI manipulation: The research examines to what extent individuals affected by AI can be held accountable. AI manipulation may undermine autonomy and diminish responsibility through emotional nudges or biased framing. Conversely, as threats like cybercrime and organized crime show, AI can amplify risks and ensure precision in achieving unlawful goals, potentially increasing liability.
- (2) Explore how liability for harms resulting from AI should work: This includes attributing responsibility for risks such as accidents involving autonomous vehicles, hate speech from bots, or fraudulent deepfakes. These challenges strain culpability principles due to the opacity and autonomy of machine learning systems.

RESEARCH QUESTIONS

- (1) How should guilt be addressed given human rational limitations and increasing reliance on AI? This includes evaluating whether AI-induced biases mitigate or remain irrelevant to determining intent and considering duties to neutralize such biases, akin to an *actio libera in causa* structure.
- (2) How can AI aggravate responsibility by amplifying risks or ensuring harmful outcomes? This involves examining whether enhanced precision or scalability of harm justifies stricter liability, even when traditional notions of intent are challenged.
- (3) How should liability for AI misuse or failures be conceptualized? Possible models include product or strict liability or treating AI like corporations, though these approaches face legal and conceptual challenges.

METHODOLOGY

The project takes an interdisciplinary approach, working with AI experts to explore its functions and limitations, and with psychiatrists and anthropologists to evaluate its impact on behavior and accountability. The methodology centers on creating an "Interdisciplinary Research Lab" to drive collaboration and innovation.

EXPECTED IMPACTS

- (1) Dissemination of results: Findings will be presented in a monograph and a Q1 international open-access journal article.
- (2) Outreach and collaboration: Insights will be shared at conferences and seminars, leveraging international academic networks to foster dialogue.
- (3) Normative proposals: The project will develop *lege ferenda* recommendations aligned with the EU AI regulatory framework.

INNOVATION AND RELEVANCE

This research addresses unregulated challenges posed by AI. By integrating legal, technological, and behavioral insights, it expands the boundaries of legal scholarship and fosters interdisciplinary collaboration.

CONCLUSION

The project aims to enrich academic discourse, inform policymaking, and advance understanding of AI's ethical and legal implications in criminal liability frameworks.

Resumen del Currículum Vitae:

SCIENTIFIC CONTRIBUTIONS & RESPONSIBILITIES: I defended my doctoral thesis in Criminal Law at the University of Navarra in 2014 (International Doctoral Mention and Extraordinary Prize). Since then, I have developed 4 research lines on novel subjects with significant impact in legislative and judicial contexts:

- (1) Corporate Criminal Law and Compliance: Since 2014, I have been recognized as an international benchmark in this field, participating in 7 funded national research projects (2 ongoing) and publishing over 20 works (6 peer-reviewed) in indexed journals and leading publishers. In 2023, I co-led a project with Prof. Kubiciel in University of Augsburg on compliance and the criminal protection of human rights and the environment, funded by the Bavarian Government (€5,600).
- (2) Transnational Corruption: Since 2020, I have been researching this topic through a Colombian Ministry-funded project, resulting in a DAAD fellowship (2021) and coordinating a collective work with four authored chapters with prof. Olasolo from University of Rosario (2024).
- (3) Strict Liability and Transnational Crime: Supported by a Spanish Ministry of Science and Innovation project, I have explored this area since 2022, including a postdoctoral fellowship at the Max-Planck-Institut.
- (4) Criminal Law and Gender: Since 2023, I have contributed to projects on femicide and extreme violence against women, co-authoring a collective book and collaborating in Spanish Government-funded research.



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IMPACT: I regularly disseminate findings through conferences, postgraduate teaching, open access publications, and professional platforms like Academia, LinkedIn, and YouTube.

INTERNATIONALIZATION & LEADERSHIP: I prioritize international collaboration, conducting research abroad and engaging with American, German, and Spanish scientific groups. My contributions include co-authored publications, workshops, and initiatives like coordinating translations with Universidad Externado de Colombia and developing online courses with Argentina's Crimint Center. Additionally, I co-founded the journal La Ley Compliance Penal (ISSN-e: 2660-7948) in 2020 and currently direct its quarterly publication.

DISTINCTIONS: Awards include the "María Zambrano Aid for International Talent" (2021, score: 97/100), José María Cervelló Award (2011), Degà Roda i Ventura Award (2019), Pedro Martín Award (2016, special mention 2017), and the Extraordinary Doctoral Award. I hold ANECA and AQU accreditations.

CONTRIBUTIONS TO SOCIETY: Since 2015, I have served as a legal of counsel advisor, co-authoring the registered work Modelo de prevención de delitos Molins & Silva Defensa Penal (Registration: 02/2017/3188). Since 2022, I advise the Barcelona Bar Association's R&D center and deliver end-user training for the Judicial School, law firms, companies, and bar associations.

TRAINING AND MENTORING OF YOUNG RESEARCHERS: As a Board Member of the Spanish Association of Criminal Law Professors since 2024, I oversee Junior Associates. I currently direct 3 doctoral theses and 5 Master's papers, having supervised 47 Final Degree Projects (2019-2025). I also mentor and evaluate Moot Court activities and contribute as editor of "InDret" Journal and peer reviewer for "Política Criminal" and "Revista Electrónica de Ciencia Penal y Criminología".



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Turno General

Área Temática: Derecho
Nombre: DIAS DOS SANTOS, ÍLISON
Referencia: RYC2024-051274-I
Correo Electrónico: ilison@usal.es
Título: La perenne expansión del poder punitivo: la fase avanzada de la selectividad penal

Resumen de la Memoria:

Throughout my research career, I have developed several lines of inquiry, the most prominent—both in terms of scientific contributions and impact on criminal policy—being the critique of the selectivity of punitive power through the lens of a new integrated model of criminal science. This focus has resulted in the publication of my monographs, including “La perenne expansión del poder punitivo” (BdeF, 2021), “La nueva crítica criminológica” (co-authored with Raúl Zaffaroni, Tirant, 2020), “En busca de la justicia restaurativa” (BdeF, second edition, 2025), and, most recently, “Aporofobia e poder punitivo” (Tirant Brasil, 2024). In addition, I have published numerous articles and book chapters in high-impact journals and editorial collections (Q1 and Q2) in Spanish, Italian, Portuguese, English, and German, with particular emphasis on my recent contribution to the prestigious German journal Goldammer's Archiv für Strafrecht (2025). Moreover, according to Google Scholar and Dialnet, my work has been cited 391 times and has served as the foundation for studies conducted by the Brazilian Parliament (2021) and jurisprudence issued by the Inter-American Court of Human Rights (2022). Apart from being the beneficiary of a highly competitive Margarita Salas postdoctoral contract in its international modality, funded by Spain's Ministry of Science, Innovation, and Universities, I have served as Principal Investigator (PI) in three research projects, including one with an international scope funded by the Inter-American Court of Human Rights (€31,000). These achievements demonstrate my ability to design projects aligned with my research interests, implement them effectively, and deliver verifiable results. Similarly, I am a member of the scientific committees of prestigious international journals, such as Critica del Diritto and Quaderni dell'ISPA. In the field of research institution management, I served as President of the Criminal Sciences Center at the Federal University of Bahia (Brazil, 2016–2017). I also created and currently direct the “Reflexiones en Derecho Penal y Criminología” book series (Editorial Reus – Madrid and Editorial BdeF – Buenos Aires, co-edited). Along the same lines, I conceived the Ibero-American Criminal Sciences book series, for which I serve as Scientific Director. This project was approved following a rigorous peer review process by Springer Nature, one of the most prestigious academic publishers worldwide, with its first volume scheduled for release in early 2025. I have been awarded the “Prêmio de Excelência e Liderança Científica em Ciências Criminológicas” (Excellence and Scientific Leadership in Criminological Sciences Award) by the Pontifical Catholic University of Minas Gerais (Brazil) in its 2024 edition.

Resumen del Currículum Vitae:

Throughout my research career, I have developed several lines of inquiry, the most prominent—both in terms of scientific contributions and impact on criminal policy—being the critique of the selectivity of punitive power through the lens of a new integrated model of criminal science. This focus has resulted in the publication of my monographs, including “La perenne expansión del poder punitivo” (BdeF, 2021), “La nueva crítica criminológica” (co-authored with Raúl Zaffaroni, Tirant, 2020), “En busca de la justicia restaurativa” (BdeF, second edition, 2025), and, most recently, “Aporofobia e poder punitivo” (Tirant Brasil, 2024). In addition, I have published numerous articles and book chapters in high-impact journals and editorial collections (Q1 and Q2) in Spanish, Italian, Portuguese, English, and German, with particular emphasis on my recent contribution to the prestigious German journal Goldammer's Archiv für Strafrecht (2025). Moreover, according to Google Scholar and Dialnet, my work has been cited 391 times and has served as the foundation for studies conducted by the Brazilian Parliament (2021) and jurisprudence issued by the Inter-American Court of Human Rights (2022). Apart from being the beneficiary of a highly competitive Margarita Salas postdoctoral contract in its international modality, funded by Spain's Ministry of Science, Innovation, and Universities, I have served as Principal Investigator (PI) in three research projects, including one with an international scope funded by the Inter-American Court of Human Rights (€31,000). These achievements demonstrate my ability to design projects aligned with my research interests, implement them effectively, and deliver verifiable results. Similarly, I am a member of the scientific committees of prestigious international journals, such as Critica del Diritto and Quaderni dell'ISPA. In the field of research institution management, I served as President of the Criminal Sciences Center at the Federal University of Bahia (Brazil, 2016–2017). I also created and currently direct the “Reflexiones en Derecho Penal y Criminología” book series (Editorial Reus – Madrid and Editorial BdeF – Buenos Aires, co-edited). Along the same lines, I conceived the Ibero-American Criminal Sciences book series, for which I serve as Scientific Director. This project was approved following a rigorous peer review process by Springer Nature, one of the most prestigious academic publishers worldwide, with its first volume scheduled for release in early 2025. I have been awarded the “Prêmio de Excelência e Liderança Científica em Ciências Criminológicas” (Excellence and Scientific Leadership in Criminological Sciences Award) by the Pontifical Catholic University of Minas Gerais (Brazil) in its 2024 edition. In total, I have supervised 11 master's theses, distributed between the Master's Degree in Criminology, Criminal Policy, and Sociology of Criminal Law at the University of Barcelona, and the Master's Degree in Public Security and the Master's Degree in Advanced Studies in Terrorism at the International University of La Rioja. Additionally, I have served as a member of the tribunal for a doctoral thesis at La Salle University in Brazil and for 17 tribunals of master's theses in the Master's Degree in Criminology, Criminal Policy, and Sociology of Criminal Law at the University of Barcelona. Currently, I am supervising a doctoral thesis at the University of Salamanca.



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Turno General

Área Temática: Derecho
Nombre: BARIFFI, FRANCISCO
Referencia: RYC2024-050364-I
Correo Electrónico: fbariffi@der-pu.uc3m.es
Título: Tecnología, Discapacidad e Inteligencia Artificial: Explorando el Impacto de las Tecnologías Disruptivas en los Derechos de las Personas con Discapacidad

Resumen de la Memoria:

Francisco Bariffi es un destacado investigador en derechos humanos, centrando su trayectoria en la discapacidad, inteligencia artificial (IA), genómica, neurotecnología y transhumanismo. Con una sólida base académica y experiencia internacional, su línea de investigación combina el análisis jurídico y ético de las tecnologías emergentes con la promoción de los derechos humanos.

Desde su participación en la redacción de la Convención sobre los Derechos de las Personas con Discapacidad (CDPD), Bariffi se consolidó como referente en este ámbito. Su primera monografía en español sobre la CDPD marcó un hito, siendo ampliamente referenciada y base para reformas legislativas en España. Posteriormente, lideró proyectos sobre el impacto de la CDPD en sistemas legales, contribuyendo a su implementación en países como Argentina, Colombia, Perú y España.

En el marco de su línea de investigación "Tecnología, Discapacidad e Inteligencia Artificial," Bariffi analiza el impacto de las tecnologías disruptivas en los derechos humanos de las personas con discapacidad. Su trabajo examina cómo la inteligencia artificial y otras innovaciones tecnológicas pueden perpetuar sesgos o, por el contrario, servir como herramientas para el empoderamiento y la inclusión. Adopta un enfoque basado en los derechos humanos que se alinea con los principios de la CDPD, buscando garantizar que estas tecnologías promuevan la igualdad, no discriminación y participación plena en la sociedad. Además, evalúa dilemas éticos asociados a la neurotecnología, la robótica y la ingeniería genética, enfatizando la necesidad de un marco normativo robusto que asegure que estas tecnologías respeten la diversidad y autonomía de las personas con discapacidad.

Sus investigaciones han abarcado el análisis de leyes nacionales en América Latina y su adecuación a estándares internacionales, particularmente en salud mental y capacidad jurídica. Publicaciones como su tesis doctoral, premiada por la Universidad Carlos III de Madrid, exploraron el impacto del Artículo 12 de la CDPD en legislaciones internas.

En los últimos años, Bariffi amplió su enfoque hacia tecnologías disruptivas. Exploró cómo la IA puede perpetuar prejuicios o empoderar a personas con discapacidad, con publicaciones pioneras en ética y derechos humanos. Su investigación actual, financiada por el programa postdoctoral CONEX-PLUS, examina los desafíos éticos de la genómica y la IA. Ha colaborado con instituciones como la Fundación ONCE y liderado proyectos sobre la aplicación de la IA en el empleo inclusivo y los modelos de cuidado personalizado.

Bariffi ha combinado investigación y docencia en universidades de Europa y América Latina. En la UC3M, coordina el centro DERTECNIA, promoviendo un enfoque ético en la intersección de tecnología y derechos humanos. Además, dirige tesis doctorales y programas de maestría en temas como la IA, privacidad y no discriminación.

Su visión innovadora lo posiciona como líder en su campo, trabajando para que las tecnologías emergentes respeten y potencien los derechos humanos, especialmente de colectivos vulnerables.

Resumen del Currículum Vitae:

Francisco Bariffi, investigador, docente y divulgador en derecho y derechos humanos, es Doctor en Derecho Internacional de los Derechos Humanos por la Universidad Carlos III de Madrid (UC3M), donde también obtuvo un Máster en Derechos Fundamentales. Su carrera se centra en los derechos de las personas con discapacidad y su intersección con tecnologías emergentes como la inteligencia artificial, las neurotecnologías y la edición genética. Con más de 20 años de experiencia académica e investigativa, ha liderado más de 30 proyectos y programas educativos relacionados con derechos humanos, discapacidad y tecnología en instituciones de España, Argentina y otros países. Ha desempeñado roles destacados como subdirector del Centro de Investigación y Docencia en Derechos Humanos de la Universidad Nacional de Mar del Plata (UNMdP) y coordinador académico de la Red Iberoamericana de Expertos en la Convención sobre los Derechos de las Personas con Discapacidad (RED-CDPD). Además, fue asesor legal del Gobierno Español durante las negociaciones de la Convención de la ONU sobre los Derechos de las Personas con Discapacidad (CRPD).

Su producción científica incluye más de 50 publicaciones entre libros, capítulos y artículos en áreas como accesibilidad universal, capacidad jurídica, inteligencia artificial, genética y derechos humanos. Entre sus contribuciones destacan análisis críticos sobre el impacto de las tecnologías disruptivas en la inclusión y los derechos de las personas con discapacidad.

En el ámbito docente, ha impartido clases de posgrado en universidades de Sudáfrica, Italia, España, Irlanda, Colombia, Perú, Brasil y Argentina, además de dirigir y supervisar investigaciones de jóvenes académicos. Su compromiso con la educación inclusiva se refleja en su trabajo en clínicas legales y proyectos de capacitación orientados a organizaciones de personas con discapacidad.

Desde 2021, lidera el proyecto EDIBILITY, financiado por el programa CONEX-PLUS, centrado en la edición genética y sus implicaciones éticas, legales y sociales, asegurando que las voces de las personas con discapacidad sean integradas en debates globales. Ha colaborado con instituciones académicas y organismos internacionales, promoviendo la formulación de marcos regulatorios inclusivos y éticos.

Sus logros incluyen conferencias internacionales, reformas legislativas y consultorías con impacto en políticas públicas. Su enfoque interdisciplinario combina investigación jurídica, bioética y tecnológica, contribuyendo al avance del conocimiento y la mejora de la calidad de vida de comunidades marginadas. Su liderazgo ha sido clave para fomentar redes globales y difundir investigaciones innovadoras en derechos humanos y discapacidad.



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Turno General

Área Temática: Derecho
Nombre: GONZALEZ SALZBERG, DAMIAN
Referencia: RYC2024-048210-I
Correo Electrónico: dags161@yahoo.com.ar
Título: International Law of Human Rights

Resumen de la Memoria:

I am an international and inter-disciplinary scholar. I started my professional career as a human rights lawyer in Argentina, after graduating from the Universidad de Buenos Aires, and following completion of two master's degree in politics (at the University of York and the Institut Barcelona d'Estudis Internacionals), I obtained my PhD in Law from the University of Reading (UK). Before defending my thesis in November 2015, I secured a permanent position as a Lecturer at the University of Sheffield (UK), where I worked from September 2014 until December 2019. Since January 2020, I am an Associate Professor of Law at the University of Birmingham (UK), where I teach and research in the areas of public international law and international human rights law.

The line of research I propose to undertake builds on my extensive work on the protection of human rights by international courts and monitoring bodies; an area in which I have published 3 academic books, 16 journal articles, and 5 book chapters. The proposed research will explore a new role that international human rights law is currently performing within international politics, which entails the "stretching" of the scope of international human rights dispute-settlement mechanisms. Sitting at the intersection of law, politics, and sociology, this line of research will examine how inter-State human rights disputes before international courts and monitoring bodies are increasingly being used (and potentially even abused) to seek justice for international conflicts that are much wider than mere human rights disputes.

Some of the most evident examples of this phenomenon can be found in the use of the dispute settlement mechanisms provided by the 1948 Convention on the Prevention and Punishment of the Crime of Genocide and by the 1965 International Convention on the Elimination of All Forms of Racial Discrimination – such as resort to the International Court of Justice and the UN Committee on the Elimination of Racial Discrimination – to deal with particular aspects of much wider and complex international armed conflicts taking place in Palestine and Ukraine. While this "stretching" of international human rights jurisdictions can offer the seductive promise of a (limited) degree of justice in a broader universe of otherwise unaccountable violations of international law, it also brings attached potentially nefarious consequences for the future of international human rights law. In particular, this phenomenon can contribute to the continued loss of legitimacy of international courts and monitoring bodies; can affect the drafting of future international treaties (especially of their jurisdictional clauses); can have an impact on the willingness of States to become parties to human rights treaties; and can detrimentally influence the level of adherence to jurisdictional clauses (which are mostly optional).

The proposed research will lead to the publication of a series of (at least) 6 journal articles and a policy paper. These pieces will shed light onto the new role that international human rights law and international courts and monitoring bodies are performing in world politics and will provide insights into the potential impact of the phenomenon of "stretching" the jurisdiction of human rights dispute-settlement mechanisms.

Resumen del Currículum Vitae:

I am an Associate Professor of Law at the University of Birmingham (UK), while I also hold fractional appointments at the Universidad de Buenos Aires (Argentina), where I am Professor of Law for the PhD programme, and at the University of London (UK), where I convene a course on the distance-learning LLM. I have an international and inter-disciplinary background, with a first degree in law ("Abogado") from the Universidad de Buenos Aires and a PhD in law from the University of Reading (UK), and two master's degrees in politics from the University of York (UK) and the Institut Barcelona d'Estudis Internacionals (España).

My research focuses on international law and human rights and benefits from the use of different methods and theoretical perspectives; from critical theories of law, including feminist, queer, and post-colonial theories, to quantitative methods, including statistical analysis. I have published this research in world-leading academic journals, such as Harvard Human Rights Journal, Journal of Law and Society, American Journal of International Law, Unbound, Modern Law Review, and Human Rights Law Review. The quality of such publications can be confirmed by their internal assessment at the University of Birmingham. My empirical piece in the Harvard Human Rights Journal has been scored the maximum possible grade of 4* and the law/history article published in the Journal of Law and Society as a borderline 3/4*.

I have also published three books with top academic publishers: Hart, Routledge, and Oxford University Press. My 2019 research monograph, 'Sexuality and Transsexuality under the European Convention on Human Rights', has received excellent reviews in leading journals (Modern Law Review, Nordic Journal of Human Rights, and European Convention on Human Rights Law Review) and has also been internally assessed with the maximum possible score of 4*. My 2019 co-edited collection (with Loveday Hodson), 'Research Methods for International Human Rights Law', was the outcome of a 2-year research project I co-led, and its quality has been highlighted in a review in a top journal of the discipline (Human Rights Law Review).

My most recent book, published in February 2024 by Oxford University Press, is fruit of a 5-year collaboration with the late Judge Antônio Cançado Trindade of the International Court of Justice. Our book 'International Law of Human Rights' undertakes an innovative approach to the discipline, being the product of two critical scholars from the Global South, and, due to its content and scope, can be expected to become a world-leading text in the field. The book has received outstanding reviews, with the Brazilian branch of the International Law Association even selecting it for a book symposium.

My research has had demonstrable impact beyond academia. Following publication of my 2010 empirical article 'The effectiveness of the Inter-American Human Rights System', the Inter-American Court modified the way it reports compliance with judgments, adopting the conclusions of my



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piece. Moreover, I have used findings from my work to support amicus curiae interventions before the Inter-American Court, having been invited to take part in oral pleadings in one of the cases. I also regularly engage with the press, having had my opinions on international law quoted by 'The Guardian' and in 'Radio Nacional de España'.



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Turno General

Área Temática: Derecho
Nombre: GOMEZ SANTOS, MARIA
Referencia: RYC2024-048446-I
Correo Electrónico: mariagomezjuridico@gmail.com
Título: Promoción de la competencia y desarrollo económico
Resumen de la Memoria:

My research primarily focuses on business cooperation and the promotion of competition as legal mechanisms that enhance economic development. In this contest, my best contributions are the publication of three monographs in the prestigious editor Aranzadi: "Pools de riesgos y derecho de la competencia. Evaluación antitrust de los pools de riesgos a la luz del fenómeno de la red empresarial" (2020); "Distribución directa de seguros: agencias de suscripción de riesgos y acuerdos para la distribución a través de agentes en exclusiva" (2022) and "La promoción de la competencia como vector del crecimiento económico. Un estudio de caso: Castilla y León" (2024).

The first two monographs have made a significant contribution to the study of business coordination in the insurance sector. The first one particularly explores different ways current legislation permits the establishment of relationships between competing insurance companies. This work is the first monograph published about risk pools, highlighting its significance in both academic and practical contexts. It is important to note that much of the research conducted in preparation for this monograph is based on my doctoral thesis, which received a Cum Laude distinction from the examining committee. This research was supported by a predoctoral contract linked to the National Research Project "Coordinación empresarial lícita en el derecho de defensa de la competencia" (DER2015-67704-P).

The second monograph explores two forms of direct insurance distribution that, despite their increasing significance in the industry over the years, have not been systematically analyzed from a legal perspective. Specifically, it focuses on risk underwriting agencies and distribution through exclusive agent networks affiliated with other entities. The third monograph discusses the potential benefits of promoting competition as a legal instrument that can significantly contribute to the economic growth of areas particularly affected by issues such as depopulation and an aging population. This monograph specifically analyzes formulas to enhance public policy development in Castilla y León, aimed at promoting the region's economic and social development.

As appointed, most of my research has focused on studying business collaboration and promoting competition as key drivers of economic growth, particularly in the financial sector. So, given my expertise and the current political and social challenges in various EU regions, I believe my future research should concentrate on how business collaboration and effective governance practices, alongside the third sector, can enhance rural entrepreneurship and eco-innovation. In this context, leveraging my current role as the coordinator of la Red de Centros de Innovación Territorial (Red CIT), created by the Ministerio para la Transición Ecológica y el Retorno Demográfico, I see this as a valuable opportunity to examine the issue from both practical and academic perspectives.

Resumen del Currículum Vitae:

From the point of view of the academics, my best contributions are the publication of three monographs in the prestigious editor Aranzadi. I also have published articles (more than 30) in several prestigious legal reviews (Revista de Derecho Mercantil; Revista de Derecho de Seguros; etc.), different chapters (more than 30) in collective books (Comares, Aranzadi, Tirant lo Blanch, Giapichelli, etc.) at the national and international level. As well, connected to my research, I have had the opportunity to present my work in several international and national congresses along the European Union (more than 40 lectures since 2017).

All the scientific contributions I have made throughout my career are single-authored, including monographs, articles, book chapters, and lectures. Additionally, it's important to highlight that, even though I defended my doctoral thesis four years ago, I received the accreditation as "Profesora Titular de Universidad" from the ANECA in May 2024 and have a "sexenio de investigación" provided in 2023.

Concerning my commitment to knowledge transfer, I consider my most relevant contribution is to have been appointed as the national coordinator for the hub of la Red de Centros de Innovación Territorial (Red CIT), created by the Ministerio para la Transición Ecológica y el Retorno Demográfico. This appointment highlights two aspects of my CV that are uncommon in young researchers: my previous and extensive experience as a legal advisor to prestigious companies (Garrigues), and my noteworthy academic activity. My responsibilities involve coordinating the work team of the central node of the Red CIT and preparing various reports aimed at designing and promoting business activities, particularly in the third sector. This project has an initial pilot phase lasting 26 months. The total amount of the contract is €137,855.38, for which I am the sole signatory and responsible party.

Other merits are also especially noteworthy, such as my appointment by the CNMC as a non-governmental advisor to the "International Competition Network" through a merit contest; my membership in the "Red Académica de Defensa de la Competencia" (RADC); my status as a collegiate arbitrator in the "Junta Arbitral de Consumo de Castilla y León" (with more than 200 decisions issued since 2016), or my position as a permanent reviewer in two legal journals: Revista de Derecho del Sistema Financiero, published by Aranzadi and the Polish magazine The Transformation of Private Law.

As well, I am the founder and the academic director of the "Instituto Jurídico de Estudios Interdisciplinares", whose main objectives are to raise funds for young researchers and to create interdisciplinary networks at an international level. By now, the members are all young PhD researchers/professors from various countries (Spain, Portugal, Italy, Poland and the Czech Republic).



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Turno General

Área Temática: Derecho
Nombre: VIOLA, PASQUALE
Referencia: RYC2024-048630-I
Correo Electrónico: viola_pasquale@yahoo.it
Título: Environmental Constitutionalism and Anthropogenic Climate Change: Assessing Climate Policies and Legislation in the Context of the EU Green Deal and the Energy Transition

Resumen de la Memoria:

The proposed research line aims to explore the evolving relationship between environmental constitutionalism and climate policies in the Anthropocene (the latter considered as a novel intellectual framework, not a geological era). The Anthropocene, defined by unprecedented human impact on the Earth's ecosystems, requires us to rethink legal structures, especially at the constitutional level. In this context, environmental constitutionalism offers a novel lens through which to examine the evolving role of national and supranational legal systems in addressing environmental degradation, anthropogenic climate change and the contemporary socio-ecological crisis.

The research will specifically analyse the EU Green Deal and the energy transition policies, assessing their alignment with principles of environmental constitutionalism. By focusing on the legal, political, and institutional frameworks within which these policies are implemented, the project seeks to understand how constitutional principles can integrate sustainability, justice, adaptation and mitigation in response to the most pressing legal and socio-ecological challenges. Depending on the interest of the funding Institution, and based on the nationally determined contributions within the framework of the Paris Agreement, other comparative studies may also refer to emerging economies (e.g., China, India, Brazil, South Africa), pointing out their trajectory to cope with environmental and climate matters, and providing comparative insights with respect to EU law and policies.

Key questions to explore:

1. How do legal systems frame environmental rights and obligations?
2. Do constitutional amendments reflect emerging environmental concerns?
3. How are environmental rights balanced with other rights?

Key Objectives of the Research:

1. Mapping the role of environmental constitutionalism and climate change policies and legislation
2. Assessing the EU Green Deal as a background for effective domestic legal responses
3. Energy transition and constitutional challenges
4. Integrating environmental justice and human rights into climate law
5. Developing a framework for adaptation to the Anthropocene

Research Methodology.

The research will accomplish the planned activities through a comparative law methodology, investigating legal frameworks from EU (and, depending on the hosting institution interests, non-EU countries). Data will be collected through:

- A) analysis of constitutional provisions, laws, and policies documents;
- B) case studies from EU Member States (mainly Spain, Italy, Germany and France), with a possible analysis of key-jurisdictions beyond Europe (specific interest may be devoted to emerging economies, e.g., China, India, Brazil, South Africa);
- C) interviews with policymakers, legal scholars, environmental and climate activists;
- D) climate litigation analysis, focusing on high-profile cases related to environmental rights and constitutional challenges.

Resumen del Currículum Vitae:

Pasquale Viola (Ph.D.) is senior post-doctoral research fellow (non-tenured) at the University of Trieste (Italy). His research spans two interconnected areas at the forefront of contemporary legal studies, both framed within a comparative public law methodology. The first delves into the evolving landscape of constitutionalism, exploring how legal systems navigate key-issues such as constitutional adjudication, integration, minority rights, political opposition, and the dynamic process of constitutional borrowing across diverse legal cultures. He completed his Ph.D. at the University of Campania in co-tutorship with the National Law University Delhi (2018), also conducting research in Nepal, Hong Kong, and South Korea. His work advanced debates on pluralistic forms of constitutionalism; he disseminated findings through publications and conferences and was appointed International Observer for Nepal's 2017-2018 elections. His interest in the Global South extends to Latin America, explored during a post-doctoral project at the University of Bologna and a stay at the Centro de Estudios Políticos y Constitucionales in Madrid (2020). Currently, he is concluding the final outcomes of a research on EU enlargement to the Western Balkans and the role of political opposition.

The second area concerns environmental constitutionalism and climate change legislation, key challenges linked to environmental degradation. Since his doctoral studies, he explored environmental law beyond European systems, focusing on the role of scientific experts in environmental litigation. He conducted a study of environmental provisions in UN member states' constitutions, categorising them by function: right-based, duty-based, state policies, resource management, and power allocation in federal systems. This formed the basis of his post-doctoral research at Charles University, culminating in the monograph 'Climate Constitutionalism Momentum: Adaptive Legal Systems' (Springer, 2022).

Quantitative data of production and dissemination (2016-2024):

- 2 monographs;
- 38 contributions in scientific Journals;
- 27 book chapters;
- 119 participations (as speaker) in conferences, seminars and workshops.

Languages of publications: English, Italian, Spanish, Portuguese, French.



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Languages of presentations: Italian, Spanish, English.

Other merits:

☐ Award ☐Young Investigator 2019☐, University of Genova, 19/1/2022.

☐ Member of the ☐Standing Committee for Equal Opportunities, the Enhancement of Workers☐ wellbeing and against discrimination☐, University of Trieste, since December 2022.

☐ Member of the Editorial Board, Revista General de Derecho Público Comparado, since 2020.

☐ Member of the Directors☐ Board, L'era di Antigone Series (Franco Angeli Publishing, Milano), since 2024.

☐ Member of the Scientific Committee, ☐International Scientific Conference Minorities for Europe of Tomorrow☐; participatory status with the Council of Europe since 1992).

☐ Peer reviewer for Routledge (London-New York), Journal of Human Rights Practice (Oxford University Press), Revista General de Derecho Público Comparado, Revista de Estudos Constitucionais, Hermenêutica e Teoria do Direito, Diritto Pubblico Comparato ed Europeo, and others.

☐ Qualified to function as Associate Professor (in the Spanish system 'Acreditación para Profesor Titular'), Italian Ministry of University and Research, 30/8/2021.



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Turno General

Área Temática: Economía
Nombre: ROLDAN BLANCO, PAU
Referencia: RYC2024-050521-I
Correo Electrónico: pauoldanb@gmail.com
Título: Firm Dynamics, Aggregate Productivity and Economic Growth

Resumen de la Memoria:

Pau Roldan-Blanco's research aims to understand the endogenous mechanisms that bind firm behavior and macroeconomic dynamics together, with the goal of quantifying the impact that firms' decisions may have on aggregate welfare and to provide policy recommendations. Pau's work spans a number of topics, which can be loosely grouped into three areas: firm intangibles and economic growth, market structure and intangibles and dual labor markets. Key research outputs from these areas are:

1. "Firm Dynamics and Pricing under Customer Capital Accumulation" (Journal of Monetary Economics, Vol. 118, pp.99-119, March 2021), with Sonia Gilbukh (CUNY Baruch College).
2. "Advertising, Innovation and Economic Growth" (American Economic Journal: Macroeconomics, Vol. 13, No. 3, pp.251-303, July 2021), with Laurent Cavenaile (University of Toronto).
3. "Style Over Substance? Advertising, Innovation, and Endogenous Market Structure" (Journal of Monetary Economics, Vol. 149, 103683, January 2025), with Laurent Cavenaile, Murat Alp Celik (University of Toronto) and Xu Tian (University of Georgia).
4. "A Theory of Dynamic Product Awareness and Targeted Advertising" (revise and resubmit at Journal of Political Economy), with Laurent Cavenaile, Murat Alp Celik and Jesse Perla (University of British Columbia).
5. "The Effects of Startup Acquisitions on Innovation and Economic Growth" (revise and resubmit at Review of Economic Studies), with Christian Fons-Rosen (UC Merced) and Tom Schmitz (Queen Mary University of London).
6. "International Trade and Innovation Dynamics with Endogenous Markups" (Economic Journal, Vol. 33, No. 651, pp.971-1004, April 2023), with Laurent Cavenaile and Tom Schmitz.
7. "Dual Labor Markets and the Equilibrium Distribution of Firms" (CEPR Discussion Paper No. 17762), with Josep Pijoan-Mas (CEMFI).

A common theme in Pau's work is to shed light on policy-relevant issues and to make specific policy recommendations. Along these lines, he has worked closely with policy institutions, especially during his tenure as Research Economist at Banco de España (2018-2024), where he had the opportunity to collaborate with economists from various central banks and from the European Central Bank (ECB) itself, as well as with other Spanish non-academic institutions such as the Instituto Nacional de Estadística (INE) and the Comisión Nacional de los Mercados y la Competencia (CNMC). From 2019 to 2023, was a member of the Price-Setting Microdata Analysis (PRISMA) network of the ECB, a collaboration that resulted in an academic publication (at AEJ: Macro) and contributions to several monetary policy discussions at the ECB.

After joining UAB, Pau was able to obtain external research funding through a Social Sciences Research grant (2024 call) from the Fundación Ramón Areces, a project for which he is the Principal Investigator.

Pau is fully integrated in the international academic community in various capacities. He has participated as a speaker in over 50 internationally renowned conferences and workshops, and he has been invited as by universities, research institutions and central banks in more than 30 occasions. He has also done research visits at the St. Louis Fed, Paris School of Economics and University of Toronto, has served as referee for every top academic journal in Economics, and is involved in the organization of several conferences.

Resumen del Currículum Vitae:

Pau Roldan-Blanco is a Serra Hùnter Lecturer (with tenure) at the Department of Economics and Economic History of Universitat Autònoma de Barcelona, Affiliated Professor at the Barcelona School of Economics, and Associated Faculty at Centro de Estudios Monetarios y Financieros (CEMFI). From 2018 to 2024, he held a position at Banco de España as Research Economist at the Structural Analysis Division. He holds a PhD in Economics from New York University (2018), a Master in Science from Barcelona School of Economics (2012), and a B.A. (Licenciatura) in Economics from Universitat Pompeu Fabra (2010).

Since obtaining his PhD, his scientific career has produced several research projects, six of which have been published in prestigious and high-impact journals, such as Journal of Monetary Economics, American Economic Journal: Macroeconomics, Economic Journal, and Journal of Economic Behavior and Organization. Two of his projects are currently under review for Journal of Political Economy and Review of Economic Studies. According to Google Scholar, as of January 2025, Pau's research has been cited 311 times, his h-index is 9, and his i10-index is 9. His articles have been cited by internationally recognized scholars.

Pau has participated as a speaker in more than 50 internationally renowned conferences. He has also been invited by universities, central banks, and other research centers to present his work on more than 30 occasions. To develop these projects, Pau has received funding from New York University, with grants to cover for travel expenses, and from the Fundación Ramón Areces, through its Social Sciences Research Grants program (2024 edition).

Additionally, Pau has held scientific responsibilities within various research teams composed of several co-authors from prestigious international institutions, such as Murat Alp Celik and Laurent Cavenaile (both at the University of Toronto), Tom Schmitz (at Queen Mary University of London), Christian Fons-Rosen (at UC Merced), and Jesse Perla (at the University of British Columbia), among others. Additionally, as a member of the Price-Setting Microdata Analysis (PRISMA) network, a task force of the European Central Bank aimed at studying price-setting behavior at the microeconomic



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level using household consumption basket data from several European countries, Pau's research has had an impact on monetary policy discussions within both the Banco de España as well as the European Central Bank itself.

Pau has also contributed to the training, development, and evaluation of research. He has served as referee for several high-impact scientific journals (among which *Econometrica*, *Quarterly Journal of Economics*, *Journal of Political Economy*, *Review of Economic Studies*, and *American Economic Review*). He has participated in the organization of conferences: Cemfi's annual "MadMac" conference, the 4th Annual Conference of the Banco de España, the "Growth and Productivity" session at the 2025 Barcelona School of Economics Summer Forum, and the Bellaterra Growth Workshop, of which he is co-founder. He has been a member of the scientific committee of the Symposium of the Spanish Economic Association (SAEe) on two occasions (2023 and 2024). He has also acted as a mentoring figure by supervising several undergraduate and master theses at CEMFI and UAB, and by advising PhD students at UAB and CEMFI.



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Turno General

Área Temática: Economía
Nombre: SANDI , MATTEO CARLO MARIA
Referencia: RYC2024-050189-I
Correo Electrónico: mcm.sandi@gmail.com
Título: Assistant Professor in Economics

Resumen de la Memoria:

After completing his undergraduate studies in Economics in Italy, in 2009 Matteo Sandi moved to the UK to pursue an MSc in Development Economics at the University of Sussex. At the end of this programme, Matteo started working as a Research Assistant at InterAnalysis Ltd., a spin-off company of the University of Sussex that developed a software of international trade analysis called Tradesift. Matteo helped develop the software and then he presented it in several different countries, including the UK, Nigeria, Burundi, Uganda, Myanmar, Nepal and Vanuatu. Within a year from the completion of his MSc, he started his PhD in Economics at the University of Sussex, where he graduated in January 2017.

In May 2014, he took up a summer internship at the World Bank Office in Jakarta (Indonesia), where his contract soon turned into a Short-Term Consultancy (STC) and he ended up working in Jakarta until December 2014. He continued to consult the World Bank with a new contract as an International Consultant until October 2015, when he took up a new position as Research Economist at the CEP, LSE. While holding his full-time job at LSE, he regularly visited the University of Queensland (Australia) for one month every year. Matteo worked full-time at LSE up until the 1st September 2022, when he took up a tenure-track assistant professor position at the Catholic University of Milan (Italy).

Resumen del Currículum Vitae:

Matteo Sandi is an economist based in the Department of Economics and Finance at the Catholic University of Milan in Italy and a Visiting Fellow at the London School of Economics (LSE) in the UK. Matteo is also a CESifo affiliate and member of the experts panel of the Youth Endowment Fund in the UK. Matteo's research focuses on crime economics, education policy, and migration. Matteo worked full-time at LSE for 8 years and he continues to collaborate with LSE colleagues today. In 2017, he completed his PhD in Economics at the University of Sussex under the supervision of L. Alan Winters while he was hired as an International Consultant by the World Bank Group. His research is published in high-impact journals, including the Economic Journal, Journal of the European Economic Association and Annual Review of Economics. Matteo has led and contributed to several research projects funded by competitive grants, including as Principal Investigator of an EU-funded research project in Italy (budget: €262,656), as Principal Investigator of a project funded by the UK's Youth Endowment Fund on what keeps pupils excluded from mainstream schooling in England away from crime (budget: £ 144,134), and multiple other grants from the British Academy/Leverhulme, ADR UK, and Newton Fund. Matteo's research on school exclusions has informed public debates in the UK, it has received substantial media coverage, including by The Guardian and The Times, it has been presented in front of the UK parliament and it has influenced education policy. He regularly conducts refereeing activities for leading journals, such as the Economic Journal and the Journal of Applied Econometrics.



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Área Temática: Economía
Nombre: BAJO BUENESTADO, RAÚL
Referencia: RYC2024-048512-I
Correo Electrónico: rbajo@unav.es
Título: Avances Teóricos y Empíricos en Economía de la Energía y Medioambiental, Organización Industrial y Desarrollo Sostenible con Implicaciones de Políticas Públicas

Resumen de la Memoria:

Aportaciones científico-técnicas. He publicado 14 artículos en revistas indexadas (sexenio reconocido por ANECA). De entre ellas, caben destacar aportaciones sobre competencia de mercado y fiscalidad ambiental publicadas en *Economic Journal*, *Journal of Public Economics* y *European Economic Review*, algunas de las que han resultado en colaboraciones con entidades (ej., CNMC); aportaciones en temas de regulación y efectos medioambientales del sector eléctrico publicadas en *Nature Sustainability* (con coautores en EE.UU.), *Energy Economics* y *Energy Policy*, siendo algunas de relevancia para el mercado ERCOT (dos tienen más de 70 citas); aportaciones en temas de mercados bilaterales publicadas en *Economic Letters* y otro artículo presentado en sesión plenaria de congreso internacional; y aportaciones a la ciencia abierta en un "artículo de replicación" en *Energy Economics*. He presentado comunicaciones en 41 congresos nacionales e internacionales (obteniendo premio a la mejor comunicación dos veces) y en seminarios en 15 instituciones. Mi trabajo ha sido divulgado en medios de comunicación, videos y podcasts, y ha sido galardonado con premios de investigación.

Movilidad e internacionalización. Obtuve mi doctorado de economía en Rice University, consiguiendo el premio a la mejor tesis y siendo financiado por Fulbright. De mi tesis surgieron cuatro artículos en revistas indexadas. Trabajé dos años como Investigador Residente en el Baker Institute for Public Policy (BIPP) colaborando en el análisis del mercado eléctrico Tejano (ERCOT). Desde 2016 mantengo la filiación al BIPP como Investigador No Residente, con el que contribuyo en investigación, divulgación y promoviendo acciones de formación de estudiantes. He realizado estancias en U Western Australia, Nova Business School, University Pennsylvania, Strathmore University y CESifo, las cuales resultaron en publicaciones, colaboraciones y/o intercambio de estudiantes.

Independencia y liderazgo. He sido IP de cuatro proyectos de investigación nacionales competitivos, liderando equipos de hasta seis miembros. Soy codirector del grupo NCID, en el que lidero la línea de Desarrollo Sostenible, organizo workshops (cofinanciados por mis proyectos), organizo las contrataciones y coordino los seminarios. Soy editor de la revista *Journal of Industry, Competition and Trade* (indexada en JCR) y he participado en comités científicos de congresos internacionales, incluyendo algunos específicos para jóvenes investigadores. Encabezo el comité organizador de dos congresos futuros (siendo impulsor de uno de ellos). He dirigido una tesis doctoral y he sido evaluador de otras dos más. También he dirigido 11 TFGs y 4 TFMs. Fui 5 años subdirector del Master en Economía y Finanzas.

Línea de investigación a desarrollar. Mi línea de investigación plantea tres grandes objetivos que aportarán valor añadido a mi carrera. Primero, analizar los efectos del conflicto Rusia-Ucrania en los mercados energéticos y políticas industriales europeas, con implicaciones en términos de bienestar social o medioambientales. Segundo, estudiar teórica y empíricamente cómo el crecimiento poblacional afecta las emisiones de carbono, explorando y diseñando políticas para reducirlas sin comprometer el crecimiento demográfico. Tercero, estudiar el impacto de la infraestructura energética en la transformación estructural de países en desarrollo.

Resumen del Currículum Vitae:

Obtuve el doctorado en economía en Rice University con una beca Fulbright, consiguiendo el premio a la mejor tesis. Soy Profesor Titular en la Facultad de CC. Económicas de la Universidad de Navarra, investigador del Instituto Cultura y Sociedad de la misma universidad y dentro del cual soy codirector del Navarra Center for International Development (NCID), e investigador no residente del Baker Institute for Public Policy. He realizado estancias en University Western Australia, Nova Business School, University of Pennsylvania, Strathmore University y Center for Economic Studies (CESifo), del cual soy miembro.

He publicado 14 artículos en revistas de revisión por pares indexadas (contando con un sexenio de la ANECA) y he conseguido 6 proyectos de investigación nacionales competitivos otorgados por la Agencia Estatal de Investigación y la Fundación Ramón Areces, siendo IP de 4 de ellos.

He realizado aportaciones novedosas sobre competencia y medioambiente en artículos en *Economic Journal*, *Journal of Public Economics* y *European Economic Review* (todas Q1 del JCR), cuyos resultados he presentado en la CNMC. También he realizado aportaciones sobre el mercado eléctrico en un artículo en *Nature Sustainability* (fruto de una colaboración con investigadores en University Southern California y University of Colorado), otro en *Energy Policy* y tres más en *Energy Economics* (todas primer decil del JCR). He publicado otros artículos en *Empirical Economics*, *Economics Letters*, *Journal of Industry, Competition and Trade*, *Electricity Journal*, *Journal of Transport Economics & Policy* e *International Journal of Economic Theory*.

He presentado comunicaciones orales en 29 congresos internacionales (siendo ponente en sesión plenaria en dos de ellos) y 12 nacionales. En dos ocasiones he obtenido premio a la mejor comunicación presentada. Además, he presentado seminarios en 15 instituciones nacionales e internacionales, tales como National University of Singapore y HEC Montreal. También he divulgado algunos resultados de mis trabajos en medios, blogs y podcasts.

Soy codirector del NCID, un grupo de nueve investigadores residentes y cuatro asistentes (una de las cuales se incorporó gracias a los fondos de mis proyectos). En el mismo lidero la línea de investigación en Desarrollo Sostenible, y he organizado (y cofinanciado con mis proyectos) dos workshops internacionales de investigación. Además, soy el responsable de los seminarios de investigación y de los procesos de contratación.



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Soy editor de la revista Journal of Industry, Competition and Trade (del JCR), y he sido revisor anónimo para revistas del JCR y del SJR en 63 ocasiones. Además, he sido revisor para dos congresos internacionales de la United States Association for Energy Economics (USAEE), y también miembro del comité científico de congresos orientados a la formación de jóvenes; ej. II Congreso Internacional de Jóvenes por la Investigación (Universidad de La Laguna).

Dirigí una tesis doctoral, y he sido miembro del tribunal de otras dos. Además, he dirigido 4 TFM's y 11 TFG's. He impartido más de 1.200 horas de docencia de grado y postgrado incluyendo docencia en instituciones extranjeras (ej., University Western Australia). Fui 5 años subdirector del Máster en Economía y Finanzas (Universidad de Navarra) y desde 2018 soy el responsable de su asignatura "Mathematical Analysis for Economic Research".



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Turno General

Área Temática: Economía
Nombre: VLADASEL, THEODOR
Referencia: RYC2024-049591-I
Correo Electrónico: theodor.vladasel@upf.edu
Título: Innovation and (social) entrepreneurship: Individuals, organizations, and society

Resumen de la Memoria:

My research investigates the individual and contextual drivers of (growth-oriented) entrepreneurship and innovation, and the implications of strategic human capital for new and established (social) ventures. I pay particular attention to individual and firm heterogeneity, and use both advanced econometrics and experiments.

My first line of work studies entrepreneurship's individual drivers and consequences. In "On the Origins of Entrepreneurship: Evidence from Sibling Correlations" (Journal of Business Venturing, FT50, ABS AJG 4*, WoS-JCR and Scopus Q1), I use human capital accumulation theories to quantify the total and relative importance of family and community influence for entrepreneurship outcomes. Applying variance decomposition techniques to Swedish registry data, I argue inquiries into the origins of entrepreneurship should focus on individuals' early lives. In "Family Structure and Entrepreneurship: Evidence from Swedish Siblings" (Entrepreneurship & Regional Development, ABS AJG 3, WoS-JCR and Scopus Q1), I study whether the family hinders or fosters children's pursuit of (growth-oriented) entrepreneurship in a systematic, unequal manner, using family socialization and resource allocation theories and a set of causal tests. In "Are Entrepreneurs More Upwardly Mobile?" (2nd R&R Journal of Business Venturing), I challenge the common view that entrepreneurship is an important avenue for upward economic mobility, using high-quality lifetime income measures for 215,000 Swedish father-son pairs. I plan to further analyze selection into entrepreneurship along the income distribution, and its implications for income mobility in society.

The second line studies innovation. In "Hiring Entrepreneurs for Innovation" (2nd R&R Strategic Management Journal), I use Danish registry data to show that founder hires enhance hiring firms' sales from innovation, arguing that they possess execution skills, a generalist ability to create and exploit market gaps by acquiring and mobilizing resources around new ideas. By shedding light on the nature of entrepreneurial skills, we reveal a novel human capital input to innovation that helps firms appropriate a larger fraction of the value they generate. In "Continuing Patent Applications at the USPTO" (Research Policy, FT50, ABS AJG 4*, WoS-JCR and Scopus Q1), I show that patent applicants strategically file continuations to keep prosecution open and change patent scope after locking in gains with an initial patent. Continuations are more privately valuable than original patents, filed in more uncertain contexts, for higher value technologies, by more strategic applicants, and react strongly to notices of allowance. I will extend this line by looking at geographical proximity to institutions (USPTO) and how organizational design influences entrepreneurial human capital deployment.

My final line of work examines social venture tensions. In "Revenue Drift, Incentives, and Effort Allocation" (Journal of Economics & Management Strategy, ABS AJG 2, WoS-JCR Q3; Scopus Q2) I experimentally show that low-powered financial incentives can address revenue drift (excessive social goal focus) and attract more (similarly prosocial) workers to social enterprises. I will add to this inquiry by studying how individuals cognitively process tradeoffs, and how ESG certification influences social ventures' external funding.

Resumen del Currículum Vitae:

I am an Assistant Professor at Universitat Pompeu Fabra, and also affiliated with the UPF Barcelona School of Management and Barcelona School of Economics. In 2022-2023 I was a Juan de la Cierva (Formación) fellow.

I received my PhD in Economics and Management from Copenhagen Business School (CBS, 2019), an MSc (cum laude) in Organizational Economics from the U. of Amsterdam (UvA, 2014), and a BA in International Business and Economics at the Bucharest U. of Economic Studies (valedictorian, 2013). In 2017-2018 I was a Fox International Fellow at Yale (funded by MacMillan Center, \$29,000); I made academic visits to UvA and SOFI (Stockholm U.) in 2015-2017. I will visit the Rotman School of Management (U. of Toronto) in April-June 2025.

My work on (social) entrepreneurship and innovation has received 190 Google Scholar (h-index 4), 36 WoS, and 43 Scopus citations (as of January 16 2025) and the 2020 NFIB Doctoral Dissertation Award from the Academy of Management's (AoM) Entrepreneurship Division.

Together with international coauthors, I have published in leading entrepreneurship, innovation, and strategy journals (Journal of Business Venturing, Research Policy, Entrepreneurship & Regional Development, Journal of Economics & Management Strategy) and have been invited to resubmit (2nd round) to Strategic Management Journal (flagship general interest journal) and Journal of Business Venturing (top field journal). I was a member of the research team for ministry project AEI-PID2022-140014NB-I00; I currently have the same role for project AEI-PID2019-109377GB-I00.

I engage in knowledge diffusion by presenting my work in top international conferences (SMS, AoM, DRUID, CEPR, SEI, BSE, ZEW), online workshops (Entrepreneurship and Innovation Policy and Strategy, Entrepreneurship, and Innovation), or invited seminars (Yale, Bocconi, Imperial, Max Planck, Utrecht, SKEMA). I organized the department management seminar series at UPF in 2021-2023. Since 2020 I lead the Barcelona School of Economics Summer Forum on Entrepreneurship, a workshop attracting strategy, economics, and finance scholars. We feature high-profile keynote speakers from top institutions. I previously assisted Mirjam van Praag (VU Amsterdam), Saul Estrin (LSE) and Maryann Feldman (ASU) in organizing the Oxford Residence Week for Entrepreneurship Scholars.

I referee regularly for leading international journals in management and economics. I also review (and was awarded best reviewer) for international conferences (AoM, DRUID), serve on Small Business Economics' editorial review board, and reviewed for the ERC Advanced Grant. I have been a



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member of UPF's management junior faculty recruiting committee and board member of the CBS Doctoral School in Economics and Management and Staff Involvement Forum. I have contributed to efforts to promote reproducibility and replication in science as member of the Management Science Reproducibility Collaboration.

I have ample teaching experience as instructor and course coordinator in business economics at UPF at the bachelor, master, and PhD levels, with teaching evaluations from 9.2 to 9.6 (out of 10) in all years. I also acquired experience as teaching assistant for classes in economics, statistics, and econometrics at all levels at CBS, and have supervised final year projects (research/business plan) for bachelor and master students.



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Turno General

Área Temática: Economía
Nombre: GIANNONE , ELISA
Referencia: RYC2024-049489-I
Correo Electrónico: egiannone@crei.cat
Título: Understanding Inequality and Growth across Space and Time

Resumen de la Memoria:

This research proposal outlines Elisa Giannone's research program, focusing on the interplay between geographic disparities, economic growth, and socioeconomic inequality. Her work utilizes large-scale microdata and advanced quantitative dynamic models.

Two main research areas are highlighted: understanding inequality across space and time and understanding economic growth in developing countries. Key contributions include papers published or under review in top economics journals examining skill-biased technical change and regional convergence, migration and wealth accumulation under income risk, and the geographic distribution of consumption patterns.

The proposal also mentions ongoing research on aging and depopulation in Japan and the impact of interconnectedness on pandemic outcomes. A new research venture is described, investigating the effectiveness of various insurance mechanisms in mitigating income shocks using a novel merged dataset. This research leverages field experiments and novel data to understand growth and inequality in developing economies. The proposal emphasizes her extensive publication record, conference presentations, and leadership in securing unique datasets.

Resumen del Currículum Vitae:

This curriculum vitae (CV) details Elisa Giannone's qualifications and experience in macroeconomics and economic geography. She holds a PhD from the University of Chicago and has 16 years of experience at top universities, including Penn State and Princeton. Giannone's research focuses on growth and inequality, using microdata analysis and structural models.

Her publications include two papers under resubmission to leading journals, examining migration and wealth accumulation under income risk, and skill-biased technological change and regional convergence.

She has presented her work at numerous conferences and has a Google Scholar H-index of 7. Giannone secured significant research funding, mentored PhD students, and actively participates in the academic community. Her leadership extends beyond research, including securing a large dataset and leading a randomized controlled trial.

She is also an associate editor of a leading journal. The CV highlights her extensive publication record, conference presentations, research funding, and mentorship experience. It showcases a strong track record of high-impact research and leadership in her field.



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Turno General

Área Temática: Economía
Nombre: MAURER, STEPHAN
Referencia: RYC2024-051177-I
Correo Electrónico: stephan.ernst.maurer@gmail.com
Título: Historical patterns in trade, urbanization, and inequality
Resumen de la Memoria:

Broadly speaking, my research can be divided into two larger projects with several subprojects:

1. Trade, urbanization, and development

This part of my research examines how trade shapes the unequal distribution of economic activity across space, with cities as a key focus. One ongoing project with Ferdinand Rauch and Max Marczinek uses the economic history of the Baltic region as a “laboratory” to study how comparative advantages, temporary shocks, and long-standing trade institutions shape economic geography. We use the “Sound Toll,” a tax collected by the Danish crown from ships passing the Øresund (1429–1857), to identify trading patterns over centuries. In a working paper, “Networks in Trade: Evidence from the Legacy of the Hanseatic League” (Revise and Resubmit at the Journal of International Economics), we show that cities in the Hanseatic League continued to trade more with each other post-dissolution, but only via ships captained by Hanseatic traders. Follow-up work examines how the Baltic’s 18th-century specialization in shipbuilding goods shaped its subsequent economic trajectory. For this project, we will collect historical data on manufacturing establishments in several Northern and Eastern European countries and will combine those with city-level import and export data that we create from the “Sound Toll” data.

Another project with Luke Milson and Ferdinand Rauch extends my work on the Panama Canal to study the opening and closure of key waterways like the Panama and Suez Canals, the Strait of Malacca, and the Northwest Passage, estimating their trade and welfare effects using gravity models and trade theory. Lastly, a project with Yu Han digitizes Chinese Maritime Customs Service data to explore the impact of social networks on career bureaucrats between 1853 and 1911. We study whether shared dialects and geographic origins among Chinese clerks influenced promotions and salaries.

2. Historical inequalities

Several ongoing projects explore patterns of historical inequality. A recent paper with Diego Battiston, Andrei Potlogea, and José Vicente Rodríguez Mora examines the “Great Gatsby Curve,” showing that while short-term changes in inequality are not systematically related to declines in mobility, long-term increases in inequality reduce intergenerational mobility, with human capital accumulation bridging these dynamics.

In another project with Luna Bellani and Anselm Hager, we investigate why the abolition of slavery did not fully level social inequalities in the US South. We explore how white elites retained power post-abolition, whether this persisted across generations, and how this shapes today’s political outcomes. This work builds on our Journal of Economic History article (2022), expanding its spatial coverage and focusing on mechanisms driving elite persistence. Lastly, in a project with Ran Abramitzky, Elibeth Cirilo, Yiming He, Guy Michaels, and Omry Yoresh, we study slum demolitions in Victorian Britain. We geocode demolitions and link them to census data to track displaced residents’ short- and long-term outcomes, including relocation, employment, and family formation. This marks my first foray into fine-grained within-city settings and complements my broader interest in Urban Economics.

Resumen del Currículum Vitae:

I am an empirical economist with research interests at the intersection of Labour Economics, Economic History, Urban Economics, International Trade, and Political Economy. I obtained my PhD in 2017 at the LSE under the supervision of Jörn-Steffen Pischke and Guy Michaels. Afterwards, I joined the University of Konstanz as Assistant Professor for Economics. Since 2023, I work as Assistant Professor (since 2024 with tenure) at the University of Edinburgh.

My research approach is data-driven and combines modern causal inference techniques with administrative, observational, and geospatial datasets. Economic history is for me both a tool and an end itself- I am interested in better understanding historical events such as the persistence of former slave owners in power in the US South. But I also frequently use exogenous variation provided by history to study questions in labour economics and political economy, such as the effect of oil discoveries on women’s labour market involvement. Similarly, I often rely on geography to provide me with variation, but am also interested in the reasons for the distribution of economic activity over space. My work often involves the creation of novel datasets, for example by digitalizing historical records. My contributions have led to 6 articles in internationally leading peer-reviewed journals, including the Review of Economics and Statistics and the Journal of Economic History. I also have 2 working papers at the stage of “Revise and Resubmit”, and 2 other ones that are currently under review.

My research activities benefit from a sizable network of collaborators. I am an affiliate at the UPF-BSM, a Research Associate at the Centre for Economic Performance at the LSE, and an Associated Researcher with the Research Cluster “Politics of Inequality” at the University of Konstanz. My research partners are based at various institutions including Stanford and the LSE. I have obtained funding for my research projects from various funders and participated in several large collaborative projects. Currently, for example, I am a Co-Investigator for a Leverhulme Research Project Grant. Before starting in Edinburgh, I was a Principal Investigator of the research cluster “Politics of Inequality” at the University of Konstanz, one of the “excellence clusters” funded by the German Research Foundation.

I disseminate my work both inside and outside academia, regularly presenting at conferences and seminars. I also have experience as organizer of such events. Outside academia, I make my research accessible to a wider audience. Nontechnical summaries of my papers have appeared, for example, on voxEU and the LSE Business Review. Since 2017, I also collaborate with the Spanish consulting firm KSNET, both leading public policy evaluation projects as well as disseminating academic research among public stakeholders.



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At the University of Konstanz, I was the co-supervisor and examiner of two PhD students that successfully defended their theses in 2021 and 2024. I also still co-supervise one other student who will defend in June 2025. I have further been an examiner for several PhD defences. At the University of Edinburgh, I am serving as the "Director of Students". As such, I am responsible for the effectiveness of the academic guidance and support structures concerning all students in the School.



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Turno General

Área Temática: Economía
Nombre: DE MORAGAS SÁNCHEZ, ANTONI-ÍTALO
Referencia: RYC2024-048454-I
Correo Electrónico: antoni.italo@gmail.com
Título: Populism, Migration and Education

Resumen de la Memoria:

I hold a PhD in Economics from the European University Institute, where I specialized in Political Economy under the supervision of Professors David K. Levine and Andrea Mattozzi. Since 2017, I have been a faculty member at CUNEF, where I obtained tenure in 2023 after establishing a solid research agenda in Political Economy. My work explores pressing societal questions, such as political polarization, the formation of national identities, the role of transparency in political accountability, and the effectiveness of media fact-checking. These topics are examined using a combination of game-theoretic modeling, causal inference techniques, and survey-based experiments.

In the last three and a half years, I have published seven academic works, including six articles in indexed journals and a book chapter. These have appeared in leading journals such as *The Economic Journal*, *The Journal of Politics*, and *the Journal of Public Economics*. This productivity is particularly remarkable given my high teaching load during the early years of my career and a four-month parental leave, highlighting my ability to deliver impactful research under time constraints. Additionally, I have led and secured competitive funding, such as the 2024 Social Research Call from the *la Caixa* Foundation (€115,000), which focuses on the impact of early childhood education on labor market outcomes, child development, and gender norms.

My future research agenda is structured into three core areas. The first examines the benefits of early childhood education (ages 0-2), with a focus on children's educational outcomes, parental workforce participation, and shifts in gender norms. The second explores the dynamics of populism, including how economic insecurity and emotional appeals drive populist success and its implications for democratic resilience. The third builds on my prior work on mandatory military service in Spain to investigate how intergroup contact shapes geographic mobility, labor market outcomes, and ideological shifts.

With my established methodological expertise, a proven record of collaboration with international coauthors, and secured funding for my new research lines, I am confident in my ability to produce significant contributions in Political Economy, Education, and Social Dynamics, informing academic debates and public policy.

Resumen del Currículum Vitae:

I have a robust and international academic background, including a PhD in Economics from the European University Institute, and I have held a faculty position at CUNEF since 2017, obtaining tenure in 2023. My research focuses on Political Economy, employing methods such as game theory, causal inference, and survey experiments to address key societal challenges, including political polarization, national identity formation, and the role of transparency in governance.

Over the past three and a half years, I have published seven academic works in journals such as *The Economic Journal*, *The Journal of Politics*, and *the Journal of Public Economics*, demonstrating a steady and impactful research trajectory. Additionally, I have secured prestigious research grants as Principal Investigator, including €115,000 from the 2024 Social Research Call of the *la Caixa* Foundation, and have actively contributed to other funded projects.

Beyond research, I have been deeply involved in academic service and teaching. I designed and implemented the undergraduate Game Theory course and the Microeconomics syllabus for the Master's in Management program at CUNEF. My teaching evaluations have consistently been above the departmental average, and I have supervised numerous undergraduate theses. I also co-founded and co-organized international initiatives such as the Madrid Political Economy Workshop and the Online Political Economy Seminar Series, showcasing my leadership and commitment to fostering academic exchange.

International collaboration has been central to my career. I have worked with coauthors affiliated with institutions such as Yale, Columbia, and the London School of Economics and have presented my research at top-tier conferences organized by the Econometric Society, the European Economic Association, and the American Political Science Association.

In summary, my academic career reflects a consistent commitment to high-quality research, effective teaching, and international collaboration, all aimed at addressing critical societal questions and advancing the field of Political Economy.



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Turno General

Área Temática: Economía
Nombre: KOROVKIN, VASILY
Referencia: RYC2024-049524-I
Correo Electrónico: vasily.korovkin@upf.edu
Título: Geoeconomics, Conflict, and Economic Development
Resumen de la Memoria:

Line of Research to Be Developed

The Ramón y Cajal Grant will support the development of my existing working papers and initiate new projects. Key priorities include:

Supply Chain Disruptions and Reorganization: Theory and Evidence from Ukraine's War

This project examines the effects of conflict on production networks, showing how firms linked to conflict zones suffer significant output declines. It highlights a 6% aggregate welfare reduction in non-conflict areas due to network disruptions and reorganization. The findings emphasize the widespread economic impact of localized conflicts.

Policy Evaluation with Aggregate Time-Series Shocks

This methodological paper, coauthored with Dmitry Arkhangelsky, introduces new tools to address challenges in policy evaluation involving aggregate shocks. The paper is submitted for publication, with resources needed for potential revisions or finalization.

Detecting Auctioneer Corruption and Ethnic Procurement

A reworked study on bid-leakage corruption in Russian procurement auctions identifies collusion patterns, while a related project investigates ethnic bias in public procurement. Using machine-learning techniques to infer ethnic markers, the study aims to disentangle taste-based bias from efficiency-based screening.

Agriculture, Linkages, and Industrialization: Evidence from India

This project explores how decolonization affected industrial development in India by fostering local processing industries through forward linkages in agriculture.

Sanctions and Production Networks

This agenda includes analyzing the effects of sanctions on Russia's supply chains. Using comprehensive data on railway shipments and firm-level sanctions, the project aims to uncover how sanctions propagate through production networks and their broader economic consequences.

Social Media and Gender Gaps

With Olga Novikova, I study how social media reduces gender wage gaps by altering job application behaviors and challenging social norms. The project combines labor market data and text analysis to document significant gender-related changes linked to social media usage.

Conflict and Nation-Building

A collaboration with Serhii Abramenko and Alexey Makarin investigates identity shifts during the Russia-Ukraine conflict. Findings suggest conflict drives stronger national identity and language shifts, with implications for nation-building.

Additional early-stage projects include analyses of political and economic dynamics with collaborators like Ruben Enikolopov, Maria Petrova, and David Nagy.

These projects build on my established research agenda, addressing pressing global challenges related to conflict, trade, and economic development. The grant will enable data collection, advanced analysis, and impactful dissemination of findings.

Resumen del Currículum Vitae:

My research focuses on political economy and development economics, intersecting with international trade. I investigate how geopolitical shocks—such as military conflicts and sanctions—affect firm performance and macroeconomic outcomes. Collaborating with international coauthors from the USA, UK, Belgium, Italy, and Switzerland, I also develop new econometric methodologies. My work has garnered a significant impact, with 508 citations on Google Scholar.

My studies on conflict and firms include a “top 5” publication, two working papers, and an AEA Papers & Proceedings article. In “Conflict and Inter-Group Trade: Evidence from the 2014 Russia-Ukraine Crisis” (with Alexey Makarin, AER), we analyze how ethnic tensions during war affect trade between firms in non-combat areas. Using a difference-in-differences strategy, we demonstrate that firms from Ukrainian districts with fewer ethnic Russians experienced sharper declines in trade with Russia due to eroded inter-group trust, particularly in trust-based contracts. Relatedly, our AEA P&P article, “Social Media as an Identity Barometer: Evidence from the Russia-Ukraine War” (with Serhii Abramenko and Alexey Makarin), explores identity shifts using VK and Twitter data during the war.



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Two working papers extend this research. In “Production Networks and War” (with Alexey Makarin) and “Supply Chain Disruptions and Reorganization: Theory and Evidence from Ukraine's War” (with Makarin and Yuhei Miyauchi), we examine how conflict disrupts production networks, impacting firms and the macroeconomy.

A separate project, published in PNAS, “Field experiment estimate of electoral fraud in Russian parliamentary elections” (with Enikolopov, Petrova, Sonin, Zakharov), estimates electoral fraud in the 2011 Russian elections using a randomized field experiment. We find 11 percentage points of vote share inflation, equating to 600,000 stolen votes in Moscow alone.

I have seven additional working papers and ongoing projects detailed in my Memoria. My research has been supported by notable grants, including a \$12,000 Harriman Institute Research Grant (2018) for work on the Ukrainian conflict, two Czech Science Foundation (GACR) grants totaling ~310,000 euros, and a 377,895 CHF Swiss National Science Foundation grant (led by Dzhamilya Nigmatulina).

I have presented at institutions such as NBER, Columbia Business School, Bocconi University, University of Zurich, UCLA Anderson, Einaudi Institute, London Business School, and University of Wisconsin-Madison. I also serve as a referee for leading journals, including AEJ: Applied Economics, Review of Economic Studies, Journal of Political Economy, QJE, and Econometrica.

In teaching, I have led undergraduate and graduate courses at UPF, UCLA Anderson, and CERGE-EI and supervised Ph.D. students at CERGE-EI.



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Turno General

Área Temática:

Economía

Nombre:

RUGGIERI N/A, ALESSANDRO

Referencia:

RYC2024-049323-I

Correo Electrónico:

aruggierimail@gmail.com

Título:

The Macroeconomics of Firms: Aggregate Effects and Distributional Implications.

Resumen de la Memoria:

Now more than ever, the economics profession, policymakers, and the general public focus on economic inequality. Over the last several decades, earnings inequality across workers have widened (Acemoglu and Autor 2011) and a massive body of literature has evolved to understand the causes and consequences of these trends. From this literature, firms, i.e., where workers work, have recently emerged as a critical determinant of earnings inequality. Why firms?

First, recent evidence points out that a large part of the rising earnings inequality is due to an increase in the dispersion of average earnings between firms (Card, Heining and Klein 2013, and Song et al. 2019). Furthermore, there is a growing concern for rising mark-ups and profits and the associated decline in the labor share (Autor et al. 2019, Eeckhout 2021). Second, firms are a crucial determinant of how workers are affected by globalization and technical change (automation), two key drivers of labor market dynamics in high-income countries. Low-skilled production workers have seen their job opportunities shrinking, either because what firms produce can now be imported from abroad or because firms adopt machines can easily perform their tasks. In contrast, high-skill service workers are much more likely to be protected from globalization and automation. These divergent trends are partly responsible for growing anti-migration and anti-globalization feelings and the return of protectionism (Fajgelbaum, Goldberg, Kennedy, Khandelwal 2020).

Governments have reacted to these challenges by implementing programs to help those affected. Such programs range from progressive taxation to means-tested programs to policies that target effective workers, such as the Trade Adjustment Assistance (TAA) Program in the U.S. In Europe, short-work arrangements, which subsidize reductions in hours worked by workers, were prevalent in the last 15 years.

Finally, firms are also a key determinant of employment and earnings gap across genders. Growing evidence suggests that firms are a crucial determinant of the gender gap. Women are less likely to work in high-wage firms (see Card, Cardoso, Klein 2016, Sorkin 2017). Moreover, men and women are likely to trade-off wages and flexibility (or other job amenities) differently (Goldin 2014). Finally, firms' demand for labor will reflect the additional burden of family-friendly policies (Olivetti and Petrongolo 2017).

Given this background, my research pipeline is centered around four projects, with the aim of answering the following questions:

- 1) Project 1: Offshoring, Technological Change and the Job Ladder. What has been the impact of globalization and technological change on workers employed across different firms?
- 2) Project 2: Welfare Cost of Globalization. What is the welfare cost of globalization for workers? Is their ability to save, together with the existing tax and transfer program, enough to face its negative consequence and enjoy its benefits?
- 3) Project 3: Labor Market Competition and Inequality. How does competition among employers affect workers' career, life-cycle wage trajectories, and inequality?
- 4) Project 4: Firms and Fertility. What are the effects of family-friendly policies on fertility decisions of households in an environment where firms can react to these policies by changing their hiring, promotion, and firing behavior?

Resumen del Currículum Vitae:

I am an Assistant Professor at the department of Economics of CUNEF Universidad. I received a Ph.D. in Economics from Universitat Autònoma de Barcelona in 2019. I am a macroeconomist mostly interested in topics of labor economics and development economics. My work focuses on understanding how globalization forces and technological progress induce changes in the distribution of earnings and income across workers and how frictions and distortions in labor markets shape employment and wage dynamics over different stages of economic development.

My research has had a meaningful impact on the academic community. I have an H-index of 7 and 339 citations (Google Scholar). I have published my work in tier-1 ranking journals like American Economic Review: Insights, European Economic Review, and the Labour Economics, and I have several working papers, some of which under revision in tier-1 ranking journals, e.g., the Review of Economic Dynamics, the American Economic Journal: Macroeconomics, and the International Economic Review.

I have a highly international profile in terms of academic mobility and scientific collaborations. I held the position of Assistant Professor at the University of Nottingham from 2019 to 2023. I worked as a Junior Consultant for the United Nations Economic Commission for Africa (2000, 2003), as a Junior Consultant at the World Bank (2003, 2004), and as a research consultant at the IADB (2004). I regularly visited the Economics department at Pennsylvania State University (2017, 2018, 2019). In 2022 I visited CEMFI through the "María de Maeztu" units of excellence visiting program. I have presented my research in several conference and seminars, including the NBER Summer Institute, the CEPR Macro and Growth meeting, the BSE Summer Forum, the Stanford IGC annual conference, the SED meetings, among the others. I have been invited to present my work by several institutions, including University Carlos III of Madrid, CEMFI, the London School of Economics, University of Pittsburgh, Paris School of Economics, and



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Yale University, among the others. My network of international collaborators spans from CEMFI (N.Guner), Pennsylvania State University (J.Tybout), Tübingen University (C.Cisneros), Lund University (D.Pietrobon), European Central Bank (A.Ferrando), Bank of Spain (L.Hospido), and Bank of Lithuania (J.Garcia-Louzao).

I have solid experience in leadership and project management. I am the recipient of a AEI-Proyectos de Generación del Conocimiento (PID2023-153294NB-I00), for the period 2024-2028 (PI: J.V.Rodríguez-Mora). I have been the recipient of the GRSA grant from the Foreign, Commonwealth & Development Office (UK) during 2021-2023, and the British Academy Special Research Grants: Covid-19, (UK) during 2020-2021. I was the recipient of La Caixa-Severo Ochoa International Doctoral Fellowships during 2015-2019.

I have been a referee for the Quarterly Journal of Economics, Economic Journal, International Economic Review, Review of Economic Dynamics, and Labor Economics, among the others.

Finally, I am dedicated to teaching and mentoring. I have taught undergraduate and graduate courses at the Universitat Autònoma de Barcelona, the University of Nottingham, and CEMFI. I have supervised one PhD thesis and several undergraduate theses, and I have coordinated the work of multiple research assistants in my projects.



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Turno General

Área Temática: Economía
Nombre: BAYER, PÉTER
Referencia: RYC2024-051452-I
Correo Electrónico: peter.bayer@uab.cat
Título: Altruism, networks, and public policy

Resumen de la Memoria:

My research examines three hypothesis related to the economics of networks and altruism. Focusing on altruism is motivated by the recent focus on in within the economics of networks literature, its broad applicability, and my own work showing that altruistic networked behavior is endogenous and comes from the evolutionary history of the homo sapiens. The hypotheses are the following.

Hypothesis 1: Altruism presenting as inequality aversion in communication networks

Networks formed under a communication game with large information decay, unilateral network formation, and two-way information flow, individuals form links as if they are inequality averse, preferentially targeting the poorest individuals. The forming network is close to regular.

Hypothesis 2: Altruism in risk-sharing networks

In a game of bilateral network formation of perfect risk-sharing, individuals form larger network components than individually optimal but smaller ones than socially optimal. Bridge players connecting a small and a large component would have individual incentives to sever ties with the small group but will keep them due to other-regarding concerns.

Hypothesis 3: Unpacking the positive association between pro-sociality and degree

Individuals with higher degree contribute more in a one-shot local public goods game. Additional considerations such as centrality or the exact architecture of the network do not affect a player's propensity to contribute.

I will analyze these hypotheses through mathematical modeling, economic theory, and experimental methods.

Resumen del Currículum Vitae:

I have 9 years of research and teaching experience. I have experience teaching on an undergraduate and graduate level as well as coordinating courses on the graduate level. I have 8 published research papers, 1 accepted peer-reviewed conference submission, and I have presented my work in dozens of international conferences.

I hold a PhD in economics issued in 2019 by the Graduate School of Business and Economics of Maastricht University. My PhD dissertation is entitled "Public goods games in networks and tumors", focusing on applications of game theory in the economics of networks and cancer therapy. I have 5 years' experience as a post-doctoral scholar, 1 year in the University of Grenoble-Alpes where I participated in a project on the intersection of behavioral economics and the economics of networks focused on the effects of optimism and uncertainty and 4 years in Toulouse School of Economics (TSE) where I expanded my portfolio to include the evolutionary foundations of economic behavior in networks and norms.

My work combines game theory, microeconomic theory, behavioral and experimental economics, applied mathematics, network science, and graph theory to investigate economic behavior in networks. My primary interest is the evolution of social ties and structures that allow humans to exchange goods, services, and information, share risk, and pursue shared objectives. My secondary focus is the application of game theory in cancer therapy, combining insight from economics, biology, and applied mathematics to understand the evolutionary dynamics of the disease, especially in the presence of therapy.



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Turno General

Área Temática: Economía
Nombre: CARRIL MAC DONALD, RODRIGO
Referencia: RYC2024-050701-I
Correo Electrónico: rodrigo.carril@upf.edu
Título: The Economics of Public Procurement

Resumen de la Memoria:

My research lies at the intersection of industrial organization and public economics and investigates how institutional and market factors affect the efficiency of public procurement systems. This is a crucial area of government activity with numerous policy implications, given that a substantial share of governments' budgets ---and the overall economy--- is spent in public procurement. In doing so, I leverage large-scale administrative data sources on public procurement purchases (both from public sources and as a result of partnerships with government agencies). Methodologically, I combine so-called reduced form and structural methods depending on the question of interest.

The common theme of my research agenda is how institutional factors on the demand side interplay with market structure and competitive forces on the supply side to determine outcomes in public procurement markets. In "The Impact of Industry Consolidation" (published in the Journal of Public Economics in 2020), I explored the relationship between market structure and procurement outcomes. We document causal effects of consolidation of contractors on both the structure of procurement competition and on contractual form: we find an increase in the use of non-competed or single-bid contracts and increased reliance on cost-reimbursement formulas. These effects are usually ignored by standard merger reviews which focus on the private market effects of the proposed operations. In "Rules Versus Discretion" (revision requested at the Journal of the European Economic Association), I study the trade-off between giving autonomy to public bodies in the way they conduct procurement, versus regulating the process closely. For the US, I find that red-tape costs of close regulation can be substantial, and develop an empirical model to quantify the optimal level of bureaucratic discretion. In "Competition under Incomplete Contracts" (revised and resubmitted at the American Economic Review), we study a regulation that incentivizes competition through the advertisement of procurement solicitations. We find that publicity leads to lower prices but that it causes worse post-award performance, particularly for more complex purchases. We then develop a quantitative model that allows us to characterize the optimal regulation considering the degree of contractual incompleteness. In "Drivers of Public Procurement Prices..." (published in the International Journal of Industrial Organization), we quantify the relative role of demand- and supply-side factors in explaining public procurement prices, using the public procurement of pharmaceutical drugs in Chile as a setting.

I have several ongoing research projects that I expect to continue to develop and turn into completed working papers in the next few months and years. One set of projects (joint with Claudia Allende, Juan Pablo Atal, Jose Ignacio Cuesta, and Andres Gonzalez-Lira) revolves around the procurement of pharmaceutical drugs for the public sector, leveraging restricted-access data due to an ongoing partnership with the agency in Chile that procures drugs. A second set of projects concerns the study of the macroeconomic implications of public procurement and is joint with Manuel Garcia-Santana (World Bank, on leave from UPF).

Resumen del Currículum Vitae:

I am an Assistant Professor of Economics at Universitat Pompeu Fabra and hold an affiliated position at the Barcelona School of Economics (BSE) since 2020. That same year I received my PhD in Economics from Stanford University. Since 2022, I have also been a Juan de la Cierva researcher.

Despite only graduating 4.5 years ago, I have already managed to publish 2 papers in top-of-the-field journals (Journal of Public Economics and International Journal of Industrial Organization), and to have 2 papers at the Revise and Resubmit stage at top-tier general-interest journals (American Economic Review, and Journal of European Economic Association). I have one additional completed working paper that has been submitted to a top journal, as well as several ongoing projects. I have presented my work at several invited seminars and contributed sessions at conferences, and I have had the honor to present at an invited session at the top European research conference in Industrial Organization (EARIE 2023). My work has been awarded two research recognitions, by the Stanford Institute for Economic Policy Research (best paper by a PhD student) and by EARIE (best EARIE paper by economist under 35). I have received more than €150,000 in grant and fellowship funding (over €70,000 as PI). And I have so far collaborated with 8 different co-authors from some of the top research institutions in the world (Stanford, UPenn, UPF, World Bank, Santa Clara University, PUC Chile).

Finally, although I am still a junior researcher, I have already started mentoring and advising younger students. I have taught at the master's level at BSE and advised dozens of students on their master's thesis. This has allowed me to get to know many bright young students, and I've had the honor to so far support 12 of them with letters of recommendation for PhD programs including at the world's best institutions. I have also been part of the committee in four PhD proposals at UPF, and I expect to keep advising these students all the way to the dissertation defense and academic job market.



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Turno General

Área Temática: Energía y transporte
Nombre: PINILLA YANGUAS, SERGIO
Referencia: RYC2024-049910-I
Correo Electrónico: sergio.pinilla@imdea.org
Título: New battery manufacturing, analysis, and modelling approaches

Resumen de la Memoria:

My research interests and background lie in the battery field. Throughout my career I have covered a wide range of topics in this field, from materials to new testing procedures and modeling.

PhD (2013-2017): I did my PhD at the UAM under the supervision of Prof. Carmen Morant. My work was focused on the use of silicon for lithium-ion batteries, trying to mitigate its degradation through nano-structuring, smart patterning, and composite formation. Aiming towards combining it with other nanomaterials I did a short research stay in Prof. Nicolosi group at Trinity College Dublin, Ireland. Among the many works we did in collaboration; a particular achievement was the identification of the degradation mechanism of the MXenes and its prevention. By that time, and still PhD student, I was awarded my first project as PI (Fundacion Iberdrola) to expand our work in nano-Si for batteries but this time on amorphous silicon substrates.

Postdoc stage (2017-2023): After finishing the PhD, I was able to establish a collaboration with Prof. Martin Winter's group at MEET, Germany, where I did a research stay to try to quantify the difference in the volume expansion of the nano-Si compared to the un-etched amorphous silicon as well as how to stabilize further the material with the use of various electrolyte additives. Few months after, I was awarded an MSCA grant (3DPrintBatt) to join with Prof. Nicolosi's group at TCD, Ireland, to start my own research line on printed batteries. The research idea was to establish which differences each deposition technique induces in the battery electrode and how they affect the end device. After 3 years at TCD, I was awarded another MSCA COFUND grant (PoliSolidBat) to join IMDEA Energy, Spain, in Dr. Rebeca Marcilla and Dr. Jesus Palma's group. Based on my previous experience, the project consisted of controlling the microstructure of the electrodes by 3D printing to design polymeric solid-state batteries by additive manufacturing. Senior assistant researcher (2023-now): During the execution of PoliSolidBat, I was awarded a "Talento" program grant (ADEMOSSBat), in which I proposed the use of new electrochemical techniques supported by modelling approaches for the study of degradation of Li-ion and solid-state batteries. Additionally, thanks to this funding I was promoted to senior assistant researcher and started my journey as fully independent researcher. In the framework of this project, and with the objective to incorporate physics-based multi-scale simulations of batteries in my work, I established a collaboration with Prof. Alejandro A. Franco at the LRCS (Amiens, France). I did 2 research stays in his group, one in 2023 and another in 2024. In 2024 I was awarded a project funded by the AEI (PID2023, project B3ES) to work on the use of physical based models in combination with my high-rate models to design a new optimization approach for complex 3D batteries architectures.

Ramon y Cajal Fellow (Future): In my next step, my plan is to consolidate and expand my research lines in the field of analysis methods and models to provide quantification and explainability to physical processes in batteries. This includes the development of new electrochemical techniques for the analysis of battery degradation, models that relate better fabrication parameters with kinetic ones, and methods to predict optimal 3D electrode shapes.

Resumen del Currículum Vitae:

SCIENTIFIC MERITS: Throughout my career, I have published 23 papers from which I'm first or equal contributor in 12 of them and corresponding in 3. Nowadays I have over 2600 citations, 713 just in 2024, an H-index of 15 (Google Scholar) and a FWCI of 3 (SciVal). I have published in some of the most prestigious journals in the material science and energy storage field (Adv. Energy Mater, Adv. Mater, Nat Rev Mater. etc) with a 70% of my publications in Q1 journals, 75% are international collaborations and 70% in Open Access. Furthermore, I have deposited an industrially exploited patent. I am guest editor in "npj 2d materials and applications" for a collection entitled "2D Nanomaterials for Energy Applications" and I also serve regularly as a reviewer in that journal as well in other prestigious journals in my field such as "Energy Storage Materials". Since 2024 I also serve as external reviewer for the "Energía y Transporte" panel for the AEI.

LEADERSHIP AND INDEPENDENCE: In total I have obtained 5 projects as PI, including one National project (PID 2023), one regional talent attraction grant and two post-doctoral MSCAs. This has allowed me to decide and lead my own research lines from an early stage. This high independency has also allowed me to work with teams all over Europe broadening my skillset and building a strong network of collaborators. I am the sole director of one PhD thesis (started 2023), and another one starting early 2025. Additionally, since the completion of my PhD I have been actively involved in the training and supervision of various international MSc, undergraduate and PhDs in every group I have belonged to.

INTERNATIONALIZATION AND MOBILITY: Along my career one of my priorities has been knowledge acquisition and establishing an excellent network of collaborators. This made me move a lot across countries and research groups and by now I have worked in 6 different institutions in 4 different countries, and I have spent around 42 months working abroad. I have been also able to establish a strong network of collaborators which include world renown scientist such as Prof. Valeria Nicolosi or Prof. Alejandro A. Franco.



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Turno General

Área Temática: Energía y transporte
Nombre: BENÍTEZ DE LA TORRE, ALMUDENA
Referencia: RYC2024-050480-I
Correo Electrónico: q62beta@uco.es
Título: Advanced materials for the development of lithium/sulfur batteries

Resumen de la Memoria:

The candidate's entire research career has been dedicated to the study of advanced materials for the development of lithium-based batteries. As a result, she has published 33 articles in peer-reviewed journals, 2 book chapters and 1 book. In addition, she is the Principal Investigator (PI) of two research projects, and co-applicant as PI of a project for 3 years. Specifically, during her postdoctoral stage, she has successfully coordinated a new research line focused on developing simple, efficient and easily scalable methods to transform agro-industrial by-products into multifunctional materials with added value, especially for the energy storage sector (10.1016/j.fuel.2024.132502; 10.1016/j.jenvman.2023.119822; 10.1016/j.jclepro.2022.132685; 10.1002/cssc.202101231; 10.3390/nano10050840; 10.3390/ma11081428). Her postdoctoral experience includes the transformation of various by-products into activated carbons, which have been successfully integrated into battery technologies previously addressed by the research group, such as Li-ion and Lithium-Sulfur (Li-S) batteries. Additionally, Dr. Benítez further advanced her research on cutting-edge materials, with a focus on advanced graphene-based materials (10.1016/j.jpowsour.2025.236173; 10.1016/j.cej.2024.155088; 10.1002/cctc.202400251; 10.3390/nano14060489; 10.1016/j.jelechem.2023.117800; 10.1039/D2SE00004K; 10.1016/j.jchem.2021.03.014; 10.3390/nano9020152) and metal-organic frameworks (10.1002/ejic.202000837; 10.1016/j.matchemphys.2020.123484; 10.3390/nano10030424), contributing to the development of potential applications.

Over the past century, the increasing energy demand has contributed to global warming, heavy environmental pollution and natural resource depletion. Nowadays, stationary energy storage and electric vehicles are the applications demanding an increasing number of batteries. Although Li-ion batteries dominate the market, there has been a strong effort in the last decades to develop Li-S batteries, due to their high theoretical specific charge, environmental friendliness and low cost. For these reasons, the research proposal presented in this Ramón y Cajal call represents an innovative step forward, focuses on developing bifunctional materials from industrial waste to advance sustainable energy storage systems, including sodium-sulfur (Na-S) batteries, lithium-oxygen (Li-O₂) batteries, and supercapacitors—three cutting-edge technologies with immense potential for addressing the global energy transition. Dr. Benítez is prepared to take on this challenge, combining basic/applied research with the aim of supporting companies in the technology-energy sector to achieve high levels of technological readiness (TRL) in their developments. Furthermore, she has demonstrated her ability to propose disruptive innovations in the field of sustainable rechargeable batteries, aiming to address energy challenges at both the European level (Clean, Secure, and Efficient Energy) and the global level (UN SDG 7 and 12). The proposal to use sodium, a more abundant and less expensive element than lithium, promises to reduce dependence on scarce resources. Moreover, Dr. Benítez's commitment to innovation and collaborative approach with companies in the sector and various universities make her an ideal candidate to lead this novel research line.

Resumen del Currículum Vitae:

Dr. Benítez has made significant strides in energy storage systems, focusing on materials that surpass commercial Li-ion batteries. Earning her PhD with International Mention and Summa Cum Laude from the University of Córdoba (UCO), she addressed Li-S battery challenges with advanced graphene-based materials. She received the "Jacobo Cárdenas Torres Research Award" from UCO, and "The best PhD Thesis Award" from STAOC-RSEQ. In her predoctoral stage, she independently conducted experiments, published 8 articles (75% as first author), and disseminated findings at conferences. Her 3-month stay at the University of Ferrara led to research on safer glyme-based electrolytes.

In her postdoctoral stage, Dr. Benítez expanded her international collaborations, publishing a total of 6 articles at Ferrara (10.1002/cssc.201800242; 10.1016/j.jpowsour.2018.07.002; 10.1016/j.jpowsour.2018.11.068; 10.1002/slct.201802529; 10.1007/s12274-019-2282-2; 10.1016/j.matchemphys.2020.123484), and exploring N-doped 3D graphene quantum dots with partners from Portugal (10.1016/j.jcis.2019.11.044). She spent 12 months at Uppsala University's Ångström Advanced Battery Centre, gaining expertise in biomass-derived activated carbons for Li-S batteries and resulting in high-impact publications (10.1016/j.rser.2021.111783; 10.1016/j.oneear.2022.02.009). A "Junta de Andalucía" grant facilitated her move to Lisbon to explore membranes for batteries, and she later collaborated with the University of Cádiz on LiFePO₄ synthesis, leading 2 articles (10.1021/acs.iecr.0c00518; 10.3390/nano11092412).

Since 2022, under a "Juan de la Cierva-Incorporation" grant, she has focused on alternative energy storage technologies, including lithium-oxygen batteries during a 3-month stay in Argentina (article under review). Currently, a UGR grant supports her supercapacitor research. She aims to integrate these innovations into the FQM-175 group, aligning her work with the UN SDGs on sustainability, recycling, and clean energy.

She has contributed to 10 National (PID2023-147436OA-I00, PID2023-147080OB-I00, PID2022-139807OB-I00, PID2022-142391OA-I00, PDC2022-133973-I00, TED2021-129314A-I00, PDC2021-120903-I00, PID2020-113931RB-I00, MAT2017-87541-R & MAT2014-59907-R), 4 Regional, and 1 Local Projects. As Principal Investigator (PI) of the UCOLIDERA Project, she led research on alpeorujo-derived materials for Na-S batteries, funded by "10,000. Currently, she leads the "OLIVE4FUTURE" project with a "299,985.04 budget, tackling alpeorujo's environmental impact and promoting valorization with olive industry leaders. Her leadership includes managing finances and team selection (4 postgraduate researchers and 2 technical staff hired).

With 1 book, 2 book chapters, 33 articles, H-index of 16, and 729 citations, she has led 11 articles as a corresponding author. She has reviewed for scientific journals and contributed to technology transfer through 7 RDI contracts, including a collaboration with Grabat Energy S.L., resulting in an international patent. She has organized scientific events, participated in over 80 congresses, and engaged in extensive dissemination activities.

In teaching, she has published a teaching article, contributed to 4 innovation projects, directed 1 PhD Thesis, and is currently directing 2 PhD Theses on energy storage materials and alpeorujo valorization. She has tutored 12 Master's and 17 Undergraduate Theses, with excellent marks. Accredited as an Associate Professor by ANECA



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Energía y transporte
Nombre: MEI, DAOFENG
Referencia: RYC2024-050043-I
Correo Electrónico: dmei@icb.csic.es
Título: Development of Chemical Looping technology for sustainable energy generation

Resumen de la Memoria:

Since the predoctoral, my research has been dedicating to the R&D of a transformative technology called Chemical Looping (CL) for Energy, Power and Sustainable fuels generation. CL uses oxygen carrier particles to transfer oxygen and thus avoids fuel and air mixing to produce a pure stream at the outlet. Therefore, CL has low energy penalty for CO₂ capture. My research on CL mainly uses atmospheric fluidized bed platforms. 1) During the predoctoral period, I was mainly focused on oxygen carrier development for coal CL-Combustion (CLC) and the reaction details involved. I found suitable ones for coal CLC process and performed reaction kinetics studies for redox reactions in CLC. 2) In the Assistant Professor period at Huazhong Agri U, I continued research on CL, but with special focus on agricultural waste utilization and conversion for green energy generation. I initiated research on biogas CL-Reforming (CLR) for green H₂ generation and CL-Gasification (CLG) with for biofuel production. When working as Postdoc at Chalmers University, I focused on 10kW fluidized bed operation for new oxygen carrier tests for biomasses CLC and CLG, and I also focused on reactor modelling. During the Researcher period at Chalmers, I worked on alkalis-oxygen carrier interactions in CLC and CLG process. I also led 100 kW pilot operation for NO_x chemistry study for CLC. In the current Marie-Curie period, I led the innovative project with focus on development of CLG for 3rd-generation biofuels production with microalgae. This project involves batch fluidized-bed reactor experiments, kW-scale pilot experiments, process simulation and lifecycle assessment.

Looking back at my research career, I'm active in CL research with fluidized beds at atmospheric pressures. Meanwhile, I'm inspired by the superior advantageous features of combustion under high pressures, namely direct use of pressurized gases in gas turbine for heat and power generation, more latent steam heat utilization.

In this new research line, I will develop Chemical Looping Combustion under high pressures. Having also seen the crucial challenge of fines damages to gas turbine in fluidized beds, I propose to use Monolithic reactors (MR) structured oxygen carrier to replace particles. In this way, the MR holistic structure avoids fines generation and thus offer an excellent solution for the challenge. So, this research line will develop high-pressure chemical looping combustion with monolithic reactor (HPCLC-MR) for heat and power generation. 3D printing technique will be employed to develop the MR oxygen carriers with Mn, Fe and Cu as precursors. The oxygen carrier's hydraulic diameter, width of channel, thickness of walls and open frontal area will be carefully controlled with 3D printing to be eligible for HPCLC use. Artificial Intelligence (AI) tool will be developed and trained to optimize the MR for optimal HPCLC performance. A series of proof-of-concept tests will be performed. Lastly, process simulation study will be carried out to explore the challenges and opportunities for HPCLC-MR's integration with various industry and civil facilities for heat and power supply.

Resumen del Currículum Vitae:

I graduated in Thermal Energy and Power Engineering from Northeast Electric Power Univ and started Predoctoral period at Huazhong Univ Sci Tech (HUST) in 2009. In 2013, I started a two-year international stay at Instituto de Carboquímica (ICB-CSIC). In 2016, I was awarded PhD degree in Energy and Power Engineering from HUST. Between 2016 and 2019, I was employed and worked as Assistant Professor at Huazhong Agri Univ (HZAU). During 2019 and 2023, I was employed at Chalmers Univ Tech (Sweden); first two years (2019-2021) as Postdoc and the second two years (2021-2023) as Researcher. In the end of 2022, HZAU promoted me to Associate Professor title in Energy. In March 2024, Chalmers conferred me the Docent title in Energy Conversion. Currently I am an EU Marie Skłodowska-Curie Actions (MSCA) Postdoctoral Fellow at the "Combustion and Gasification" group at ICB-CSIC.

I am Principal Investigator of 6 projects funded by European Union MSCA, National Science Foundation of China (NSFC), Provincial Natural Science Foundation, Fundamental Research Funds for the Central Universities and Universities' Open Fundings. I am also Principal Investigator of a technical contract with company. I have explored international collaborations through application of several Internationalization Projects (STINT-NSFC, CHINEKA). I was supervisor of 1 Postdoctoral Researcher, 1 PhD Doctoral Thesis, 4 Master Theses, and 14 Bachelor Theses.

I was Session Chair in important Int Conferences like FBC24 and Chemical Looping 2022, Executive Organizer of the FBC24 Int Conf and two Int Webinars. I'm Associate Editor for Heliyon Energy, Guest Editor for Fuel and Energies, Internal Editor and Early Career Editorial Board Member for Gas Science and Engineering. I'm a Certified Reviewer for scientific journals in the Energy Areas.

I hold a Teacher's Qualification Certificate for Higher Education and have three years of university teaching experience. To strengthen my soft skills and research skills, I have taken certified Leadership and Personal Skills training by Harvard Business School and BBC, and Research Skills training on Process Simulation by Aspen Tech and Artificial Intelligence by Oxford University. I will take professional training on life cycle analysis (LCA) and social-LCA during my new stay at La Universidad Pública de Navarra (UPNA).

As a summary, over my career, I have published 62 scientific documents (43 in English scientific journals, 11 in Chinese journals and 8 conferences), co-worked with 85 authors from 4 countries. 76.7% of my publications are in Q1 journals. I have also delivered a dozen presentations and two Keynote Speeches in international conferences.

Below are some Indices on my research:

H-index (Scopus)=22; Scientific journals in English: 43 (Q1: 33); First author: 16; Corresponding author: 13; Editorials: 5; Citations (Scopus)=1272. Principal Investigator: 6; Organizer: 1 Int Conference, 2 Webinars



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Energía y transporte
Nombre: COLLADO BRUNETE, LAURA
Referencia: RYC2024-051314-I
Correo Electrónico: laura.lcb84@gmail.com
Título: Artificial Photosynthesis technologies for scalable solar fuels production

Resumen de la Memoria:

I am Senior Assistant Researcher at IMDEA Energy with 15 years of experience (10 years as PhD) in Solar Fuel technologies by photo(thermo)catalysis. My expertise also covers bioenergy applications and integration of renewable energy conversion technologies. My career path includes consecutive granted fellowships (FPI, FPI mobility grant, GET-cofund MSCA, JdC-I) and 2 competitive JIN-type R+D+i projects in which I am principal investigator. My multidisciplinary research has turned into relevant outputs in the renewable energy field, which span from fundamental science to applied research. I have published 32 scientific articles in peer-reviewed journals (18 in Open Access (56%), 9 as 1st author (28%), 8 as corresponding author (CA) (25%), 2 as last and CA), and 1 book chapter (1st author and CA). My research has received 1090 citations, with an average citation/year of 298 (2019-2024); h-index: 16. My career accounts with national and international mobility (27 months in total at Imperial College London and Heriot-Watt University). My fruitful collaboration with research institutions and companies is reflected by the internationalization of my research outputs (25%) and institutional collaboration (50%). My increasing independency and leadership are demonstrated by the acquired funding (488,830€ attracted for self-funding and research), development of new research lines, knowledge transfer through supervision, participation as reviewer of R+D+i projects and scientific papers, external examiner of PhD thesis, and scientific/organizing committee member. I am the scientific responsible for the photo(thermo)catalysis research area of the Photoactivated Processes Unit at IMDEA Energy, which covers 2 main lines: (i) Photo(thermo)catalytic production of high-energy fuels and chemicals, and (ii) Solarization of artificial photosynthesis technologies. I noted that I have initiated from scratch all research activities related to ammonia production, as well the scaling-up of solar CO₂ and N₂ reduction processes. Besides, I am in charge of the Operando Lab at IMDEA Energy (Lab Network of Community of Madrid). To date, I have supervised 1 BEng, 1 Master student and 1 postdoc. I am currently supervising 3 PhD students and I am external supervisor of an international PhD student. My proactivity is reflected by my teaching experience in the area of chemical and environmental engineering, and my active participation in outreach activities and scientific divulgation. Based on the above, my track record of scientific achievements (PI of highly competitive projects, publications as corresponding, 1st and last author), multifaceted profile (teaching, supervisor, external examiner, reviewer), research maturity and proactivity prepare me to become a Ramon y Cajal Fellow. Here I propose an innovative research line, scarcely studied until now, based on the scalable production of solar ammonia through photothermal nitrogen reduction, as an alternative solution to shift from the conventional fossil-fuel-based synthesis to a carbon-neutral route powered by solar energy. This research line is inspired from my on-going work on photo(thermo)catalytic N₂ fixation, but including many unexplored aspects such as unconventional photothermal catalysts (non-critical and affordable), up-scaled solarization using in-situ green H₂ production, and operando mechanistic studies.

Resumen del Currículum Vitae:

I am Senior Assistant Researcher at the Photoactivated Processes Unit of IMDEA Energy and scientist in charge of the photo(thermo)catalytic research line for the production of solar fuels and high-energy chemicals. My scientific expertise covers solar energy conversion technologies, heterogeneous catalysis and renewable energies coupling. I have a strong background on the design and synthesis of energy materials, multi-technique characterization, photoreactors, catalytic performance evaluation and mechanistic studies. My research career has been almost fully developed through public funding. I obtained a FPI fellowship to carry out my PhD at IMDEA Energy on photocatalytic CO₂ valorization. Then, I was awarded a FPI Mobility Grant to complete a 3-months stay at Imperial College London (UK), where I developed charge dynamics studies. I participated in two beamtime periods at ALBA Cells (Spain) to perform in-situ and operando NAP-XPS. I received my PhD (2015) from Rey Juan Carlos University (URJC) with Cum Laude and European mention. In 2016, I started my postdoctoral career at Heriot-Watt University (UK) within an EPSRC-funded project on bioenergy. In 2018, I was awarded a Got Energy Talent MSCA-cofund fellowship at URJC to develop my own research project (ArtifUEL) as principal investigator (PI). On 2020, I was awarded a Juan de la Cierva-Incorporación (JdC-I) at URJC. Shortly after, I obtained a second JIN-type R+D+i project (ARMONIA, PI), and I stopped my JdC-I to hold the JIN-type project at IMDEA Energy, where I work at present. My international mobility includes a total of 27 months in world-class European institutions (Imperial College, HWU). My career includes international and national collaborations with renowned research institutions and companies. This networking is reflected by the strong degree of collaboration (50%) and internationalization (25%) of my research. I have published 32 scientific articles in peer-reviewed journals: 18 in Open Access (56%), 9 as 1st author (28%), 8 as corresponding author (CA) (25%), 2 as last and CA); and 1 book chapter (1st author and CA). My research has received 1090 citations, with an average citation/year of 298 (2019-2024); h-index: 16. 74.2% of my publications are in the top 10% journals (Chem. Soc. Rev., Nat. Commun., Appl. Catal. B Environ (x5), ACS Catal. (x2), Adv. Funct. Mater., J. Mater. Chem. A (x2)). My career accounts with national and international mobility (27 months in total at Imperial College London and Heriot-Watt University). I participated in 49 conferences (33 international, 16 national) and 11 competitive research projects at international (3), national (7) and regional (1) level. I am scientist in charge of the Operando Lab at IMDEA (from Lab Network of Community of Madrid). My research maturity by the attraction of 488,830€ for self-funding and research purposes (ARMONIA, ArtifUEL and DualCat projects). I also participate as reviewer of R&D projects, scientific papers, and Scientific/Organizing Committees. I have supervised 1 BEng, 1 Master student and 1 postdoc. I am currently supervising 3 PhD students and I am external supervisor of an international PhD student. I also mentored 7 students. I have teaching experience in chemical and environmental engineering, and I actively participate in outreach activities.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Energía y transporte
Nombre: ALEXANDRINO DE FREITAS, KATIUSKA
Referencia: RYC2024-050572-I
Correo Electrónico: katiaalexandrino@hotmail.com
Título: Chemical conversion of clean fuels

Resumen de la Memoria:

I am a Chemical Engineer conducting transdisciplinary research on chemical conversion of new fuels and measurement of air pollutants. For several years, I have investigated on the experimental and modeling of the oxidation and pyrolysis of several biofuels proposed as clean fuels as well as in the minimization of pollutant emissions in combustion processes. This was the main topic of my PhD thesis, supervised by Profs. María Ujué Alzueta and Rafael Bilbao, at the University of Zaragoza. As a part of my doctoral training, I completed a research stay under the supervision of Prof. Henry Curran at the National University of Ireland, Galway (NUIG), complementing my training. My research has significantly contributed to understanding the chemical conversion of biofuels at high temperatures and high and low pressures and that includes the development and validation of chemical kinetic models that can be further used to simulate the physical and chemical processes in engines, contributing to the design of more efficient systems with minimal emissions. During my PhD, I supervised two undergraduate students, whose works were published in high-impact scientific journals. I completed my PhD in February 2018 with 7 publications in high-impact peer-review journals (most of them in Q1, as first author in all of them) and over 10 national and international conferences. I was awarded the Extraordinary Doctorate Award by the University of Zaragoza. From September 2018 to April 2023, I led a research line at the University of the Americas (Quito, Ecuador) focused on studying the chemical composition of particulate matter, including soot, and to detect the presence of air pollutants, and identify the emission sources, using trees as biomonitors. My work advanced scientific knowledge and emphasized the need for public policies to reduce emissions and improve urban air quality in Quito. During this postdoctoral period, I was the Principal Investigator of two multidisciplinary funded projects with national and international collaboration and participated in three additional projects as a co-Principal Investigator. Also, I supervised two undergraduate students. These years were crucial for my professional growth, honing my skills in research project management, teaching and establish a multidisciplinary and international network of collaborators. Additionally, I gained maturity, independence, and leadership experience. All this helped me to obtain accreditation as "Profesor Titular" by ANECA in 2024. From June 2023 to November 2024, I worked as a junior researcher in the Thermochemical Processes group at the University of Zaragoza, where I supervised an undergraduate student's work on the high pressure oxidation of NH₃/dimethoxymethane mixtures. In January 2025 I started the Marie Skłodowska-Curie Postdoctoral Fellowship, returning to my main line of research, i.e., the chemical conversion of clean fuels and the minimization of pollutants. I am interested in developing a research line dedicated to the chemical conversion of Sustainable Aviation Fuels (SAFs), contributing to the development of clean and efficient solutions for the aviation industry. I am committed to consolidating my independent research career, and I consider the "Ramón y Cajal" program as the ideal vehicle to achieve this and to provide me with long-term stability in the Spanish Science

Resumen del Currículum Vitae:

I am a Chemical Engineer, graduated in 2012 from the University of Aveiro (Portugal), with a Master's degree in 2013 from the University of Zaragoza (Spain). In February 2018, I completed my PhD in Chemical and Environmental Engineering at the University of Zaragoza, graduating summa cum laude, with an International PhD mention and the Extraordinary Doctorate Award for the academic year 2017/2018. During my PhD, I completed a 4-month research stay at the National University of Ireland, under the supervision of Prof. Henry Curran. My doctoral research, focused on the development and validation of chemical kinetic models to predict the conversion of biofuels, has been key in advancing the understanding of the chemistry involved in biofuel conversion. From September 2018 to April 2023, I worked as an Associate Professor at the University of the Americas in Quito (Ecuador), where I taught over 1000 hours to engineering students. I led a research line focused on the chemical analysis of particulate matter (soot) and urban air quality using plants as biomonitors. This research significantly improved the understanding of air pollutant concentrations in Quito and led to valuable collaborations with the Secretary of the Environment of the Metropolitan District of Quito, demonstrating the importance of implementing public policies in the city. From June 2023 to November 2024, I worked in the Thermochemical Processes group at the University of Zaragoza, investigating the experimental and modeled chemical conversion of ammonia and its mixtures with promoters as a promising carbon-free fuel. Working in different universities/scientific institutes worldwide and conducting transdisciplinary research has allowed me to establish an international and multidisciplinary collaborative scientific network, further enhancing the quality and impact of my research. Throughout my career, I have co-authored 27 peer-reviewed scientific articles (14 as first author and 13 as corresponding author), which have received a total of 403 citations and an H-index of 11 (Scopus). I have been an active contributor to the scientific community, with more than 10 conference papers and media interviews that have helped disseminate my research to a broader audience. I have consistently demonstrated leadership in research, having supervised 5 undergraduate students, whose work has been published in internationally recognized journals. I have also participated in 9 funded research projects, 2 as Principal Investigator, 3 as Co-Principal Investigator, and 4 as a team member. Moreover, in January 2025, I started the highly competitive Marie Skłodowska-Curie Postdoctoral Fellowship at the University of Zaragoza, where I am investigating the combustion of sustainable aviation fuels, further advancing my research in the field of sustainable energy solutions. Furthermore, I serve as reviewer for several international journals indexed in the JCR, such as Energy & Fuels and Fuel. I have received the positive evaluation for "Profesor Titular" by ANECA. My trajectory, marked by scientific excellence, leadership in research projects, and a steadfast commitment to training future generations of researchers, provides a solid foundation for continuing to develop a successful international research career.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Energía y transporte
Nombre: PIERNAS MUÑOZ, MARÍA JOSÉ
Referencia: RYC2024-050194-I
Correo Electrónico: mjpgiernas@um.es
Título: Materiales para baterías de iones alcalinos

Resumen de la Memoria:

Obtuve la Licenciatura en Química en 2011 y el Máster en Química Fina y Molecular en 2012 en la Universidad de Murcia (UM). Durante estos años de formación, mi investigación se centró en nuevos compuestos de coordinación con propiedades ópticas (luminiscentes) y magnéticas. A finales de 2012, comencé mis estudios de doctorado en el centro de investigación CIC EnergiGUNE (CIC) y la Universidad del País Vasco, donde me dediqué a la búsqueda de nuevos materiales para el almacenamiento de energía electroquímica, investigando, específicamente, la familia del Prussian Blue y su posible utilización en baterías de ion litio (LIBs) y sodio (NIBs). Tras haber realizado una estancia de 6 meses en el laboratorio nacional de Argonne (ANL), obtuve un doctorado internacional a finales de 2016. En enero de 2017, recibí un premio de Doctorado del Gobierno Vasco. Desde abril de 2017 a julio de 2019, trabajé como investigadora postdoctoral en ANL (USA), en el grupo de análisis post-test. Allí, lideré varias líneas de investigación enfocadas al uso de silicio en LIBs, y también colaboré en otros proyectos de LIBs relacionados con otros materiales (óxidos laminares, olivinos) y electrolitos. De estos esfuerzos resultaron 2 publicaciones como autora correspondiente, y el surgimiento de una nueva línea de investigación. En julio de 2019, regresé al CIC, donde trabajé como investigadora postdoctoral en el análisis post-mortem y también en la búsqueda de materiales catódicos avanzados y electrolitos de estado sólido para LIBs y NIBs. En esta etapa, participé en múltiples proyectos nacionales y europeos, siendo responsable de alguno de ellos y actuando como asesora en un ERC-HE2020. También promoví la creación de un nuevo tema de investigación (reciclado de LIBs). Desde junio de 2020, trabajo en la UM. Pertenezco al grupo de Metalofármacos, liderado por el catedrático J. Ruiz López, donde participo en diversos proyectos, pero también soy mi propia IP, dedicando mis esfuerzos a la investigación de nuevos complejos metálicos para su uso en terapia fotodinámica contra el cáncer.

Considerando mi trayectoria, la línea de investigación que propongo, la cual está en consonancia con el Plan de Acción de Electrificación de Europa, tiene como propósito buscar **Materiales para baterías de ion potasio de bajo coste**. Las principales motivaciones son: 1) ayudar a reemplazar los combustibles fósiles y contribuir a la descarbonización, 2) buscar alternativas a las LIBs, debido a la escasez de recursos de litio y al problema no resuelto de su reciclaje, 3) obtener KIBs sostenibles y económicas, dada la alta abundancia de potasio, con unas prestaciones similares a las LIBs. A tal fin, sería necesario cumplir con los siguientes objetivos: 1) búsqueda de materiales catódicos, 2) búsqueda de materiales anódicos, 3) testeo de su idoneidad para KIBs, 4) optimización de sus propiedades electroquímicas (si fuera necesario), 5) estudio de su mecanismo de reacción y, si fuera posible, 6) culminar con el ensamblaje de una celda completa (que podría comercializarse).

Aunque no tengo experiencia en KIBs, el hecho de haber trabajado durante 8 años en casi todos los componentes de una batería (ánodos, cátodos, electrolitos) y con diferentes materiales para otros sistemas de baterías de ion A (A = Li, Na) me confiere un perfil holístico, haciendo viable este proyecto.

Resumen del Currículum Vitae:

Hasta la fecha, mis mayores contribuciones científicas son 19 artículos publicados (17 de ellos en revistas de primer cuartil), 1 libro (<https://www.springer.com/la/book/9783319914879>) con el grupo Springer Nature, y la invención y desarrollo de una celda in operando (que condujo a una solicitud de patente). Soy primera autora del 50% de mi producción científica, y autora correspondiente del 25% de ésta. He difundido los resultados de mi investigación en numerosas conferencias de prestigio nacional e internacional (RSEQ, ECS, MRS), contribuyendo a un total de 4 charlas invitadas (2 de ellas como autora correspondiente y ponente), 9 presentaciones orales y más de una quincena de pósteres. He participado en 15 proyectos de I+D, cuya financiación asciende a unos 14 millones de euros, incluyendo 3 financiados por el Departamento de Energía de los Estados Unidos y 1 por la Unión Europea (HE2020), y he colaborado con socios industriales (una importante compañía europea internacional (confidencial), Iberdrola y Cegasa). Actualmente, estamos colaborando con EchoPol Tech S.L., y he contactado con Repsol y Moeve. También cabe destacar que he sido beneficiaria de varias becas, tales como una beca de colaboración (Ministerio de Educación), una de iniciación a la investigación (UM) y una predoctoral (Gobierno Vasco), y que he conseguido atraer financiación por un valor total de 220k € como IP en programas altamente competitivos, como una ayuda de investigación **Saavedra Fajardo** (Fundación Séneca) y una **Juan de la Cierva** Incorporación (MCIN/AEI&NextGenerationEU), la última de las cuales estoy actualmente disfrutando. Además, en octubre de 2024 (Convocatoria 2025) solicité una ERC Starting Grant. Cuento con casi 3 años (33 meses) de experiencia en el extranjero, y unos 7 de experiencia internacional (tesis + 1er postdoc + 2º postdoc). A lo largo de mi carrera científica, he adquirido diversas habilidades sintéticas (síntesis solvotermal, en estado sólido, a alta y baja temperatura, en atmósfera inerte), de caracterización química (PXRD, IR, Raman, SEM, TGA, RMN, MS, GC/MS) y electroquímica (principalmente, voltametría cíclica y medidas galvanostáticas), así como habilidades transversales (pensamiento crítico, inventivo e innovador, capacidad de resolución de problemas, de trabajo en equipo y colaboración, adaptabilidad, compromiso) y de liderazgo e independencia.

He dirigido/codirigido 3 TFGs y 3 TFGs, y estoy supervisando 3 TFGs y 1 TFM internacional. Además, codirijo una tesis doctoral y mi experiencia docente en diversos estudios de Grado (Química, Farmacia y Bioquímica) y Master (Química Fina y Molecular) asciende a casi 400 h. En septiembre de 2021, conseguí la acreditación **Profesor Contratado Doctor** por la ANECA.

Sirvo regularmente como revisora en revistas internacionales de alto índice de impacto, habiendo revisado un total de 25 artículos, y soy editora de **Frontiers in Chemistry** y editora invitada de un volumen especial (https://www.mdpi.com/journal/materials/special_issues/F6A4W4BA86) para la revista de acceso abierto **Materials**. Asimismo, he participado en actividades de divulgación para promover la vocación científica en estudiantes de



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Turno General

secundaria, en seminarios académicos para estudiantes de Master e investigadores y he formado parte del Comité Organizador del 2nd Symposium of Phys. and Chem. Sciences for Young Researchers.



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Turno General

Área Temática: Energía y transporte
Nombre: LAGUNA BENET, GERARD
Referencia: RYC2024-049350-I
Correo Electrónico: gerard.laguna.benet@gmail.com
Título: Advanced Data-Driven Solutions for Distributed Renewable Energy Integration and Intelligent Grid Management

Resumen de la Memoria:

Research path

In recent years, I have focused on developing data models utilising data-driven approaches and grey-box modelling techniques to enhance building energy efficiency, energy management systems, and the integration of renewable energy into the grid. My contributions to the scientific field include advancements in photovoltaic anomaly detection and optimisation of forecast horizons for model predictive control strategies.

Additionally, I have worked on monitoring municipal energy transition plans as part of the European ePLANET project, which led to the publication that stakeholders have already used to inform policy recommendations at the EU level.

Moreover, I have contributed to the development of open-source tools published under intellectual property protection. These tools leverage existing data to estimate photovoltaic energy production and provide capabilities for evaluating energy consumption trends in buildings and assessing the impact of refurbishment measures.

Proposed research line

This research focuses on advancing data-driven technologies to integrate Distributed Energy Resources, storage systems, and electric vehicle infrastructure into medium- and low-voltage electricity networks. By leveraging digital twin technology, the project aims to create a dynamic, semantic knowledge graph to model and optimise grid operations in real-time, enabling smarter and more flexible energy systems.

The methodology combines physics-informed Graph Neural Networks with statistical learning techniques like AutoRegressive models, recursive least squares, and Support Vector Machines. This approach enhances predictions and operational efficiency, addressing the variability and intermittency of renewable energy while optimising power flows and ensuring grid stability.

A key innovation lies in applying semantic knowledge graphs to urban energy systems, structuring data as multigraphs to model complex interdependencies. While physics-based models are data-intensive and time-consuming, and purely data-driven models lack contextual interdependence, this research bridges the gap by integrating Graph Neural Networks with real-world data from low-voltage networks and scaling analyses from individual buildings to neighbourhoods.

Digital twin technology enables software-in-the-loop simulations for real-time testing and validation of solutions. By replicating grid dynamics and generating synthetic data, digital twins enhance algorithm scalability and predictive accuracy while visualising grid operations for stakeholders. The research also incorporates distributed intelligence at the grid edge through Remote Terminal Units, enabling real-time anomaly detection, fault isolation, and load optimisation without reliance on centralised systems.

The ultimate aim is to develop an AI-driven software framework for managing Demand Response and Distributed Energy Resources within distribution networks. By addressing challenges like renewable variability, grid safety, and computational efficiency, the research contributes to sustainable energy transition. Multidisciplinary collaboration with the CIMNE-BEE Group and the UPC Electrical Engineering Department combines renewable energy, AI, and IoT expertise to ensure success.

Resumen del Currículum Vitae:

Gerard has been a Data Analyst and Project Coordinator in the Buildings Energy and Environment Group (BEE Group) at the International Centre for Numerical Methods in Engineering (CIMNE) since 2020. He holds a PhD in Engineering and ICT, a Master's in Industrial Engineering from the University of Lleida (UdL), and a Bachelor's in Energy Engineering from the Universitat Politècnica de Catalunya (UPC). As part of his undergraduate studies, he participated in the Erasmus program for one semester at the Norwegian University of Science and Technology (NTNU) in Trondheim, Norway.

From 2016 to 2020, Gerard was part of the Dynamic Systems Applied in Solar Energy (SDAES) group, contributing to the design and testing of liquid cooling solutions for microelectronics and Concentrating Photovoltaic (CPV) receivers. His work included 3D designs, CFD analyses of microfluidic cells, and the development of 3D-printed liquid distributors for cooling devices. During his PhD at the Université de Sherbrooke, Canada, Gerard led the final assembly of these devices.

In parallel, Gerard worked as a laboratory technician, designing, building, and programming experimental setups for testing liquid cooling systems. As an associate lecturer at the University of Lleida from 2017 to 2020, he taught courses into Mechanical, Electronic and Energy and Sustainability Engineering bachelors. He developed course content, delivered lectures in Catalan and English, and supervised final-year projects. In 2020, Gerard received the Tenure-eligible Lecturer (Lector) accreditation from the Agency for the Quality of the University System of Catalonia (AQU).

Since joining the BEE Group at CIMNE in 2020, initially as a Severo Ochoa Postdoctoral Researcher and now as an Assistant Research Professor, Gerard has focused on data analytics for energy transition at building and municipal levels. He developed algorithms for optimizing HVAC operations using Model Predictive Control (MPC) and fault detection algorithms for solar PV installations. His research interests include energy flexibility, demand response, energy communities, and territorial planning.

Gerard has played a key role in several EU-funded projects, both in technical development and project coordination. He is the Principal Investigator of the ePLANET and BLUEBIRD projects. ePLANET focuses on digitizing municipal energy transition plans and analyzing building energy consumption, while BLUEBIRD aims to develop tools for integrating buildings as energy flexibility assets in energy markets, considering user needs and acceptance.

On the academic front, has supervised three final-year projects since joining the BEE Group. The first explored predicting PV energy generation using minimal data inputs. The second aimed to create a tool for developing energy communities by estimating building-level energy consumption through the integration of various data sources. The third, set to be defended in February 2025, involves developing a tool to map regional PV potential and estimate rooftop PV production. Currently, Gerard supervises a doctoral thesis titled "Artificial Intelligence Methods for Energy Generation Prediction".



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Turno General

Models and Their Application for Anomaly Detection in Photovoltaic Systems. This research focuses on AI-driven models to enhance renewable energy integration and smart grid intelligence.



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Turno General

Área Temática: Energía y transporte
Nombre: MOHAMED , MOHAMED SAMIR YOUSEF
Referencia: RYC2024-051316-I
Correo Electrónico: myousef@ing.uc3m.es
Título: Innovative High-Temperature Solar-Driven Trigeneration System: Development and Analysis
Resumen de la Memoria:

I am a postdoctoral researcher at the System Analysis Unit of IMDEA Energy, with over six years of expertise in thermal engineering, energy systems, and sustainable engineering. My work focuses on developing innovative, high-efficiency multigeneration systems for power, cooling, and hydrogen production, leveraging advanced technologies like solar-thermal systems, supercritical CO₂ (sCO₂) power cycles, and hybrid renewable solutions.

During my Ph.D., conducted under joint supervision between the Egypt-Japan University of Science and Technology (E-JUST) and Tokyo Institute of Technology, I pioneered the use of novel materials in solar desalination systems, publishing two high-impact papers. As a Marie Skłodowska-Curie Fellow at Universidad Carlos III de Madrid, I advanced multigeneration systems by designing seven innovative configurations utilizing sCO₂ Brayton cycles, absorption refrigeration, and SOECs, resulting in seven Q1 journal publications.

I have led significant projects, including a Horizon 2020 initiative on 4E analysis of sCO₂ cycles and the EU-funded DESIRED project on CO₂ and water co-processing. My impactful review on PV cooling techniques has garnered 160 citations and received media recognition from PV Magazine.

My expertise spans solar thermal optimization, energy storage, desalination, and multigeneration systems for high-temperature applications. Through energy and exergy analyses, life cycle assessments, and exergoeconomic studies, I have consistently delivered innovative solutions for renewable energy adoption, water scarcity, and environmental sustainability. My work represents a commitment to advancing the global transition toward sustainable energy systems.

Resumen del Currículum Vitae:

I am a dedicated researcher specializing in thermal engineering, energy systems, and sustainable engineering, with over six years of experience developing innovative solutions to global challenges in renewable energy and water scarcity. My career has been defined by pioneering work in high-efficiency multigeneration systems, advanced solar-thermal technologies, and sustainable energy integration.

During my Ph.D., conducted under joint supervision between the Egypt-Japan University of Science and Technology (E-JUST) and Tokyo Institute of Technology, I spearheaded experimental research using novel materials for solar desalination systems, resulting in two high-impact publications. Following this, as a Marie Skłodowska-Curie Fellow at Universidad Carlos III de Madrid, I designed seven cutting-edge multigeneration systems utilizing supercritical CO₂ (sCO₂) Brayton cycles, absorption refrigeration, and hydrogen production technologies. These systems, recognized for their high efficiency and sustainability, were published in prestigious Q1 journals.

Currently, as a postdoctoral researcher at IMDEA Energy, I am contributing to the DESIRED project, focusing on the co-processing of CO₂ and water into sustainable energy products using novel photocatalytic reactors. My expertise includes solar power tower technologies, advanced thermal storage using chloride salts, and the integration of hybrid renewable energy systems. I have also conducted extensive analyses, including energy and exergy evaluations, exergoeconomic studies, and life cycle assessments, to optimize system performance and assess environmental impacts.

My academic contributions include 32 ISI journal publications (22 in Q1), 2 book chapters, and 160+ citations for a widely recognized review on PV cooling techniques featured in PV Magazine. I have actively participated in international collaborations, including an 8-month research stay at Tokyo Tech, and delivered teaching and mentoring at Universidad Carlos III de Madrid, supervising several master's students and participating in examination panels.

With expertise in solar-thermal systems, energy storage, desalination, and multigeneration technologies, I am committed to advancing sustainable energy solutions. My work emphasizes innovation, scalability, and environmental responsibility, aligning with global goals for renewable energy adoption and carbon neutrality.



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Turno General

Área Temática: Energía y transporte
Nombre: JAMIL , BASHARAT
Referencia: RYC2024-048404-I
Correo Electrónico: basharat1986@gmail.com
Título: Optimization of heliostat field Performance for Concentrated Solar Tower plants using Artificial Intelligence techniques

Resumen de la Memoria:

My research is primarily focused on developing advanced techniques for Data-Driven Modelling in the field of energy with a particular focus on solar energy systems. My research is aligned with the UN Sustainable Development Goals 7 (Affordable and Clean Energy), and 13 (Climate Action). I have progressed my research career in the development and application of modelling techniques to analyse the performance of energy systems, as well as estimation and prediction of future energy trends. I have also developed skills in Exergy analyses and Life-Cycle Analysis (LCA) together with economic analysis to complement the overall assessment of solar-based energy systems. With this, I am directing my research that assimilates the area of energy efficiency in solar energy systems with data-driven models, to provide more robust results for the future. My proposed research is directed toward the incorporation of Artificial Intelligence tools to improve the system efficiency in the case of solar energy systems for high-temperature energy conversion processes. This includes the numerical simulation of solar receiver fields (optical systems), as well as overall performance optimization of the heliostat using AI tools. The heliostat field can be utilized to produce high-temperature thermal energy which can be used to produce electrical power or process energy (for the production of Hydrogen energy). the objectives of the proposed research can be clearly defined: (i) Analyzing the high temperature-based solar power cycle for power generation, hydrogen production, and process heat. (ii) Implementing numerical simulation codes for parameters assessment and optimization of optical and thermal performance of components of the system. (iii) Multi-objective optimization of the energy system based on power and heat generation, and hydrogen production. In the first step, it is required to identify the important parameters that affect the optical and thermal efficiency of the system. These can include parameters like row spacing of the reflective surfaces, the dimension of the heliostats, etc. Numerical simulation will be applied to investigate the performance of each of the components individually. Numerical codes will be developed to optimize different parameters of the heliostat field. In the second step, the system's overall performance assessment will be carried out once each component has been individually modelled. This step requires the use of different metaheuristic-based algorithms. The dynamic performance of the system is required to be quantified since the generation of thermal energy is based on the availability of the sun.

Resumen del Currículum Vitae:

Currently (Starting March 2023), I am working with IMDEA Energy Institute (Madrid, Spain), on the research line of dynamic pointing correction for heliostat-based central receiver systems. Previously I was an MSCA postdoctoral research with Universidad Rey Juan Carlos (Madrid, Spain) for two years (2020-2022) where I developed the research line of Intelligent energy demand estimation. I have also worked for more than 6 years in the capacity of Assistant Professor and have established several national and international collaborations. In this time (from 2018 to 2024), I have supervised 7 Master's theses or TFM (including one Erasmus+ research stay), 5 end-of-degree projects or TFG and 1 Junior Research Fellow. Quality indicators: 55 articles (33 Q1, 51 SCI), 04 chapters (Springer Publications), & 13 conference papers. Total citations: 1965 to date with an h-index of 26 and i-10 index of 37, according to Google Scholar. 74.4% documents in the top 25% journals by CiteScore percentile (Scopus data), reviewer for over 100 journals with over 400 articles reviewed to date. Editorial Board member of Energies, MDPI, ISSN: 1996-1073; Energy and Thermofluids Engineering, ASPS Journals ISSN: 2716-8026). Teaching experience at Assistant professor Level: 6+ years, 02 PhD Mentoring (1 Completed, 1 ongoing), 7 Master's thesis and 5 end-of-degree project supervision. Principal Investigator (PI) for 1 European Union Project, Co-Principal Investigator (CO-PI) in 2 International Projects; Currently participating in 5 collaborative projects (4 are funded by the European Union and 01 is funded by Comunidad de Madrid). Previously, External Collaborator for 6 Projects funded by the Deanship of Scientific Research at Najran University, Saudi Arabia; and 1 Project funded by the Deanship of Scientific Research at King Saud University, Saudi Arabia.



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Turno General

Área Temática: Energía y transporte
Nombre: CARMONA CABELLO, MIGUEL
Referencia: RYC2024-050888-I
Correo Electrónico: q22cacam@gmail.com
Título: Development of Biorefineries for a circular and Digital Economy

Resumen de la Memoria:

Miguel Carmona Cabello has developed a remarkable research career focused on the concept of biorefineries and circular economy, with a particular emphasis on the valorization of waste for the production of sustainable energy and materials. With 18 scientific publications, over 20 conference contributions, and a robust international profile, his work spans a wide range of topics, from biotechnology for biofuel production to innovative technologies in waste management. During his doctoral studies, he explored biotechnological processes for biodiesel production from food waste, employing advanced technologies such as ultrasound to enhance efficiency and utilizing macromolecules to develop microbial culture media. These efforts included waste characterization and the development of strategies for its valorization, resulting in high-impact publications and the establishment of methodologies that have informed decision-making processes in waste-to-energy conversion.

In his postdoctoral stage, Miguel expanded his research into multidisciplinary areas, including biofuel emissions analysis in engines, fermentation processes for bioenergy production, and the development of bio-oils from anaerobic digestion digestates. This work was complemented by international collaborations and culminated in innovative approaches such as integrating NIRS technology for biomass energy characterization and developing "Biorefineries 5.0," which combine cutting-edge digital technologies with sustainability principles. His ongoing projects include contributions to the field of thermoplastics through biotechnological principles applied to 3D printing. As part of his Marie Skłodowska-Curie Actions fellowship, he is leading a pioneering project to recycle plastic waste into composite materials for additive manufacturing, with applications in renewable energy and advanced materials.

Currently, Miguel is spearheading the "Smart-container 5.0" project, which aims to develop a portable pilot plant that combines advanced pyrolysis processes, metal 3D printing, and renewable energy integration for the valorization of mixed plastic and organic waste. This initiative seeks to produce energy and alternative fuels while addressing the technical and economic challenges posed by complex waste fractions. The project exemplifies his vision of creating adaptable, sustainable, and portable technologies that can serve both industrial and rural settings, ensuring broad accessibility and scalability.

Beyond his scientific output, Miguel demonstrates strong leadership through his involvement in numerous research projects, co-supervision of national and international doctoral theses, and active participation in academic and industrial consortia. His collaborations span institutions across Europe, Latin America, and Asia, where he has contributed to joint research projects, consultancy services, and knowledge transfer. Miguel's research philosophy is deeply rooted in interdisciplinary integration, combining environmental science, chemical engineering, and advanced technology to design future-ready biorefineries that align with the goals of digitalization (4.0) and sustainability (5.0). This approach not only addresses pressing environmental challenges but also fosters innovation and academic growth by equipping the next generation of researchers with the tools and knowledge to drive meaningful change.

Resumen del Currículum Vitae:

completed my doctoral thesis (Integrated Biorefinery for the Production of Microbial Oil from Agro-industrial Waste, awarded summa cum laude with international distinction) through a joint doctoral program between the University of Córdoba (Spain) and the Agricultural University of Athens (Greece) (where I undertook an 18-month predoctoral research stay). This work allowed me to initiate a research line on the development of biorefineries from waste, which has defined my professional career. Subsequently, I began my postdoctoral career (5 years of which 3.5 were spent abroad), thanks to a postdoctoral contract from the University of Córdoba. This was followed by a post-doc research contract under the Andalusian Research Plan (which included two-month stay at the University of Birmingham, UK), and later a Margarita Salas contract, during which I completed one-year stay at the University of Birmingham, UK. Currently, my research work is carried out within the "Marie Skłodowska-Curie Actions" program, where I hold a postdoctoral contract. Leveraging the professional connections I have built over the years, I have designed an international consortium between the University of Birmingham (host institution), the University of Córdoba, the Agricultural University of Athens (Greece), technological centers, i.e. ANDALTEC and IMDEA (Materials and Energy), and enterprises, like EWM Soluciones (focused on waste recycling) and Unimos Alliance (an international company specialized in project management). My postdoctoral trajectory focuses on applying the methodologies I have learned for the production and characterization of eco-composites, biofuels, biolubricants, and the development of new value chains. I was responsible for the setup and management of the pyrolysis and fermentation laboratory in the Department of Thermal Engines and Machines at the University of Córdoba. In addition to collaborating on various research projects, I am deeply involved in the transfer of generated knowledge, actively working to strengthen relationships with companies and technological centers (both national and international). In this context, I have co-led several knowledge transfer projects with Acciona Energía, the National Association of Olive Oil Companies, among others, as well as competitive projects funded by the Ministry of Industry (see below), securing total funding exceeding 200,000 €. My scientific output includes 17 JCR-indexed articles (12 in Q1), 3 book chapters in prestigious publishers, and 15 presentations at national and international conferences (one of which was awarded "Poster Award Breakthrough Initiative" at the 6th International WasteEng2016 Conference in Albi, France). Currently, I co-supervise 6 doctoral theses, several final degree thesis and have taught in the Department of Thermal Engines and Machines in the subjects: Pneumatic and Hydraulic Systems (2018-2020, 90 h), Thermal Power Plants (2019-2020, 25 h) and Biomass for Energy Generation (Master in Distributed Renewable Energies), among others. I have participated in several teaching innovation projects, including Erasmus+ projects. I have achieved the accreditation as Assistant Professor Doctor and Contracted Professor Doctor.



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Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: CRISTOFERI, DAVIDE
Referencia: RYC2024-048668-I
Correo Electrónico: cristoferi.davide@gmail.com
Título: Socio-economic transformations, Inequality and Redistribution in the Late Medieval rural and urban Mediterranean and Western Europe

Resumen de la Memoria:

I hold an MA in Documentation and Historical Research from the U. of Siena (2021), where in 2016 I obtained my PhD in medieval history with the highest distinction with a research on the role of fiscal institutions in redistributing the effects of the fourteenth-century crisis between urban and rural areas, using the development of transhumance in Southern Tuscany as a case study. This research has resulted in several articles, a monograph and an edition of sources.

Thanks to a second interdisciplinary PhD in Social and Economic History and Business Economics at Ghent U. (2015-20), within the framework of the CORN network and of the GINI project led by renowned scholars such as E. Thoen, Th. Lambrecht, E. Vanhaute and K. Schoors, this initial focus has evolved into my current investigations: socio-economic inequalities and the evolution of Mediterranean social-agro systems. This research, supported by substantial groundwork and by a training at the Posthumus Institute and at Bocconi U. with an expert in the field such as G. Alfani, has been pioneering in several respects and has resulted in several articles, book chapters, papers at prestigious international conferences and a dissertation currently in preparation.

This phase of my research laid the foundations for my two successive individual postdoctoral fellowships at Ghent U. and the U. libre de Bruxelles, funded by the prestigious FWO (2020-23) and FNRS (2023-26) Research Foundations, following a competitive selection process at European level. These fellowships have allowed me to broaden the scope of my research, both geographically and chronologically, and to position my research and expertise at the forefront of critical debates such as the late medieval conjuncture and pre-industrial economic inequality. Two international workshops, several articles and an edited volume are the main outputs of this project.

The research to be undertaken, contingent upon the award of this contract, aims to build on and extend the two main lines of inquiry that have defined my scholarly work to date:

- 1) Redistribution & Inequality: understanding wealth patterns, social hierarchies and economic inequality in Late Medieval Europe (1300-1550).
- 2) Adapting to crises: the evolution of Mediterranean social-agro systems during the conjuncture of the 14th-15th c.

Particular attention will be paid to the intersection of these themes with critical crises - including famines, epidemics, shortages - and the ways in which these events shaped the redistribution of resources in medieval and early modern societies. In both lines of research, I will take a comparative approach, drawing on my in-depth knowledge of medieval Tuscan history and sources, but also including other Mediterranean and Western European regions.

By comparing these regions, I will be able to explore how different patterns of economic and social development, welfare systems and responses to crisis influenced the redistribution of surplus while perpetuating socio-economic inequality, and to construct a nuanced understanding of how and why Mediterranean societies coped and adapted differently to the intertwined crises of the 14th and 15th c.

Resumen del Currículum Vitae:

I am an economic and social historian of the late medieval Mediterranean and Western Europe. My research focuses on the links between agrarian change, economic inequality and redistribution during the 14th-15th century conjuncture, with a broad geographical scope spanning Tuscany, northern Italy, the Mediterranean and central northern Europe. My work has resulted in high-impact publications in prestigious journals (Quaderni Storici, Reti Medievali, Ricerche Storiche) and publishers (including Brepols, Routledge, Boydell & Brewer, CSIC, Flaran) as authored and co-authored articles, chapters and books (1 monograph, 1 edition of sources and 1 edited volume) as a result of international collective and individual projects. Additionally, I have been reviewer of high-impact journals and series (Continuity & Change, Le Moyen Âge, Studi Medievali).

Throughout my career, I have demonstrated my competitiveness, both in my studies and in my research. I completed my Master's degree and my PhD with the highest distinction, and I am currently completing a second interdisciplinary PhD in Economic and Social History and Business Economics. I have been trained in prestigious academic centres for both medieval and economic history (University of Florence, University of Siena, Ghent University, Bocconi University, N.W. Posthumus Institute, Université libre de Bruxelles) and have received competitive funding throughout my career, including an FWO and an FNRS postdoctoral fellowship. I have presented my work at several international conferences (ESSHC, IMC Leeds, Rural History Conference, World Economic History Conference), both as a speaker and as a panel organiser, and have been invited to present my research in prestigious seminar series (Université Paris 1 Panthéon-Sorbonne, ENS Paris, IMF-CSIC).

I have experience in managing and working with undergraduate and postgraduate students and researchers since the beginning of my career thanks to my participation in international projects (GINI, TraTTO) and networks (CORN, CRISIS). I also have extensive international teaching experience with MA and BA courses at Ghent University and Université libre de Bruxelles since 2020, as well as several seminars for undergraduate and graduate students.



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Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: GONZÁLEZ CESTEROS, HORACIO
Referencia: RYC2024-048516-I
Correo Electrónico: hgonces@gmail.com
Título: Economía y estudios materiales en el Mundo romano y bizantino

Resumen de la Memoria:

La carrera científica del candidato se define por la excelencia de sus publicaciones, por la amplia capacidad de liderazgo que ha demostrado, por su internacionalización y por su eficiencia a la hora de captar recursos, materializada en la obtención de un amplio número de becas, contratos y proyectos en concurrencia altamente competitiva.

Sus líneas de investigación principales se han centrado en el estudio de la economía antigua y medieval desde una perspectiva multidisciplinar basada en el análisis de la cultura material. Ha trabajado en una gran cantidad de proyectos en España, Croacia, Alemania, Holanda, Italia, Grecia, Turquía, Emiratos Árabes y Austria, durante la etapa predoctoral, postdoctoral y una vez establecido como investigador senior. Entre todos ellos destacan los trabajos llevados a cabo en Haltern y Neuss (Alemania), en Pompeya, Ostia, el Ágora de Atenas, y especialmente en Éfeso (Turquía). Esta gran movilidad se ha materializado en un amplio número de publicaciones relacionadas con varias líneas de investigación, destacando el análisis de la economía y de la interconectividad entre distintas regiones.

El trabajo desarrollado en Éfeso desde 2010, si bien en un primer momento se centró en la participación en distintos proyectos de investigación dirigidos por varios investigadores, posteriormente se ha llevado a cabo gracias a los proyectos liderados por el candidato y obtenidos en régimen altamente competitivo. Igualmente, desde la obtención del título de doctor en 2014 H. González abrió una línea de investigación centrada en el estudio de la economía y comercio de la metrópolis asiática, principalmente a partir del estudio de la cerámica y las ánforas encontradas en el puerto y núcleo urbano de Éfeso, ampliando tanto metodológica como temáticamente el trabajo de otros investigadores que le precedieron.

Gracias a la amplia internacionalización y estrecha colaboración con investigadores e instituciones extranjeras, el candidato ha desarrollado su labor en otros puntos del Mediterráneo, destacando Italia y especialmente Grecia, donde desde 2017 viene trabajando de manera prácticamente continua, especialmente en las excavaciones del Ágora de Atenas, un yacimiento dirigido por la Escuela Americana de Estudios Clásicos y en el que continúa estudiando la cultura material de época romana y tardoantigua como director de un proyecto que analiza las relaciones comerciales entre Atenas y Éfeso entre el siglo I a.C. y el VII d.C.

Dentro de la investigación que analiza las interacciones culturales y económicas de distintas regiones mediterráneas en época romana y tardoantigua, una línea importante en la que H. González es actualmente uno de los principales referentes internacionales, es el análisis del impacto del comercio de exportación en la economía de la antigua Hispania; una región eminentemente productora y exportadora cuyos bienes tuvieron una importante aceptación en la mayor parte de los mercados mediterráneos.

Las líneas de investigación abiertas por H. González, continúan evolucionando constantemente debido a la continua colaboración internacional, pero también gracias a la transmisión de conocimiento a futuras generaciones. En este sentido destaca la importante actividad tutorial y docente, muy notable durante los últimos tres años y que tendría continuidad en caso de obtenerse un contrato Ramón y Cajal

Resumen del Currículum Vitae:

Desde su etapa predoctoral el candidato ha disfrutado de varias becas y contratos de investigación, tanto nacionales como europeos, que han continuado a lo largo de su etapa postdoctoral. Actualmente disfruta de un contrato de 5 años Talento-1 en su modalidad Senior en la Universidad Complutense de Madrid, que conlleva asociada la dirección de un importante proyecto de investigación. Igualmente, es director de otro proyecto financiado por el Servicio de Investigación Austriaco y desarrollado entre Atenas y Éfeso.

El candidato ha organizado 8 encuentros científicos y 2 congresos internacionales, y ha publicado un largo número de artículos, libros (tanto monografías como libros editados), y participado en los congresos y seminarios más importantes de las disciplinas en las que investiga.

Ha sido codirector de dos proyectos en Italia y actualmente es parte del equipo de investigación de otros dos en Pompeya y Cataluña. Independientemente de haber obtenido varios proyectos internacionales en régimen altamente competitivo, dotados de una amplia financiación, ha sido capaz de captar fondos específicos para realizar congresos, llevar a cabo publicaciones, y para contratos de investigadores predoctorales. Entre otros méritos internacionales ha desarrollado una amplia colaboración con centros de investigación nacionales y extranjeros, así como con otras instituciones, especialmente con la Embajada Española en Atenas, y los Institutos Cervantes de Atenas y Estambul.

Junto su faceta investigadora, desde la etapa predoctoral ha dado importancia a la transmisión de conocimiento a un público no especializado, algo que queda plasmado en la constante colaboración con el Museo Arqueológico Nacional de Madrid, en la publicación de libros divulgativos (2006 y 2007), la participación en festivales de divulgación (Tarraco Viva 2012 y 2013), en la organización de ciclos de conferencias para buceadores aficionados en Mainz y Berlín (2014 y 2015), o en la colaboración constante con colegios e institutos de secundaria.

El candidato ha impartido e imparte docencia de grado y máster en universidades españolas (Un. Complutense, Un. de Sevilla), así como distintos seminarios y clases en universidades europeas (Un. Frei de Berlín, Un. Viena) y estadounidenses (Un. Stanford). Actualmente dirige dos tesis doctorales (UCM), y tres TFGs (UCM), y ha dirigido TFGs (Un. de Sevilla) y Trabajos de Título de Experto (Un. Alcalá de Henares/UCM). Desde 2022 ha formado parte de distintos proyectos de innovación docente de la UCM, y de grupos de investigación de la misma universidad.

El candidato siempre ha mostrado una alta exigencia propia y de los miembros de los equipos que dirige, y sus 80 publicaciones y 60 presentaciones científicas siempre se han caracterizado por su alta calidad científica o divulgativa.

Por último, H. González ha evaluado un gran número de artículos (20) para revistas nacionales e internacionales, ha formado parte de varios tribunales de tesis (3 como parte del tribunal y 3 como externo para la obtención del doctorado internacional) y ha sido evaluador de proyectos pre y postdoctorales (2).

Ha sido parte del comité científico de distintos congresos y proyectos de investigación, y durante los últimos años ha pasado a formar parte del consejo editorial de la revista Estudios Bizantinos y a ser vicepresidente de la asociación Barbaricum



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: VAGRAMENKO CHUKOVA, TATIANA
Referencia: RYC2024-048867-I
Correo Electrónico: tvagramenko@ucc.ie
Título: Archives of Power: Soviet Secret Police Surveillance and the Legacy of Authoritarian Regimes in Postsocialism, and Beyond

Resumen de la Memoria:

This project, based on archival research in Ukraine, Russia, Moldova, the Baltic states, and Kazakhstan (additionally in Hungary and USA), focuses on the everyday surveillance practices of the Soviet secret police and their legacy in postsocialism. It offers a novel perspective on political surveillance in the Socialist bloc by examining the lived experience and non-institutionalized interactions between state authorities and nonconformist groups. The project explores mechanisms of secret police operations, agent networks, infiltration strategies, and lesser-known forms of agency within surveilled or coerced communities. Bridging the history of state control with lived experiences of surveillance, collaboration, and resistance, the study employs interdisciplinary methodologies, including intelligence history, anthropology, oral history, archival research, digital humanities. It contributes to broader discussions on the dynamics of power, authoritarianism, surveillance, and state control in Cold War Europe. An in-depth analysis and digitization of recently declassified KGB materials will be enhanced through ethnographic and oral history research, discourse analysis, and the political economy of memory.

Incorporating cross-national and cross-temporal comparisons, the project examines the legacy of dictatorships, regime archives and (de)classified state records in postsocialism and wider Europe. It draws on historical experiences from Eastern Europe, to examine how state control and surveillance shaped contemporary security mechanisms, with comparisons to other regions, including Spain. An innovative approach to regime archives addresses critical issues: access to information, truth recovery, weaponization of history, securitization, surveillance, and state intervention in civil society in contemporary Europe.

OBJECTIVES

- 1 Conduct comparative historical analysis of declassified Soviet secret police materials to expose the mechanisms of Soviet surveillance, uncover the history of KGB operations and agent networks. Recontextualize totalitarian archives as instruments of state power and tools for state-sanctioned narratives. Advance debates on the epistemological challenges of regime archives and their implications for transitional justice, historical memory, and reconciliation.
- 2 Examine the legacy of Soviet surveillance practices in postsocialism and wider Europe, advancing scholarship on authoritarianism, surveillance, and state power across different political regimes and historical periods. Recontextualize archival findings through ethnographic engagement, oral history research, discourse analysis, and the political economy of memory.
- 3 Launch a new phase in studying totalitarianism in Europe by integrating digital humanities techniques. Develop the History Declassified Digital Archive as the largest data repository of archival documents from former KGB archives. Create 3D Digital History Exhibit with VR, AR elements, 3D reconstructions, and digital storytelling to visualize the history of totalitarianism.
- 4 Foster collaboration across sectors and provide human rights organizations and policymakers with tools to address the impacts of authoritarian regimes on governance, civil liberties, and minority communities, offering policy recommendations through an open-access brief in partnership with the Wilson International Center for Scholars.

Resumen del Currículum Vitae:

Vagramenko has an established international profile and recognized expertise in the history, anthropology and political developments of Eastern Europe. She received the BEST EARLY-CAREER RESEARCHER AWARD, University College Cork (Ireland, 2023); was nominated for Ireland's Best Researcher of the Year, 2024. Holder of the Marie Curie Action Seal of Excellence, 2021. Holder of the Impact Case Study Narrative Prize, University College Cork. She has secured 19 awards total 899,580€ from Irish, UK, US, Canadian, German, Spanish, Hungarian institutions.

Her research explores police surveillance in XX century East Central Europe, the legacy of dictatorial regimes, anthropological studies of Putin's regime, war in Ukraine. She specializes in the politics of religion, state surveillance, intelligence history, and the study of secret police archives from authoritarian regimes.

She integrates innovative digital humanities techniques (VR, AR, 3D visualization), and advanced preservation and archiving methods to protect cultural heritage in war-affected zones.

SCIENTIFIC CONTRIBUTIONS: Principal investigator in 6 collaborative projects with researchers from Spain, Ireland, UK, USA, Ukraine and Bosnia&Herzegovina. Also led 2 individual projects, participated in 3 projects funded by Horizon2020 and ERC. Currently, she leads the History Declassified project, funded by Ireland's prestigious SFI-IRC Pathway grant, 616000. She is also a PI in 2 socially impactful projects, funded by University of California and British Library

PROJECTS OUTCOMES: 2 books, 36 articles/chapters, editor of 1 special issue. Research presented at conferences in Ireland, USA, Germany, Australia, Canada, UK, Spain, Lithuania, Ukraine, Russia, Finland, Estonia, Sweden, Croatia, Romania, Hungary.

Rescued, digitized nearly 500000 endangered archival documents in Ukraine.

Digitized, ensured public access to previously classified KGB materials from Ukrainian archives

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Created digital archive History Declassified, one of the largest digital repositories of archival materials on the KGB's secret operations in the USSR. Contributed to two digital archives: COURAGE Collection and Hidden Galleries.
Co-organized 3 public exhibitions in Romania, Hungary, Ireland.
Lead curator the VR Digital Exhibition "The Underground" on Soviet secret police archives, recognized as a major achievement in the COST Action initiatives, 2022

INTERNATIONAL COLLABORATION/ LEADERSHIP: Worked at leading research and policymaking institutions in Ireland, Spain, USA, Germany, Russia. Collaborated with 7 international projects, including the Hidden Galleries ERC project; the Horizon2020 COST Action; the Horizon2020 COURAGE project
Member of the steering committee: International Council for Archives Section for Archives of Faith Traditions
Holds Certificate Professional Skills for Research Leaders, Institute of Leadership and Management

POLICYMAKER OUTREACH: Worked at the Wilson International Center for Scholars, the top-10 think tank worldwide founded by the US Congress
COMMUNITY EDUCATION/ PUBLIC ENGAGEMENT: Provided expert commentary to global media outlets: Voice of America, BBC History Hit, Pat Kenny Show, Eurasian Knot. Three articles in Irish Independent.
Founding member of the Sanctuary Fellowship scheme, University College Cork
PARTICIPATION IN RESEARCH EVALUATION COMMITTEES: COST Action; Horizon Europe; Agencia Estatal de Investigación, Spain



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática:

Estudios del pasado: historia y arqueología

Nombre:

ALBISSON, MATHILDE

Referencia:

RYC2024-049644-I

Correo Electrónico:

mathilde.albisson@uclouvain.be

Título:

Una historia cultural de la censura inquisitorial en la España Moderna

Resumen de la Memoria:

Desde 2016 he venido desarrollando una línea de investigación sobre la censura ejercida por el Tribunal de la Inquisición española, desde la perspectiva de la Historia cultural. Esta investigación ha sido realizada gracias a un contrato predoctoral, una ayuda Juan de la Cierva, 5 estancias de investigación en centros de I+D y 7 proyectos de investigación competitivos.

Esta línea ha consistido en un tratamiento sistemático de las distintas facetas del fenómeno censorio en el s. XVII, un periodo mucho menos estudiado desde esta perspectiva que el siglo anterior. He investigado la evolución de los procedimientos, de la teoría y de las herramientas (conceptuales y prácticas) de la censura, los cambios en la distribución del poder represivo, la diversificación de contenidos prohibidos y de los criterios de valoración de los textos, así como el impacto de la censura en distintos géneros literarios y en la circulación de libros. El objetivo de esta investigación ha sido cartografiar las prácticas de represión y de gestión del disenso en torno a uno de los principales medios de difusión de la cultura y del saber en la Primera Edad Moderna, el libro impreso, y determinar sus principales agentes, así como los objetivos y razones de la censura.

Los resultados de esta investigación se han difundido en más de 30 publicaciones y en una amplia variedad de géneros académicos. Mis aportaciones científicas más destacables a esta línea son la monografía *El proceso al libro. La censura inquisitorial en la España del siglo XVII* (Cátedra, 2024), el libro colectivo *Los agentes de la censura en la España de los siglos XVI y XVII* y la base de datos *CÁLICE*. Catálogo digital de los libros censurados por la Inquisición española en el siglo XVII. Esta última, adscrita al campo de las Humanidades Digitales, constituye la primera herramienta digital de búsqueda que procura una información catalográfica e interpretativa sobre un gran volumen de material manuscrito inédito: los procesos inquisitoriales de libros.

Asimismo, he participado en distintas actividades de transferencia y de diseminación de resultados. La actividad más notoria que he llevado a cabo al respecto es el comisariado de la exposición *Malos libros. La censura en la España Moderna* (Biblioteca Nacional de España, 2023-2024), que se adscribe al programa expositivo de la Prueba de Concepto INDEX (PDC2022-133136-I00).

Desde 2024 lidero el proyecto de investigación *Between diplomacy and espionage: the correspondence of the agents of the Spanish Inquisition in Rome*, financiado por la Agencia Estatal de Investigación de Bélgica (FNRS). Este proyecto se desarrolla en el Religions, Spiritualities, Cultures, Societies Research Institute de la U. Católica de Lovaina, donde soy investigadora posdoctoral, y en estancias de investigación en Italia y España. Con este proyecto he iniciado una nueva línea de investigación, que aspiro a seguir desarrollando en el marco de la Ayuda, sobre las relaciones entre el Tribunal del Santo Oficio y la Santa Sede y en concreto sobre los agentes de la Inquisición española en Roma en los s. XVII y XVIII.

Resumen del Currículum Vitae:

Mi carrera académica se ha desarrollado principalmente en 4 universidades europeas, donde he disfrutado de contratos de investigación competitivos. He obtenido un contrato predoctoral en la U. Sorbonne Nouvelle (Francia), donde me doctoré en 2020. Posteriormente he disfrutado de 2 contratos posdoctorales: una Ayuda Juan de la Cierva (2022-2024) en la UAB (evaluación informe científico-técnico final: Excelente) y, desde 2024, una posdoctoral fellowship en la U. Católica de Lovaina (Bélgica), otorgado por la Agencia Estatal de Investigación de Bélgica (FNRS). Asimismo, he sido profesora ayudante en la U. Montpellier 3 (2021-2022, Francia).

He realizado también estancias de investigación en centros de I+D de Reino Unido, España e Italia, con becas de movilidad: Maison Française d'Oxford-CNRS (Oxford), UAB, UAM, USAL, UCM y en 2025 en la U. Roma Tre.

Actualmente lidero un proyecto de investigación en el Religions, Spiritualities, Cultures, Societies Research Institute de la U. Católica de Lovaina: *Between diplomacy and espionage: the correspondence of the agents of the Spanish Inquisition in Rome* (F.R.S.-F.N.R.S. 40010693), financiado por la Agencia Estatal de Investigación de Bélgica (FNRS). Asimismo, he participado en 7 proyectos competitivos de investigación y de transferencia en Francia y España dedicados al análisis del disenso y de la idea de disenso en el período altomoderno, al estudio de los índices de libros prohibidos y de la política expurgatoria de la monarquía hispánica, a la teoría de la censura y los mecanismos de la censura difusa, la construcción y gestión de la memoria y la recepción de la Reforma en Europa.

Los resultados de mi investigación se han difundido en más de 30 publicaciones, que han sido objeto de medio centenar de citas (Google Scholar) y de 6 reseñas, y en más de 30 conferencias y ponencias en sedes europeas y americanas. Asimismo, he organizado 3 congresos internacionales.

Además de actividades de investigación, he desempeñado labores de transferencia: he participado en la realización del programa expositivo de una Prueba de Concepto como comisaria de exposición y responsable de la gestión gráfica, he participado en la publicación de catálogos de exposición, en un programa televisivo de divulgación (RTVE) y en la producción de podcasts de transferencia.

A lo largo de mi carrera académica, he impartido más de 400h de docencia reglada en Grado y Máster en las 4 universidades en las que he sido contratada y he desempeñado otras actividades docentes en 5 universidades de Francia, España e Italia. He participado en actividades de supervisión y formación de jóvenes investigadores y he liderado nuevas propuestas formativas. He obtenido la acreditación de Prof. Titular en Francia en las secciones *Histoire moderne* y *Études romanes*. Desde 2020, he obtenido 2 mandatos en el Consejo de la asociación académica Société des Langues Néolatines, dedicada a la promoción de la investigación y enseñanza de la cultura de los países de lengua romance en Francia. Por otro lado, desempeño actividades editoriales, como jefe de redacción de la revista *CECIL-Cahiers d'études des cultures ibériques et latino-américaines* (Scopus) y evaluadora externa para 7 revistas científicas europeas y americanas del primer cuartil.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: MÉNDEZ QUINTAS, EDUARDO
Referencia: RYC2024-050910-I
Correo Electrónico: eduardo.mendez.quintas@gmail.com
Título: The Emergence of Homo erectus and the Acheulean in East Africa and their development and global expansion

Resumen de la Memoria:

I defended my PhD in 2017 (Sobresaliente cum laude and Extraordinary Prize) under the supervision of Dr. M. Santonja and Dr. A. Pérez-Gonzalez, National Research Center on Human Evolution (CENIEH), Spain, analysing the Lower Palaeolithic record of the north-west Iberia (mainly Miño basin). After my PhD I have obtained a three competitive contract to support continuous postdoctoral research in the University of Vigo and >60 months of national and international experience in 3 country. As an independent researcher, I started a new line of research focusing on the emergence of the Acheulean and Homo erectus in East Africa.

My lines of research are focused on Lower Palaeolithic age, mainly on Acheulean tecnocomplex of the Iberian Peninsula and East Africa range. I study behavioural aspects associated with variability and the technological features of stone tools. Moreover, I analyse the processes of formation and distribution of intra-site spatial patterns using GIS and geo-statistics procedures.

Finally, I develop other secondary lines of research focused on Palaeolithic and post-Palaeolithic rock-art in the northwest of Iberia, as well as some archaeological features of the Late Prehistory of the same region.

My research is carried out as PI or CO-PI in major Iberian Acheulean sites such as Porto Maior, Arbo or Gándaras de Budiño (Spain), and mainly the archaeological complex of Melka Kunture (Ethiopia). Also, I lead the research of some Mousterian sites, such as Cuesta de la Bajada or A Piteira (Spain).

Resumen del Currículum Vitae:

Since 2017, I have achieved 108 scientific contributions, including 44 papers, 23 book chapters, 2 books, 2 edited special issues, and 36 conference contributions. Specifically, 39 papers have been published in Scopus/SCI journals (Q1-Q2 = 22), as first author on 17 occasions, and as last author on 6 occasions, in journals such as Science, Scientific Report, Nature Ecology & Evolution, Journal of Archaeological Science, Quaternary International, Journal of Paleolithic Archaeology, Archaeological and Anthropological Sciences...

During my PhD I opened an unexplored line of research, involving archaeological surveys, geomorphological exploration, and excavations on new archaeological sites in the north-west of the Iberian Peninsula, collaborating with a network of 20 international researchers. Some of the main results of this research have been published (first author or PI position) in international journals (e.g. Scientific Reports, Quaternary International, JAS: Reports, Palevol, Journal of Paleolithic Archaeology), national and international conference, book chapters and in one monograph. Of particular significance is the publication of the first European site with African-like extensive accumulations of handaxes (Scientific Report, 2018) or the most recent age of the Acheulean tecnocomplex in the Iberian range (JAS: Reports, 2019).

After my PhD I have obtained a three competitive contract to support continuous postdoctoral research in the University of Vigo and >60 months of national and international experience in 3 country. During my first postdoc, I expanded the research line of my PhD, and as an independent researcher, I started a new line of research focusing on the emergence of the Acheulean and Homo erectus in East Africa. Since 2019 I am CO-PI of Melka Kunture project (Ethiopia). The results of the research were published in highest impact international journals. Among the most significant results is the publication of the world oldest remains of Homo erectus and the earliest Acheulean record (~2 Ma) in Science or the world oldest example (1.2 Ma) of a specialized knapping workshop in Nature Ecology & Evolution.

I have ANECA recognition as Contratado Doctor (Profesor Titular, under evaluation). I co-supervised 1 PhD, and I am currently supervising other 2 PhD. Also, I supervised 4 master dissertations, and I have been full member in PhD (x4) and master (x6) dissertation committees. Also, I have developed multiple scientific dissemination tasks (~14 times, in the last 6 years) in local, regional and national events, and I have played as a curator and/or advisor in 6 national exhibitions.

Throughout my post-PhD stage, I have obtained R&D&I funding (x35), either independently or through my participation in research projects, amounting to 3,934,493€. Specifically, I have secured my salary through funding amounting to 242,560€. I have directly led research projects (x7) and transfer contracts (x9) by 1,028,196€, as Co-PI (x8) by 104,137€, and funded as a researcher in projects (x11) by 2,559,529€. Also, I have extensive experience in archaeological fieldwork across four different countries, with a total of 59 sessions, of which I have led 31 times.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: LEONARDIS , IRENE
Referencia: RYC2024-048426-I
Correo Electrónico: irene.leonardis88@gmail.com
Título: Ancient Rome in Buzzwords, Metaphors and Code words

Resumen de la Memoria:

My research lines and previous work can be synthetized as follows:

1. The rediscovery of Marcus Terentius Varro's fragmentary work and figure in the context of Roman antiquarianism and of the crisis of the Roman Republic (see above 1. and 6.).
2. Intellectual history and philosophy in the Late Roman Republic, with particular emphasis on Cicero's, Varro's and Lucretius' roles (see above 2., 3. and 4.).
3. Crisis metaphors in ancient Rome as compared to other cultures as well as other historical ages (see above 10. and my second monograph in preparation).
4. Metaphors and their different scenarios in ancient Roman political discourse and oratory (see above 5., 7. and 8.).

For the future, I plan to continue to work on the research lines 3. and 4., since they can still lead to new important results, as my recent publications and also other scholars' work have proved (see Lopez Barja De Quiroga 2007 and 2024; Walters 2020; Mebane 2024). In case I obtain the "Ramon y Cajal" fellowship, I would also like to focus on the following innovative research project: "Ancient Rome in buzzwords: from metaphors to code words". The project will investigate specific slogans and buzzwords of the late republic and early empire, which could simply appear as rhetorical metaphors part of the political conversations, but which could possibly also conceal coded messages, accessible only by certain target readers. Moving from some recent groundbreaking work by Cristina Rosillo Lopez (2017; 2022), I will study Cicero's letters as well as other literary evidence for conversations and rumors in Roman political life looking for coded messages, exchanged and passed on during the late republic to organize elections, coups as well as political assassinations (such as Caesar's notorious murder). The original idea behind this project is to select words that have a metaphorical meaning and, as such, could easily hide a message, since a metaphor is fundamentally a transfer of meaning.

Furthermore, by using artificial intelligence, the aim is to pursue an interdisciplinary research at the crossroad of ancient roman history, latin semantics and cryptography. For this reason, AI-based research with IT-specialists will complement my personal work. Such an attempt to decipher ancient buzzwords depends on the very interest for code words attested during the late republic, as the famous "Caesar cipher" clearly proves and exemplifies. For this future project I would like to integrate my work in the Spanish Academy, particularly active and innovative in the last two decades in the study of the Late Roman Republic especially thanks to the work of Francisco Pina Polo, Cristina Rosillo Lopez and Pedro Lopez Barja De Quiroga.

Such a research will pave the way for a study of the use of code words in literary evidence also during the Roman empire (at least until the age of Trajan). Indeed, after the end of the Republic, politicians and writers, despite and because of their smaller agency and freedom in Rome, would continue to pass on code messages to try to influence Roman politics by organizing overthrows and new political proposals and leaderships.

The impact of this new project will be fundamental for a deeper understanding of the Late Roman Republic, especially its politics and its literature.

Resumen del Currículum Vitae:

I am currently an Fixed-term Assistant Professor (Ricercatore RTD-A) at the University eCampus. My main research interests are Roman History (especially Late Republican culture and politics) and Latin Semantics (especially metaphorical vocabulary, with a focus on discourse analysis). I use literary evidence and the study of semantics as a primary source of knowledge of the Roman political discourse and as a privileged means to access the Roman culture. I combine the traditional methodology of philology with the innovative methods of Critical Discourse Analysis and Critical Metaphor Analysis that study language and metaphors to identify the intentions and ideologies underlying language use. Thanks to my rigorous education as a Classical Philologist (BA 2010 and MA 2012, Pavia) and my advanced experience in Roman History (PhD 2016, Paris-Rome), with specialized trainings in several other disciplines, I am able to approach topics from an interdisciplinary perspective.

I have a very strong international curriculum, with long study and research stays at distinguished institutions in Italy, France, Germany, Uk, which has provided me with a direct experience of different research and teaching approaches, and a rich intellectual and cultural background. I have a proven expertise in leading Postdoctoral research projects as well as in organizing and managing scientific events, dissemination and teaching activities at both academic and extra-academic level. During my predoctoral and postdoctoral career, I have been awarded with several prestigious prizes, grants and competitive fellowships, including the Humboldt Postdoctoral Fellowship. I am the author of 1 monograph and of ca. 20 papers in international journals or books, various of them upon invitation and five of them in Open Access.

I am an internationally recognized specialist on Varro and more largely on Late Roman Republican history and culture, both fields of study to which I have extensively contributed with original investigations, including the adoption of an interdisciplinary approach (embracing Roman literary and political culture as well as ancient philosophy) and innovative methods of analysis (e.g. Critical Discourse Analysis and Critical Metaphor Analysis). So far, my work has 46 quotations recorded in Google Scholar (ih = 4; i10 = 1), a h-index of 1 on Scopus and 42 mentions on academia.edu. I have also worked as a peer reviewer for international journals.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

As a result of my experience in various European countries, I am fluent in Italian (native), English (C2), French (C1), German (C1) and currently I am studying Spanish. I have delivered invited lectures and seminars in prominent European venues as well as paper presentations at international conferences (for a total of 29 talks). I have been the initiator and organizer of an international hybrid conference (‘‘Crises we live by. A Metaphorical Approach to Crisis’’, Potsdam 2023). Beside my personal projects, I have had many international collaborations since 2014: with various universities in Paris; with the international project based in Munich of the Thesaurus Linguae Latinae; with the ERC project FRRAnt (Ordering, Constructing, Empowering: Fragments of the Roman Republican Antiquarians) based at UCL; with the research center ‘‘AMA’’ at the University of Siena; with the AHRC-DFG research group active between Germany, UK and Spain, ‘‘Twisted Transfers: Discursive Constructions of Corruption in Ancient Greece and Rome’’



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Estudios del pasado: historia y arqueología

Nombre: TRAPERO FERNÁNDEZ, PEDRO

Referencia: RYC2024-049681-I

Correo Electrónico: pedro.trapero@uca.es

Título: GIS and agricultural studies in Roman Times

Resumen de la Memoria:

I am currently a postdoctoral researcher at the University of Cádiz, working on a contract to acquire competencies necessary for the R3 Certification. My research is focused on Ancient History, particularly Roman agriculture, viticulture, rural societies, and landscapes, with an emphasis on GIS analysis. This work builds on my extensive background in historical studies and digital humanities, aiming to study rural Roman economies within their environmental and social contexts.

I began my academic career with a pre-doctoral contract at the University of Cádiz (2016–2020), followed by a postdoctoral position there (2020–2021). In 2022, I was awarded a Margarita Salas postdoctoral contract, continuing my research into Roman agriculture, particularly in the Baetica and Lusitania provinces.

I hold a PhD in Maritime History and Archaeology (University of Cádiz, 2020), along with multiple Master's degrees: in unmanned aerial vehicles (2017), teacher training (2016), Historical and Archaeological Heritage (2015), and a Bachelor's degree in History (2014).

My current project, ULTERIOR (Understanding Landscape, Territory, Economy, and Rural Identities in the Occidental Roman Ulterior), is structured around two complementary research lines: studying viticulture and agriculture in the southwestern Iberian Peninsula and applying GIS for spatial and landscape analysis. This project aims to enhance knowledge of ancient production systems and integrate environmental and social perspectives into the study of Roman villas and agricultural societies, particularly rural populations like peasants in southern Iberia. A central hypothesis is that agricultural spaces in Roman Baetica and Lusitania operated under a unique productive model influenced by Phoenician-Punic traditions. This research expands the geographic scope to the Lower Guadalquivir region (Cádiz, Huelva, Málaga) and includes comparative studies in Lusitania, especially in Pax Iulia (Beja) and Alto Alentejo. The project also revisits classical agronomic literature to analyze agricultural techniques across time.

My project includes two main research lines:

Comparative Agricultural Practices: This line focuses on local variations in agricultural practices in Baetica and Lusitania, with an emphasis on vineyard production. Fieldwork will concentrate on the Lower Guadalquivir, incorporating evidence from Roman villas in Portugal, such as Pisões and Monte da Chaminé. I aim to explore the socio-environmental dynamics shaping agricultural practices by integrating environmental and social perspectives often neglected in traditional studies.

Geophysical and Archaeological Surveys: In collaboration with the University of Cádiz's Geophysics Unit, I will conduct surveys and excavations of pottery workshops in the Lower Guadalquivir, focusing on amphora typologies like Dressel 1, Dressel 2, and Haltern 70. Additionally, environmental analyses, including pollen studies, will document plant species in these regions. This research will expand to include studies in Portugal, with funding secured for 2025.

The project will integrate GIS-based studies to model ancient economies and landscapes, leading to the creation of a WebGIS platform focused on Roman viticulture and landscapes in Cádiz.

Resumen del Currículum Vitae:

I have made substantial contributions to Ancient History, particularly in the areas of Roman agriculture, viticulture, and rural economies. My research output includes 36 articles (11 in Q1 journals, 6 in Q2), 27 book chapters, and 10 books (three as sole author), with *The Application of GIS Technologies in the Roman Period* (Bloomsbury, 2024) emerging as a seminal work in digital humanities and Roman studies. My research integrates GIS methodologies with classical agronomic texts, generating innovative hypotheses that redefine Roman economic landscapes. My work has received 201 citations, an H-index of 7, and an I10 index of 7.

I am the Principal Investigator (PI) of several competitive projects, including CELLA VINARIA BAETICAE (€32,880, Junta de Andalucía, 2023–2028) and Vitalentejo (€15,000, pending approval, Portugal, 2023–2026), both of which investigate Roman viticulture in Spain and Portugal. My international collaborations have been extensive, including research stays at CHAIA (University of Évora, 24 months), ICT (Portugal, 5 months), FORTH (Crete, 3 months), and Carleton University (Canada, 4 months), leading to co-authored publications and the development of methodologies for projects like the Starting Grant. I have also organized 14 international workshops and congresses, such as *Creating Narratives for Roman Viticulture* (Estremoz, 2024), fostering interdisciplinary dialogue. My leadership extends to founding the Arkeosig network, which promotes GIS in historical research across Spain and Portugal, and mentoring doctoral candidates, enhancing my impact on knowledge generation and dissemination.

My research is deeply embedded in societal outreach, connecting academia with industry and public institutions. I have collaborated with wine producers and territorial stakeholders, especially in Vitalentejo, which explores the legacy of Roman viticulture. My outreach activities include exhibitions, such as those on the Pisões villa and Roman viticulture in Beja (Portugal), as well as public lectures in Cádiz, Jerez de la Frontera, and Estremoz. Additionally, my work includes the development of open-access GIS tools, such as a WebGIS platform for Roman landscapes, and I have facilitated knowledge transfer between academics and industry stakeholders through the *Creating Narratives for Roman Viticulture* congress. My collaborations with public institutions, such as the archaeological map of Estremoz, further reflect my commitment to preserving and promoting cultural heritage.



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Turno General

In academia, I have significantly contributed to the training of young researchers. I have accumulated over 50 teaching credits, supervised undergraduate, master's, and doctoral theses, and coordinated innovative teaching programs. Notably, I supervised a co-tutelle PhD at the University of Évora on Roman landscapes and organized GIS-focused training sessions. My educational initiatives, such as Motivarte, promote teaching innovation, while the Arkeosig network supports early-career researchers. I have also served on over 20 undergraduate and 7 master's thesis committees and have coordinated events aimed at enhancing young historians' methodological skills. As an editor, I have coordinated special issues for Q1 journals and reviewed high-impact publications.



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Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: MARTÍNEZ MARTÍNEZ, ALBA
Referencia: RYC2024-048801-I
Correo Electrónico: alba52m@gmail.com
Título: Forced displacement and humanitarianism in 20th Century Spain-Europe from a gender perspective

Resumen de la Memoria:

I am a historian specialised in Women and Gender Studies, with a particular focus on Forced migration and Humanitarianism in 20th Century Spain-Europe. My work ranges from the history of ordinary refugee women after the Spanish Civil War to the history of women's transnational humanitarian networks in 20th-Century Europe. My PhD (awarded in 2021 at the University of Granada and the University of Paris 8) is the first comprehensive chronological study to focus on the experiences and identities of ordinary Spanish refugee women in France (1939-1978). The thesis contributes to a growing body of literature that nuances hegemonic representations of ordinary refugee women as mere passive subjects. It led to a book publication ("Nosotras, las refugiadas. Género, identidades y experiencias de las españolas refugiadas en Francia (1939-1978)", Comares, 2024) that have made it possible to renew our knowledge of the Spanish Republican exile from the socio-cultural and gender perspectives, from which it has been scarcely studied. As a PhD student, I spent a total of 15 months of research stays abroad (12 at the University of Paris 8 and 3 at the University of Toulouse Jean Jaurès), thanks to competitive grants.

As a postdoctoral researcher I was awarded with prestigious postdoctoral fellowships that allowed me to further explore this topic in preparation for the book and to start my new postdoctoral project focusing on humanitarianism. After enjoying a "Margarita Salas" fellowship at the Centre for the History of Ibero-America (University of Leeds, UK), a "Juan de la Cierva" fellowship at the Complutense University of Madrid and a research stay at the Oxford Centre for European History (University of Oxford), I was awarded the prestigious Marie Skłodowska-Curie postdoctoral fellowship to develop the WomenhuNET project at the School of History of the University of Leeds. This project focuses on the transnational humanitarian activism of women, especially British women, who mobilised in refugee relief campaigns in the 1930s and 1940s. This research has led me to work in archives in the USA, UK, France, Spain and Switzerland, analysing sources of a very different nature: administrative, hemerographic, oral, as well as the so-called "writings of the self" (memoirs, diaries and correspondence). The project is funded by the UK government's Horizon Europe funding guarantee with total budget of £200,512.76.

The main goal of my future line of research is to address the political and emotional dimension of transnational women's experiences in the field of humanitarianism, covering aid campaigns during the First World War, the inter-war period, the Second World War, and the post-war period, especially the World Refugee Year campaigns. My aims are: 1) Explain the different emotional and political pathways that led European women to become involved in refugee relief campaigns and the transformative impact of their actions and rhetoric. 2) Re-evaluate the national approach to their experiences by analysing the transnational and intergenerational networks they developed through their humanitarian activism and tracing/mapping their trajectories. 3) Explore the field of identities, subjectivities and (self)representations to understand how they were shaped by gender and the transnational experience.

Resumen del Currículum Vitae:

I hold a degree in History (UGR 2013), a Master in Contemporary History (UCM 2014), and a Master in Secondary Education (UAL 2015). In 2016 I was awarded a 4-year national competitive fellowship FPU to develop my PhD (2021), "Las refugiadas del exilio republicano español. Género, identidades y experiencias (1939-1978)", which received the Cum Laude Award. My international career started then since I did my PhD under an international cotutelle agreement between the UGR and the University of Paris 8, where I spent 12 months. I also did a 3-months funded research stay at the University of Toulouse Jean Jaurès.

Prior to become a Marie Skłodowska-Curie Fellow with the project WomenhuNET (EP/Y028341/1) at the University of Leeds for the period 2023-2025, I was "contratada puente" at the UGR, "Margarita Salas" postdoctoral Fellow at the Centre for the History of Ibero America (University of Leeds), and "Juan de la Cierva-Formación" postdoctoral Fellow at the UCM. In addition, as a Juan de la Cierva fellow, I did a 4-months research stay at the Oxford Centre for European History (University of Oxford). Additionally, my research has given me experience in international archival work, visiting many different countries such as UK, France, Netherlands, Switzerland and USA. To sum up, my internationalization can be tracked since my cotutelle PhD (15 months) until my postdoctoral period (32 months). During these 4 years abroad, I became a very international researcher with a consolidated networks of collaborators along Europe.

Regarding my scientific production, I am the author of 28 publications: 5 books (4 as co-coordinator), 10 journal articles (1 co-authored) and 13 book chapters (3 co-authored). I have published in leading journals and publishers such as Ayer (Q1), Arenal (Q2), Journal of Iberian and Latin American Studies (Q2), Historia Contemporánea (Q1), Marcial Pons (SPI 1), Peter Lang (SPI 6), Sílex (SPI 6), among others. My work published in Ayer received the XXIII Mary Nash Early Career Researcher Award by the Spanish Association of Contemporary History in 2022. In addition, I have been a member of 12 national and international research projects (3 ongoing). I acted as a reviewer for more than a dozen national and international journals, and since September 2022 I am a member of the editorial board of the prestigious contemporary history journal "Ayer". I have been certified as "Ayudante Doctora" and "Contratada Doctora" by both the Spanish and French scientific systems. It worth mentioning that I have both national and international teaching experience in Spanish, French and British universities, and I have been invited to be part of two PhD examination panels.

My leadership and strongness of my CV is tangible not only through the award of highly competitive fellowships, but through the organization of several workshops and seminars (most of them international and one received funding of the prestigious Past and Present Society), as well as the invitation to present my work in a total of 13 seminars/conferences held at Spanish, French, British, Dutch and German universities. I have also given talks aimed at a general audience, secondary school students and teachers, and I have carried out several outreach activities, including participation in documentaries and collaboration as historical advisor in the theatre sector.



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Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: GUTIÉRREZ RODRÍGUEZ, MARIO
Referencia: RYC2024-049973-I
Correo Electrónico: mgrodrig@ujaen.es
Título: Dinámicas del imperialismo romano en el Alto Guadalquivir a través de una perspectiva postcolonial y metodología multiescalar

Resumen de la Memoria:

La línea propuesta busca aportar nuevas narrativas sobre el imperialismo romano en el Alto Guadalquivir, alejándose del concepto de Romanización. Desde un enfoque teórico postcolonial y mediante tecnologías analíticas avanzadas, se pretende profundizar en las complejas interacciones entre el mundo romano y las comunidades ibéricas preexistentes, con especial atención al desarrollo de las colonias Augusta Gemella Tucci (Martos) y Salaria (Úbeda la Vieja). Este análisis se centra en microhistorias matizadas por la diversidad del registro arqueológico.

El objetivo principal es estudiar la naturaleza e impacto del imperialismo romano en esta región, abordando tres aspectos clave desde la perspectiva postcolonial: las dinámicas de poder expresadas en el urbanismo romano y su interacción con las estructuras ibéricas previas; las identidades híbridas locales, exploradas mediante análisis multiescalar y multidisciplinar de la materialidad y el registro funerario; y los modelos urbanos y de ordenación territorial, evaluando las colonias como espacios tanto de imposición como de intercambio cultural.

Los objetivos específicos incluyen: (1) analizar el fenómeno colonial a través de los casos de Tucci y Salaria, mediante una metodología multiescalar que aborde diversas dimensiones del registro arqueológico; (2) realizar un análisis diacrónico para identificar variabilidad espacial y temporal, desde su origen como oppida ibéricos hasta el fin del período romano; (3) desarrollar modelos interpretativos sobre la pervivencia de la cultura material ibérica en época romana, valorando la agencia de las comunidades locales en la construcción de identidades provinciales; y (4) estudiar las dinámicas imperialistas en las colonias y su rol en la articulación económica, política y social de los territorios.

La estrategia metodológica se basa en un continuum observacional e integrado que abarca desde el territorio hasta la evidencia microscópica. Para ello, se combinan métodos no invasivos (prospección superficial, teledetección y geofísica), excavaciones arqueológicas y análisis especializados, como micromorfología de suelos, química (pH, CE, XRF, ICP-MS), espectroscopía (FTIR-ATR, RAMAN) y bioarqueología (arqueobotánica y zooarqueología). Este enfoque multiescalar permitirá explorar procesos históricos complejos desde diversas perspectivas.

La propuesta expandirá las investigaciones del IUIAI-UJA, ofreciendo un modelo teórico-metodológico replicable en otras provincias romanas. Su énfasis en la identidad provincial y el poder urbano como vehículo ideológico proporcionará nuevas perspectivas para comprender las relaciones coloniales. En última instancia, se espera establecer estándares innovadores en el estudio del imperialismo romano, posicionando al Alto Guadalquivir como un laboratorio clave para investigar las dinámicas coloniales en el mundo romano. Además, se busca resaltar el valor de la arqueometría no solo para caracterizar contextos arqueológicos, sino también para avanzar en nuevas direcciones teóricas en Arqueología Clásica.

Resumen del Currículum Vitae:

Desde que comencé mi carrera investigadora con una beca de Formación del Profesorado Universitario (Ministerio de Educación 2014-2018, Universidad de Granada, España), he desarrollado mi propia línea de investigación, centrada en el estudio microestratigráfico de los procesos de formación del registro arqueológico a través de técnicas geoarqueológicas de alta resolución, como la micromorfología de suelos, análisis físico-químicos y geoquímicos. El objetivo de mi investigación es comprender la relación entre los humanos y el medio ambiente, los cambios en las dinámicas geomorfológicas y la huella sedimentaria de las actividades humanas a escala microestratigráfica. Realicé una estancia predoctoral de tres meses en el Institut für Naturwissenschaftliche Archäologie de la Eberhard-Karls-Universität Tübingen (Alemania). Desarrollé mi tesis doctoral con el objetivo específico de identificar procesos de transformación urbana, usos secundarios y episodios de abandono en edificios públicos romanos durante la transición del Alto Imperio a la Antigüedad Tardía. Posteriormente, realicé dos estancias posdoctorales en la School of Archaeology and Ancient History de la University of Leicester

(Reino Unido), la primera autofinanciada durante 2 meses y la segunda durante 1 año y 5 meses

financiada por un contrato posdoctoral del Plan Propio de Investigación de la UGR. Allí desarrollé una línea de investigación centrada en la transformación urbana en el norte de África entre el período mauritano y la Antigüedad Tardía. He sido Investigador Juan de la Cierva Formación en el Instituto Universitario de Investigación en Arqueología Ibérica de la Universidad de Jaén (en adelante, IUIAI-UJA), donde continúo siendo investigador posdoctoral (Acción 7, Plan Operativo de Apoyo a la Investigación, UJA). Me he unido a dinámicas activas de investigación sobre las sociedades ibéricas. En mi etapa posdoctoral he realizado estancias internacionales de concurrencia competitiva en la Universidad Nacional de Cuyo (Argentina, 2 meses) y autofinanciadas en the University of Edinburgh (UK, 1 mes). He participado como miembro del equipo en 40 proyectos: 5 internacionales, 10 nacionales (Plan Nacional de I+D), 11 regionales y 14 locales, todos financiados en convocatorias competitivas. En 4 de ellos, he sido el IP, mientras que he sido coordinador en otros 2. Soy autor de 29 artículos científicos, de los cuales 14 se publicaron en revistas internacionales indexadas en Journal Citation Reports, 32 capítulos de libros y 1 libro de divulgación científica. He participado en 8 contratos de investigación art. 83 LOU, siendo co-IP en 6 de ellos. Mi participación en publicaciones y proyectos de diferentes instituciones nacionales e internacionales demuestran mi capacidad de integración en equipos

fuera de mi grupo de formación. Actualmente colaboro en proyectos de investigación internacionales en Argentina, Colombia, Italia, Marruecos y Costa de Marfil. He revisado manuscritos para revistas indexadas en el JCR en 14 ocasiones (Arch. and Anth. Sci., Geoarchaeology, J. of Arch. Sci.; J. of Arch. Sci. Reports; Plos One; Regional Env. Change). Estoy acreditado para las figuras de Profesor Ayudante Doctor, Profesor Contratado Doctor y Profesor de Universidad Privada.



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Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: BURGUET COCA, AITOR
Referencia: RYC2024-051168-I
Correo Electrónico: aitorburguetcoca@gmail.com
Título: The prehistoric pyroarchaeological record from a multidisciplinary perspective.
Resumen de la Memoria:

I am a postdoctoral researcher with a strong interest in pyroarchaeology and its relevance to the lifestyles of prehistoric human groups. My approach combines microarchaeological techniques from the fields of archaeobotany (phytoliths), mineralogy (FTIR) and chemistry (biomarkers), from a perspective that combines field archaeology, experimental archaeology and ethnoarchaeology.

My research career has been characterised by a strong international orientation, including research stays in Germany and the United States, complemented by two postdoctoral fellowships at Leiden University, the Netherlands. These experiences have been instrumental in defining my research trajectory. International collaboration has been a consistent theme, with fieldwork conducted in Italy, Mongolia, Malta and Tanzania, alongside researchers from a variety of institutions around the world.

My postdoctoral research at Leiden University, supported in part by a Marie Skłodowska-Curie Individual Fellowship (MSCA-IF), provided invaluable opportunities to engage with leading experts in the field of fire science, an experience that continues to impact my scientific work. I am currently involved in a number of research projects spanning regional, national and European contexts, often taking the lead on pyroarchaeological investigations. At the same time, I am leading an ethnoarchaeological project with Maasai communities in Tanzania, which seeks to explore the socio-cultural dimensions of fire use in contemporary traditional settings.

My contributions to the field extend beyond individual projects. I have been involved in 26 research projects and have served as Principal Investigator or Co-Investigator on three. I am also co-director of the Roca dels Bous archaeological site and contribute to its ongoing excavation and research. My commitment to the wider academic community is reflected in my active involvement in conference organisation, peer reviewing for academic journals, and the co-supervision of two PhD students.

My line of research has built on my previous acquisition of analytical tools, networking and project management experience. I now aim to address key questions about fire in human evolution. I hypothesise that the Iberian Peninsula was a centre of innovation in Neanderthal fire technology (400 kya - late Middle Palaeolithic). I propose three lines of research: (1) developing metabolomic techniques to identify anthropogenic fire traces and distinguish them from natural fires; (2) investigating Neanderthal pyrotechnology by analysing the use of fire in their intricate technological and functional processes; and (3) establishing a comparative framework with other European regions, using niche modelling to reconstruct past environments and fire culture. I will generate new data from understudied sites and review existing evidence within a robust chronological context.

Resumen del Currículum Vitae:

I'm a postdoctoral researcher deeply interested in pyroarchaeology and its relevance to prehistoric human lifestyles. My research combines microarchaeological techniques from archaeobotany (phytoliths), mineralogy (FTIR), and chemistry (biomarkers) with field, experimental, and ethnoarchaeology. My work focuses on understanding past human behavior through the analysis of fire-related remains.

My research spans four main areas: 1) Palaeolithic pyroarchaeology and fuel management; 2) Fumier sequences and animal-plant interactions; 3) Experimental archaeology and modern reference collections; 4) Ethnoarchaeology of fuel and fire, studying contemporary traditional fire practices to gain insights into past behaviors.

My fieldwork experience includes over 20 sites nationally and internationally (Malta, Mongolia, Italy), where I've often coordinated pyroarchaeological research and archaeobotanical sampling. Since 2021, I've co-directed the Middle Palaeolithic site of Roca dels Bous. My master's research (URV) explored microarchaeological techniques applied to fire records, specifically phytoliths at Cova Gran. My doctoral thesis (URV-IPHES) expanded on this work, using dung spherulites, infrared spectroscopy, and experimental archaeology at Cova Gran and El Mirador, covering a wide timeframe from the Middle Paleolithic to the Bronze Age. This research demonstrated the value of pyroarchaeological analysis for understanding site formation processes and various behavioral aspects, including herd diet, seasonality, fumier management, human occupation dynamics, fuel gathering, plant use, and Neanderthal/ Homo sapiens pyrotechnology.

During my PhD, I joined the Atapuerca research team, establishing a lasting connection with the El Mirador site and the Atapuerca project, which continued into my postdoctoral phase. I co-lead the "Paleoecology during the Quaternary and Holocene" research line within the Atapuerca Project (PID2021-122355NB-C32). I also gained international experience through research stays at the Max Planck Institute for Evolutionary Anthropology and Rutgers University.

My first postdoctoral project (Margarita Salas, MSCA-IF, Leiden University) shifted my focus to Middle Pleistocene fire evidence and the earliest traces of fire use. I incorporated chemical biomarker analysis (PAHs & n-alkanes) and re-examined existing fire evidence from La Cansaladeta and La Sima del Elefante. I also began developing an experimental reference collection of biomarker signals in Palaeolithic fires and started ethnoarchaeological fieldwork with Maasai communities in Tanzania. My current postdoctoral project (Batriu de Pinós MSCA-COFUND, IPHES) explores paleoecology and hearth function in Middle Paleolithic sites to understand Neanderthal fire-making capabilities. I'm now using microcharcoals and archaeomagnetism alongside my previous techniques (phytoliths, FTIR, biomarkers) at Roca dels Bous and Mas Trader.



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Turno General

I've led three research projects, co-supervise two doctoral theses, and have been awarded four competitive postdoctoral fellowships. My research has been presented at over 40 conferences and I've co-organized several scientific meetings, including "Fire in Human Evolution" (Leiden, 2024). I'm involved in 26 research projects and have been awarded substantial funding for my work. My commitment to open science is reflected in my open-access publications and participation in the IPHES-CERCA Open Science Working Group.



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Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: SERRANO HERNÁNDEZ, SERGIO TONATIUH
Referencia: RYC2024-050734-I
Correo Electrónico: stsh83@gmail.com
Título: Gold, Silver and Taxes in Early Modern Spanish America

Resumen de la Memoria:

My professional trajectory shows that I have prioritized mobility to acquire new skills and engage with innovative methodologies. Thus, I have participated in several research projects in Mexico, Spain, and the United States. Regarding the internationalization of my career, the points I outlined in the previous section illustrate that the themes and subjects I have pursued have led to collaborations with international experts in early modern economic history and social history, as a coauthor on research papers and as a collaborator on editorial ventures stemming from various research projects.

The Ayuda Ramón y Cajal would allow me to pursue an ambitious research project: locating, processing, and analyzing microdata from new archival sources to reconstruct public expenditures and revenues in Spanish America during the sixteenth century. In addition to reconstructing the time series and other economic indicators derived from tax data, the research will focus on the role that intersectionality (race, gender, class) played in the colonial societies that emerged in the sixteenth century. This will also provide new interpretations of the evolution of societies and institutions within the Spanish Empire during the early modern era. However, such a demanding research agenda requires a careful approach to succeed.

One conclusion I reached during my Ph.D. thesis is that the literature on state finance has almost overlooked the Caribbean in the sixteenth and seventeenth centuries. Despite serving as the central hub for Spain's overseas empire, we still lack the most basic data to evaluate the region's social evolution during these formative centuries. My current project at CUNY aims to address this historiographical gap by compiling and analyzing the Treasury Office (Caja Real) accounts in Santo Domingo during the sixteenth century. This effort continues to provide many insights into the development of the fiscal system in the New World, revealing the richness of previously unknown primary sources. This project phase has already uncovered new data illustrating Hispaniola's economic and social development during an era marked by structural changes due to the end of the first gold cycle in the Antilles.

Thus, the project's first step would be to continue working on Santo Domingo's fiscal revenue and expenses for the second half of the sixteenth century and the early years of the seventeenth century, reaching a crucial crossroad in the island's history: the devastaciones conducted by the governor Antonio de Osorio (1605). The second step would be to widen our perspective by incorporating information from the other two key Treasury Offices in the region: La Habana and Puerto Rico. These entrepôts of the empire consumed significant fiscal resources as the government located the bulk of the defenses there. However, we know little about the local revenue and how the officers allocated the expenditures. The third step would be to incorporate other minor Cajas Reales operating in the region, such as San Agustín de la Florida, Caracas, and Margarita.

Resumen del Currículum Vitae:

I specialize in the economic history of Spanish America during the early modern era. My work experience in Mexico, Spain, and the United States has allowed me to engage in highly competitive research projects. Throughout my academic career, I have analyzed the mining production in San Luis Potosí during the colonial era, the emergence of the first global markets, and the Spanish American fiscal system in the sixteenth and seventeenth centuries. This research agenda aims to bridge the knowledge gap regarding Latin America's role in global and comparative history studies.

In 2014, I received a scholarship from CONAHCyT to begin a doctoral program at UC3M. My Ph.D. dissertation, titled "Building an Empire in the New World: Taxes and Fiscal Policy in Hispanic America during the Seventeenth Century," offers a broad perspective and analytical interpretation of the fiscal system established by the Spanish Empire in the Americas. I demonstrated that the New World's fiscal structure gradually evolved into a sophisticated system that continuously adapted to the numerous social and economic changes experienced throughout the period examined. Consequently, the Spanish American Real Hacienda (Royal Finance) emerged as one of the most efficient taxation systems in the Atlantic World during the seventeenth century. After finishing my Ph.D. in December 2020, I continued working on a paper that emerged from my research during the predoctoral period, focused on the Spanish Crown's debt policy in America during the seventeenth century. In September 2023, *Explorations in Economic History*, one of the most prestigious journals in the area, published the paper.

Thanks to the Margarita Salas postdoctoral scholarship in Spain, I started a research project centered on the Caribbean. As of January 2023, I was a visiting researcher with the Historia Social Comparada group at the UJI. There, I analyzed the accounts of the Treasury Office of Santo Domingo during the first half of the sixteenth century, as previous research has not assessed the information from this critical region for the Spanish Empire in America. As of November 2024, I began working as a Research Associate Paleographer at the Dominican Studies Institute of CUNY. I am leading a research project titled "AI in the Archive: Economic and Social Data for the Early Modern History of the Americas." Throughout this year (2025), we will employ Artificial Intelligence and Relational Databases to process, store, and analyze micro-data from Santo Domingo's Royal Finance manuscripts. The knowledge gained will be significant; the new data will allow researchers to uncover new perspectives on the social and economic history of the early modern era. In addition to reconstructing the time series and other economic indicators derived from tax data, the research team will focus on the role that intersectionality (race, gender, class) played in Hispaniola at the beginning of the sixteenth century.



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Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: BURGUERA I PUIGSERVER, VICTÒRIA-ALBA
Referencia: RYC2024-048921-I
Correo Electrónico: victoriaburguera@gmail.com
Título: Conflictividad marítima, guerra naval y cautiverio en la Corona de Aragón bajomedieval
Resumen de la Memoria:

Durante mi carrera investigadora, he desarrollado mis propias líneas de investigación en el marco de los estudios sobre la historia marítima y naval del Mediterráneo medieval desde el observatorio de la Corona de Aragón. A partir de la realización de mi tesis doctoral (U. Barcelona, Cum Laude, 2020), he ido desarrollando dos líneas de investigación principales: la guerra naval y la gestión de la conflictividad marítima en la Corona de Aragón bajomedieval, y el cautiverio, el tráfico y la liberación de cautivos en el Mediterráneo occidental medieval. Los resultados de la investigación sobre estas dos líneas, diferenciadas e interconectadas, se sitúan en la transversalidad entre la historia política y la competencia entre estados; la historia social y la movilidad ascendente de las personas intervinientes, y la historia económica, a partir de los negocios desarrollados entorno a las empresas de robo, venta de botines y rescate de personas.

Gracias a dos contratos postdoctorales (uno nacional y otro internacional), y una sólida carrera investigadora afianzada en tres centros de investigación españoles (Universidad de Barcelona, Universidad de las Islas Baleares y IMF-CSIC Barcelona) y experiencia internacional en tres países extranjeros (Estados Unidos e Italia (estancias predoctorales) y Alemania (contrato postdoctoral)), he revisado y renovado el conocimiento sobre el conflicto marítimo y uno de sus efectos colaterales, el cautiverio y el tráfico de personas entre las riberas cristiana e islámica. Asimismo, he abierto nuevas vías de investigación a partir de nuevas fuentes y otras ya conocidas, pero escasamente trabajadas hasta el momento.

La relevancia de mis investigaciones es patente a través de publicaciones en revistas y editoriales de prestigio, en un total de 5 lenguas (2 libros; 10 artículos + más 3 en revisión + 5 capítulos de libro + más 4 en vías de publicación, y 1 coordinación de dossier monográfico + junto al Dr. A. Reixach) y de frecuentes invitaciones a congresos y seminarios como experta invitada (École Française de Rome; Universität Halle (Saale; Alemania); Encuentros Internacionales del Medievo en Nájera; Universidad del País Vasco, etc.). Además, he sido senior commentator de la European School for Training in Economic and Social Historical Research (ESTER) (Universität Münster, 2024), en el que evalué el proyecto de tesis de dos doctorandos de la U. Antwerp (Bélgica) y he ganado varios premios: premio Antoni de Capmany por el Trabajo Final de Master (3.000 + publicación); premio Raimon Noguera por la Tesis doctoral (12.000 + publicación) y premio Medievalismo por el mejor artículo de joven investigador (600 + publicación).

Durante los últimos años, me he especializado en el campo de las Humanidades Digitales, sobre todo en el desarrollo de técnicas para el "data management". En el marco del proyecto alemán del que soy investigadora postdoctoral, lidero un equipo de informáticos para la realización de la Database of Medieval Maritime Predation y un grupo de estudiantes colaboradores. Asimismo, he co-organizado dos congresos internacionales (en Barcelona y Heidelberg), así como sesiones y panels en congresos de prestigio internacional, a los que asisto regularmente; he sido evaluadora de artículos para revistas peer-review y, desde hace dos años, soy coordinadora de reseñas de la revista Medievalismo.

Resumen del Currículum Vitae:

Actualmente, soy investigadora postdoctoral de la Universität Heidelberg (Alemania). Realicé mi tesis doctoral en la Universidad de Barcelona (con mención Cum Laude y doctorado internacional), en codirección con la Universidad de las Islas Baleares, con contrato predoctoral financiado por el Gobierno de las Islas Baleares. Realicé 3 estancias (sumando un total de 16 meses) en la IMF-CSIC de Barcelona, con la Dra. R. Salicrú i Lluç; una estancia de 3 meses en la University of Colorado at Boulder, con los Dres. B. Catlos y N. Silleras Fernández, y otra de 3 meses en la Università di Napoli Federico II, con el Dr. F. Senatore, estas dos últimas financiadas por el Gobierno de las Islas Baleares. Posteriormente, he sido profesora asociada de la Universidad de Barcelona (2021-2022); investigadora postdoctoral de la Universidad de las Islas Baleares (2022) e investigadora postdoctoral de la Universität Heidelberg (contrato actual). Me concedieron también el contrato postdoctoral Juan de la Cierva formación en 2021, al que renuncié antes de la incorporación por haber aceptado el contrato postdoctoral internacional.

Formo parte de grupos de investigación tanto nacionales como internacionales: CAIMMed 2021 SGR 00502 La Corona de Aragón, el Islam y el mundo mediterráneo, dirigido por la Dra. R. Salicrú (IMF-CSIC de Barcelona); GRESMED Grup d'Estudis Medievals, dirigido por la Dra. S. Sabater Rebassa (U. Islas Baleares); el grupo Iberomediävistik, dirigido por el Dr. N. Jaspert (U. Heidelberg, Alemania) y el grupo Mediterranean Seminar, dirigido por los Dres. B. Catlos (U. Colorado-Boulder, EEUU) y S. Kinoshita (U. California, EEUU).

Además, mis investigaciones han formado parte de los resultados de 4 proyectos nacionales: 3 financiados por el Ministerio de Ciencia e Innovación, dirigidos por la Dra. R. Salicrú i Lluç, y 1 por el Institut d'Estudis Balearics (proyecto propio), y 2 internacionales: uno financiado por el consejo nacional de investigaciones científicas de Alemania (DFG), dirigido por el Dr. N. Jaspert, y uno por la agencia europea COST, dirigido por el Dr. A. Urquizar Herrera; Dr. B. Franco Llopis; Dr. E. Filipovic y la Dra. I. Capeta Rakic. Colaboré también puntualmente en el proyecto Leverhulme RPG-2018-080, dirigido por la Dra. A. Sapoznik.

Cuento con varias publicaciones en un total de 5 lenguas (2 libros; 10 artículos + más 3 en revisión + 5 capítulos de libro + más 4 en vías de publicación, y 1 coordinación de dossier monográfico); he participado en un total de 23 congresos y seminarios nacionales e internacionales (por selección) y he pronunciado 26 conferencias (por invitación), en varios países europeos y norteamericanos.

Como principales actividades de transferencia, he sido asesora histórica del documental Piratas en Baleares (octubre 2021) coproducido por Canal Historia (History Chanel España y Portugal) e IB3; soy autora de un artículo de portada de la revista de alta divulgación Sapiens, además de otras publicaciones de prensa, y he participado en varias entrevistas de radio y televisión, destacando el programa En guàrdia de Catalunya ràdio. Asimismo, he impartido docencia en universidades nacionales (U. Islas Baleares y U. Barcelona) e internacionales (U. Messina (Italia); U. Colorado (EEUU) y U. Heidelberg (Alemania)) y he obtenido la acreditación de profesora ayudante doctora por la AQUIB.



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Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: CORTELL NICOLAU, ALFREDO
Referencia: RYC2024-051418-I
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Título: Modelización computacional para entender procesos de transición cultural en la Prehistoria

Resumen de la Memoria:

Mi línea de investigación se centra en el estudio de los procesos demográficos y culturales que se dieron durante el paso de las últimas sociedades de grupos de caza-recolectores a los primeros grupos de agricultores en el Mediterráneo Occidental. Para ello, utilizo las puntas de flechas de ambos grupo como marcador cultural básico. Metodológicamente, emprendo esta tarea desde el punto de vista computacional en el que (1) utilizo la simulación de forma extensiva para la valoración de hipótesis y métodos y (2) me baso en un enfoque cuantitativo y de testeo de hipótesis para obtener resultados reproducibles. Actualmente, me centre en las relaciones entre demografía y diversidad cultural, de modo que, a partir de la última, podamos obtener información sobre los procesos demográficos y sociales que se dieron durante esta transición capital en la historia de la humanidad. Actualmente trabajo en el Instituto Max Planck de Antropología Evolutiva (Leipzig), después de haber obtenido un proyecto para contrato por la Fundación Humboldt. Previamente he estado tres años en la Universidad de Cambridge, primero como investigador post-doctoral Marie Curie y después como Profesor Asociado Senior. Este, si se incluye el periodo POP del que disfruté al acabar la tesis por acabarla en tres años, abarca todo mi periodo post-doctoral en el que, gracias a esta experiencia internacional, he podido desarrollar numerosas conexiones internacionales, contando actualmente con colaboraciones (consumadas y en procesos) con investigadores de EEUU, Reino Unido, Alemania, Dinamarca, Holanda, Francia, Chipre o Japón entre otros. Todo esto se fundamenta en una investigación independiente, posible gracias al porcentaje de éxito en mis solicitudes de proyectos y contratos (actualmente cerca de 500,000 obtenidos en proyectos/contratos personales). Por último, en mi posición actual, en el Instituto Max Planck de Antropología Evolutiva, dentro del Departamento de Conducta, ecología y cultura humanas, profundizo en la calidad, intensidad y posibilidades de inferencia, a través de diversas colaboraciones dentro del instituto, tanto con arqueólogos, como modeladores teóricos y antropólogos.

Resumen del Currículum Vitae:

En el CVA adjunto se muestra una parte del trabajo realizado en estos últimos años. En dicho CVA se mencionan no solo las posiciones obtenidas anteriormente (e.g. MSCA, Profesor Asociado Senior e Investigador Humboldt), sino también aspectos adicionales como mi papel como coordinador del Máster de Ciencia Arqueológica de la Universidad de Cambridge. Asimismo, he colaborado en un número importante de publicaciones científicas, teniendo en cuenta el tiempo de mi carrera investigadora (35, con siete como primer autor y otras siete como único autor) en la que demuestro, no solo la capacidad de liderar investigación, sino también la capacidad de contribuir como miembro de un equipo más amplio. Esto no solo se observa en mis publicaciones, sino también en mi participación en proyectos, en los que, aparte de los que he conseguido como investigador principal, también he participado como investigador externo en otros a nivel europeo como COREX (Synergy Grant) o ENCOUNTER (ERC-StG), así como he sido miembro de varios proyectos nacionales. Toda esta actividad, además, se complementa con una importante presencia en congresos y conferencias científicas, con más de cuarenta presentaciones en diferentes grados de autorías, así como varias charlas invitadas en países como Alemania, Japón, Chipre o el Reino Unido. Complemento todo esto no solo con una actividad importante en actividades de divulgación (desarrollo de vídeos temáticos, participación en jornadas de campo abiertas y en actividades de divulgación), sino también acercando la arqueología mediante charlas a grupos no expertos, pero con interés social, ya sean grupos de adultos interesados o grupos de niños y jóvenes de educación primaria y secundaria. Por último, todo esto lo llevo a cabo prestando atención y supervisión a mis compañeros más jóvenes. Esto incluye la dirección de un TFM, pero también la supervisión y coordinación de todos los estudiantes de máster del Máster en Ciencia Arqueológica en Cambridge, así como haber participado como miembro del tribunal en tres defensas de tesis y haber guiado en trabajo de campo a un número significativo de alumnos en diferentes niveles de formación (desde pre y post-doctorales hasta estudiantes de grado), tanto de la Universitat de València como de la Universidad de Cambridge.



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Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: TRAVIESO BARRIOS, EMILIANO
Referencia: RYC2024-049605-I
Correo Electrónico: emiliano.travieso@gmail.com
Título: Slavery and the origins of racial inequality in Uruguay
Resumen de la Memoria:

I began studying economic history in my native Uruguay, and went on to earn my PhD in History at the University of Cambridge in 2020. My research has developed along three main themes: (a) the history of rural slavery in Uruguay; (b) comparative histories of agrarian inequality and rural migrations in the 19th and 20th centuries; (c) the global environmental impacts of modern economic development since 1800, with an emphasis on agriculture. My single-authored work has been published in several top History journals (Past & Present, Journal of Global History, Economic History Review).

My main historiographical intervention in recent years intended to fundamentally revise the role of enslaved people and their descendants in Uruguayan economic and social history. My proposed line of research for this Ramón y Cajal fellowship will continue to develop this area of my work, exploring the historical origins of racial inequality in Uruguay.

Over the last two decades, economists such as the recent Nobel Prize laureates Acemoglu, Johnson and Robinson have emphasised the importance of institutions inherited from the colonial past to explain high levels of poverty and inequality. Historians have rightfully criticised their work, pointing out that they tend to “compress history”, drawing correlations between the present and some more or less distant point in the past, without explaining historical processes of continuity and change. To overcome these limitations, we need to understand exactly in which way the institutional legacies of the colonial past persist far beyond the contexts in which they emerged.

Slavery is one of the most crucial institutions in economic historiography and in the history of the Americas. Despite the vast scholarship on the history of slavery in the Americas, we know far less about the processes of transition to freedom, which included in all cases a period of selective emancipation before abolition, and that decisively shaped the long-term impacts of slavery. How did the transition out of slavery reshape or reinforce the inequality legacy of the colonial period? In particular, for the case of Uruguay, more than 150 years have passed since the end of slavery, so which are the historical bridges between the de jure racial inequality of the colonial past and the de facto racial inequality of the 20th and 21st centuries?

Uruguay is a good case study to examine these questions because racial inequality remains extremely high, even if it has been overlooked by scholars. Today, Black Uruguayans live predominantly in the poorest parts of the country, and while they represent 10% of total population they account for over 50% of Uruguay’s poor population. These inequalities are rooted in a past that remains unknown and uncounted.

This line of research will build the first historical databases of Afro-Uruguayan people by working with three sets of primary sources, all to be found in archives in Montevideo. The main hypothesis is that, once they won their freedom in the mid-19th century, Africans and their descendants had to move to the least fertile parts of the country in order to find a plot of land, therefore transforming the de jure inequality from the colonial period into de facto inequality in the distribution of the main economic resource in all agrarian societies, including 19th century Uruguay: fertile land.

Resumen del Currículum Vitae:

I am an economic historian of late-modern Uruguay and Latin America, focused on the interactions between the environment and rural development, and the legacies of slavery and agrarian inequality. I earned my PhD from the University of Cambridge in October 2020, with a dissertation on “Environment, Resources, and Rural Development in Uruguay, 1779-1913” that was awarded the Alexander Gerschenkron Prize of the Economic History Association (USA) to the best doctoral thesis in the economic history of any country outside North America.

Since January 2021 I have been a full-time lecturer at Universidad Carlos III de Madrid, where I teach economic history at the undergraduate level, and Latin American economic history and environmental history at the graduate level. I also serve as co-director of the Master in Sustainable Development.

My research reconstructs and analyses historical evidence from colonial and post-colonial contexts (late 18th-20th centuries), with a focus on long-term rural development (agricultural techniques, landholding structures, and landscape change) and agrarian inequality, especially in slavery and post-slavery societies. While most of my primary research continues to rely on archives from the Río de la Plata, I have also worked on West African colonial history. My methodological approach is based on archival work with primary sources to produce original datasets, which I then examine with the tools of quantitative social science through causal identification designs, combined with qualitative case studies and microhistory.

Only four years after defending my PhD thesis, my research has so far resulted in 13 academic publications: 9 journal articles, 4 book chapters, and one book. I am interdisciplinary in my approach to the human past, and attempt to speak to diverse scholarly audiences. Seven of my articles are in top journals (first decile) of the JCR ranking in the categories History, Economics, History of Social Sciences, Geography, and Multidisciplinary Sciences.

I am committed to teaching and remain strongly convinced that historical knowledge is crucial to develop students’ critical thinking across disciplines. I have earned stellar marks in student evaluation surveys across all of my courses, scoring on average 4.8 out of 5 in student satisfaction in over 800 hours of teaching (compared to an average of 3.9 in Economic History courses at Carlos III). I have supervised 5 master’s thesis and over 20 social sciences’ undergraduate theses on economic history topics. Finally, I am currently supervising two PhD theses on Uruguayan economic history.



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In sum, I am an economic historian with a deep interest in the entangled histories of agriculture, environment, and slavery, and I have an emerging publication record in some of the best History journals, as well as in top outlets for other social sciences and interdisciplinary science.



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Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: FUERTES BROSETA, MIQUEL
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Título: Formas de negociación política en la Monarquía Hispánica de los Austrias

Resumen de la Memoria:

Durante esos años he desarrollado una investigación sobre los mecanismos de comunicación y diálogo político en la Monarquía de España, especialmente en los reinos de Valencia y Cerdeña. Igualmente, me he centrado en la definición y estudio del funcionamiento del sistema político de la Monarquía y de las partes que la componían. Por un lado, me he dedicado al estudio de las potestades del monarca y sus limitaciones y, por otro, me he aproximado al papel de las instituciones que representaban a las corporaciones y comunidades locales.

En el futuro me planteo seguir con esta línea de estudios profundizando en dos territorios. Por un lado, el estudio de los medios de comunicación política empleados por las ciudades castellanas a la hora de negociar con la corona. Por otro lado, profundizar en las instituciones y cauces de diálogo que se empleaban en la isla de Cerdeña en el período que formó parte de la Monarquía.

El estudio de la realidad de las urbes castellanas permitiría mis investigaciones de historia comparada un poco más allá. Mi objetivo es cubrir un pequeño déficit que tiene lugar actualmente en las investigaciones, puesto que se continúan desarrollando más trabajos sobre las comunicaciones de los territorios ultramarinos como América, las Filipinas o los territorios italianos, a la par que también hay importantes estudios sobre los reinos peninsulares de la Corona de Aragón, de Navarra o de las Provincias Vascas; pero parece que estas perspectivas de estudio no han cuajado con igual contundencia entre los estudiosos de las ciudades castellanas peninsulares.

La capacidad política y de autogestión de estas repúblicas urbanas castellanas era enorme y debido a su desarrollo económico eran capaces de condicionar las políticas de la corona. En consecuencia, a la hora de entablar un diálogo con el rey o con otros organismos como la Santa Sede tendrían posibilidades presumiblemente superiores o similares de negociar y ejercer presión que las ciudades de Italia, la Corona de Aragón o América, por lo que conocer mejor estos aspectos ayudaría a definir el sistema imperial de la Monarquía Hispánica.

Sobre la isla de Cerdeña pretendo continuar con los estudios sobre sus formas de gobierno y diálogo político en época de los Austrias con la finalidad de terminar algunas investigaciones que tengo en curso relacionadas con los mecanismos de relación entre las élites regnícolas y la corona, especialmente durante el siglo XVII.

En resumen, las líneas de investigación planteadas trazan un horizonte que trata de responder a algunas cuestiones que han surgido a lo largo de mis investigaciones y a las que todavía no puedo dar una respuesta. Para todas ellas hay hipótesis de partida que deberán ser comprobadas o refutadas por las evidencias documentales. El método propuesto para tal fin es el trabajo sobre fuentes primarias (lo que conlleva desplazamientos a diversos archivos que podrían financiarse con los fondos asociados a la Ramón y Cajal) debidamente complementadas con lecturas bibliográficas.

Resumen del Currículum Vitae:

Tras graduarme en Historia (U. Valencia-2015) cursé el doctorado en la Università degli Studi di Cagliari con una tesis en cotutela internacional defendida en 2021. Igualmente, para completar mi formación me matriculé en un doctorado en Derecho en la Universidad de Valencia, doctorándome en 2023 con una tesis en Historia del Derecho con Mención Internacional y cum laude que también ha sido galardonada en los premios Mavi Dolç de la U. de Valencia.

Mi trayectoria investigadora se ha desarrollado mayoritariamente en el extranjero merced a una beca predoctoral de la Universidad de Cagliari (Italia) entre 2017 y 2020. Con posterioridad tuve un contrato Margarita Salas mediante el cual me incorporé al Istituto di Storia dell'Europa Mediterranea del Consiglio Nazionale delle Ricerche con una estancia de 24 meses. Asimismo, durante 2024 he tenido una ayuda del subprograma Juan de la Cierva gracias a la cual he podido desarrollar una estancia de investigación de dos meses en la Université Gustave Eiffel de París. En consecuencia, desde 2017 he pasado fuera de España más de 5 cinco años.

Mis investigaciones se han centrado en los mecanismos de diálogo y mediación política en la Monarquía Hispánica de los Austrias, centrándome en los reinos de Valencia y Cerdeña. Asimismo, también he puesto mi atención en los debates sobre las potestades del monarca y la aplicación del derecho positivo en el Antiguo Régimen. Ello me ha hecho profundizar también en las interpretaciones sobre el absolutismo y el constitucionalismo. Un elemento característico de mis investigaciones es la combinación del estudio de la jurisprudencia y la teoría política con la exhumación de la documentación de archivo, lo que ofrece una visión más compleja de aquel sistema político. Asimismo, gracias a mi doble formación en Historia y en Historia del Derecho trato de abordar los problemas de investigación desde varias perspectivas de análisis y ofrecer unas conclusiones más completas. Todo ello ha tenido su transferencia en forma de monografías, artículos, capítulos de libro e intervenciones en congresos y seminarios. Asimismo, he organizado diversas actividades científicas, coordinado publicaciones y he sido investigador principal del proyecto "Integración y diversidad en las monarquías ibéricas: el caso del reino de Cerdeña (ss. XIV-XVIII)" (CIGE/2023/84), financiado con las Subvenciones para Grupos de Investigación Emergentes, convocadas por la Generalitat Valenciana en el que he liderado un equipo internacional de investigadores. Igualmente he participado o he sido responsable de contratos con administraciones públicas como el Boletín Oficial del Estado, las Corts Valencianes y el Consiglio Regionale della Sardegna. Gracias al tiempo y esfuerzo dedicados a estas tareas resultados de estos contratos han sido ya publicados o están en proceso de evaluación, lo que acredita cierto nivel de solvencia investigadora.



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Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: BOTTAINI, CARLO
Referencia: RYC2024-049175-I
Correo Electrónico: carlo.bottaini@gmail.com
Título: Protohistoric metallurgy and its social and economic implications: Atlantic Europe and the Western Mediterranean

Resumen de la Memoria:

Throughout my career, I have developed a solid interdisciplinary and international research profile in archaeology, with a focus on metallurgy and technological innovations in prehistory and protohistory. My academic contributions span a broad range of topics, with an emphasis on the study of metalworking practices and their social and economic implications. I have authored around 60 scientific publications, 33 of which are in peer-reviewed, indexed journals such as Scopus and Web of Science. I have collaborated extensively with national and international teams, integrating data from a wide variety of archaeological materials, including metals, ceramics, and pigments.

One key area of my research has been the analysis of prehistoric and protohistoric metallurgical practices. My work on copper supply networks in the Irish Later Bronze Age, as part of my Marie Curie Fellowship, involved detailed study of copper procurement and exchange. This project not only advanced our understanding of ancient metallurgy in Europe but also highlighted the importance of trade and resource management in shaping the social structures of the time. I have also led research projects on the metalworking traditions in the Iberian Peninsula, such as my study of Late Bronze Age metallurgy in Western Iberia, which revealed the complex regional exchange networks that connected local communities with distant copper sources. These projects have contributed to the understanding of the dynamic interactions between human societies and their environments, particularly in relation to resource use and trade.

I have also focused on Islamic metallurgy, including a study of copper-based artefacts from the Garb al-Andalus, which explored the impact of political and economic instability during the 12th and 13th centuries on metal production. This work, published in *Heritage Science*, provided key insights into how artisans adapted to challenges posed by resource scarcity, underscoring the links between material culture and socio-political contexts.

Another important aspect of my research is the application of advanced scientific techniques to the study of metals. For example, in my study of Bronze Age hoards in Western Iberia, I applied a combination of chemical analyses and metallographic methods to uncover the technological processes behind the production of metal objects and their role in social and economic interactions. Similarly, I have collaborated in the implementation of an innovative non-destructive method combining X-ray fluorescence and Monte Carlo simulations to analyse corrosion patinas on archaeological bronzes, opening new avenues for studying complex multilayered artefacts and has been widely cited for its contribution to the conservation and study of cultural heritage.

Throughout these studies, my role has been central in formulating research questions, designing methodological frameworks, and interpreting data. My work not only contributes to the archaeological understanding of past societies but also offers practical solutions for the conservation and preservation of cultural heritage. I have worked with a range of materials, from metals to ceramics and pigments, and my research continues to push the boundaries of archaeological science, offering new insights into ancient technologies and their social implications.

Resumen del Currículum Vitae:

I am currently a Marie Skłodowska-Curie Fellow at Queen's University Belfast (UK). Previously, I was a Newton International Fellow at Queen's University Belfast (2022-2023) and a postdoctoral researcher at the HERCULES Laboratory (Universidade de Évora, Portugal) (2013-2022).

My research focuses primarily on prehistoric and protohistoric metallurgy in the Atlantic and Mediterranean world, with an emphasis on technological advances and raw material provenance. I also have extensive experience of Islamic metallurgy and have worked in a variety of geographical contexts, including Europe and Asia.

Throughout my research career, I have published over 60 papers, including 29 in Scopus-indexed journals, most as first or corresponding author, with a strong focus on open access journals to improve the dissemination of research results. I have participated in more than 70 scientific meetings and have co-organised 10 international conferences.

As an archaeologist, I have a solid grounding in archaeological and heritage sciences, complemented by extensive experience working independently with advanced analytical techniques such as XRF, XRD, Raman spectroscopy, OM and SEM-EDS.

Building on this laboratory expertise, I have gained international experience in promoting global collaboration in heritage science through my involvement in E-RIHS - European Research Infrastructure for Heritage Science. I have also contributed to the establishment of the China-Portugal Joint Laboratory of Cultural Heritage Conservation Science, supported by the Belt and Road Initiative and funded by the Ministry of Science and Technology of the People's Republic of China.

I obtained financial support from several prestigious funding bodies, including the Portuguese FCT, The British Academy, and the UKRI, totalling approximately €430,000 over the last three years. The projects I lead involve advanced knowledge of Western European metallurgy, including extensive chemical, metallographic, and Pb isotopic analyses of copper-based objects and minerals, and ¹⁴C AMS dating of associated organic materials.

In addition to the projects where I am PI, I have contributed to several highly competitive international projects funded by the FCT (Portugal), the Deutsche Forschungsgemeinschaft (Germany), and the Ministerio de Ciencia, Innovación y Universidades (Spain).

I have extensive teaching experience, having lectured at the Universidade de Évora and the Universidade de Coimbra. In addition, I have supervised three Ph.D. students (one completed, two ongoing) and four master's theses from various Portuguese institutions. I have also been a member of two master's and two doctoral thesis committees.

I have extensive expertise in public engagement and have consistently disseminated research findings to diverse audiences through a range of initiatives including the organisation of international scientific meetings, summer schools, public lectures, workshops and media appearances. I have played a key role in organising and participating in events designed to promote dialogue between the academic community and the general public, with a particular focus on the dissemination of knowledge related to archaeology, cultural heritage and the application of new technologies in these fields.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: PAÑEDA MURCIA, BEATRIZ
Referencia: RYC2024-048602-I
Correo Electrónico: bpanedamurcia@gmail.com
Título: Historia de la religión en el Mediterráneo helenístico y romano

Resumen de la Memoria:

I am a Doctor in Humanities from the University Carlos III of Madrid (UC3M) and Doctor in Religions and Thought Systems from the École Pratique des Hautes Études²PSL (EPHE) of Paris. My research explores the workings of polytheism and the dynamics of religious change in the Hellenistic and Roman Mediterranean, with a focus on five interrelated topics: 1) the joint enshrinement and veneration of gods; 2) divine onomastics; 3) the religious life of port cities; 4) ruler cults; 5) mystery cults.

The high-quality research and scientific impact of my doctoral thesis "Divine Cohabitations in Sanctuaries of the Graeco-Roman World" (May 2021), co-supervised by Prof. Jaime Alvar Ezquerro and Prof. Nicole Belayche, has been recognised with two awards: the University Carlos III of Madrid Award for the Best Doctoral Thesis in Humanities (2021) and the Chancellerie des Universités de Paris Award for the Best Doctoral Thesis in Lettres et Sciences Humaines (2022).

My postdoctoral career has mainly focused on developing the project "Divine Networks in Ancient Mediterranean Ports" (DiNAMPo), first funded by a Margarita Salas Postdoctoral fellowship at Leiden University (April ² September 2022) and subsequently by a postdoctoral contract at Lund University (October 2022 ² September 2024). DiNAMPo explored the impact of culture contact on the formation of divine networks in shared sanctuaries and rituals of two port cities: Delos and Rome (the river port area). Research within this project led me to recognise the need for a more comprehensive comparative study of the religious dynamics of port cities, which is the research line I intend to develop as a RyC fellow.

The project "Port Godscapes: Religious Dynamism through Culture Contact in Hellenistic and Roman Ports" (PORTGODS) aims to offer an in-depth micro-historical account of how polytheism worked and local polytheistic traditions changed amid, and driven by, the intense inter-local and cross-cultural interactions resulting from the unprecedented maritime mobility of the Late Hellenistic and Early Roman Mediterranean (ca. 150 BCE ² ca. 230 CE). PORTGODS will pursue this overall scientific goal through a comparative study of polytheism in 10 long-distance trade port cities, conducted through an innovative interdisciplinary methodology that integrates micro-history, the Lived Ancient Religion approach, multicultural psychology theory, anthropological and sociological perspectives on cross-cultural contact and change, and a gender perspective. Research will be based on written and material sources from the 10 ports under study (Corinth, Delos, Byzantium, Caesarea Maritima, Alexandria, Carthage, Syracuse, Tarraco, Puteoli, and Rome-Ostia-Portus) and will focus on three thematic axes: 1) divine configurations, divine onomastics, and language choices in private and public votive epigraphy; 3) ritual practices (beyond dedication). This way, the project will generate new knowledge on three major open questions in ancient religious studies: How did ancient polytheisms work? How did theological and ritual innovations, new religious attitudes, values, and behaviors originate and spread? What were the modes and the social, political, and religious outcomes of daily face-to-face interactions between religious groups?

Resumen del Currículum Vitae:

My doctoral thesis "Divine Cohabitations in Sanctuaries of the Graeco-Roman World" (May 2021) was conducted within Jaime Alvar's project HAR2014-52531-P: Oriental Religions in Spain, supported by a FPI contract, and co-supervised by Alvar and Nicole Belayche (EPHE).

After my PhD, I was employed for six months at the University of Toulouse - Jean Jaurès as a Guest Researcher within the ERC Advanced Grant project MAP 741182: Mapping Ancient Polytheisms, directed by Prof. Corine Bonnet. From April to September 2022, I conducted a six-month stay at Leiden University under the supervision of Prof. Miguel J. Versluys, funded by a Margarita Salas Postdoctoral Fellowship. Both this fellowship and my subsequent two-year contract at Lund University (October 2022 ² September 2024) were aimed at developing the project Divine Networks in Ancient Mediterranean Ports. Since October 2024, I am a Guest Researcher at the Swedish Institute at Athens, funded by this institution. In this role, I am working on the individual project Living and Working with the Gods on Hellenistic Delos.

In addition, since the beginning of my career, I have participated in four national research projects besides the project ORINS, as well as in the network RED2022-134137-T: Ancient Religions and Cults Network (2023-2025), led by Prof. María del Mar Marcos Sánchez.

By April 2025, I will have completed 7 research stays in 7 European countries (The Netherlands, France, Greece, Italy, and Switzerland) and worked for 8 different European institutions.

Since 2016, I have presented papers at 17 international conferences and 9 international workshops (in Belgium, Estonia, EEUU, France, Germany, Italy, Hungary, Poland, Portugal, Spain, and Switzerland), as well as in other 4 Spanish scientific events. I have also co-organised the international conference OMEGA 1. The Power of the One and of the Many, UC3M, 15²17 November 2023, which reunited 27 international speakers, and the international workshop Imperium, Commmercium et Communitas: Social and Economic Dynamics of Italic Harbour Communities between the 2th and 4th Centuries CE, 13 June 2024, University of Warsaw. I am the author of 1 monograph, the co-editor of 2 collective volumes, and the author or co-author of 13 book chapters published or forthcoming with 9 renowned international publishers (Brill, De Gruyter, Wiley, Peter Lang, Brepols, Peeters, Dykinson, Presses Universitaires de Franche-Comté, and ENS Editions), as well as the author or co-author of 7 papers in high-impact peer-reviewed journals. Moreover, I am a co-creator of five open-access epigraphic and archaeological databases.



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I have taught 13 credits at Bachelor's level and I have experience in mentoring early career researchers as the developer and lecturer of the master and PhD course ARKN23: Cross-cultural Religious Interactions in the Ancient World (7.5 credits), taught at Lund University in the academic year 2023/2024. From 7th to 14th June 2024, I undertook a teaching and training stay at the University of Warsaw under the Erasmus + programme. I also have experience in editorial processes of peer-reviewed journals as a technical secretary of ARYS since 2019. I am a member of ARYS association and of the research group Historiography and History of Religions of the Institute of Historiography Julio Caro Baroja (UC3M).



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Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: MARTÍN-FRANCÉS MARTÍN DE LA FUENTE, LAURA
Referencia: RYC2024-049470-I
Correo Electrónico: lauramartinfrancesmf@gmail.com
Título: Integrating Dental Wear, Biomechanics, and Palaeopathology to Investigate Hominin Adaptation and Evolutionary Ecology

Resumen de la Memoria:

I, Laura Martín-Francés, am an anthropologist specializing in palaeopathology, dental biomechanics, and dental morphometrics for studying hominin adaptation. As an early mid-career researcher with nearly 10 years of post-PhD experience, I have sought, since 2015, to enhance my research profile by exploring new perspectives on hominin adaptation beyond phylogeny and taxonomy. My work has taken me to two international institutions (PACEA-University of Bordeaux and Monash University, Australia) and three national institutions (CENIEH, IPHES, UCM-ISCIII).

My multidisciplinary profile is demonstrated through contributions across various areas of the human evolution field. In the Atapuerca research team, I pioneered the use of advanced virtual techniques on dental fossil remains to enhance our understanding of the Eurasian evolutionary scenario, particularly the groundbreaking hypothesis that European hominins may have an Asian rather than African origin. I also explore hominin adaptation mechanisms from a palaeopathological perspective. This research resulted in inferences about taxonomy, behaviour, evolutionary mismatches or feeding strategies. In 2024, I became the leader of the dental biomechanical research at CENIEH. This pioneering research integrates previous virtual analysis with novel engineering tools to investigate hominin adaptation to changing environmental conditions. Over the years, I have progressively cultivated an interest in the ecological insights that dental evidence can provide, particularly in understanding the degree of adaptation of past populations to their specific time and context. This curiosity has led me propose a novel approach for exploring metabolic deficiencies in hominins. Building on my expertise in palaeopathology, I assess developmental disruptions in dental tissues to gain insights into the health status of hominins and whether their environments and resources (based on macrowear and biomechanical analysis) met their physiological demands. My research also includes methodological advancements and heritage preservation, with expertise in mCT scanning, I am part of the international team studying the impact of X-ray techniques on dating methods. Our findings show significant effects on chronological estimations, underscoring the need for improved accuracy and preservation practices.

My international standing also stems from my ability to secure funding (PI of 5 projects, including the highly prestigious EU-MSCA-GF; co-PI of 2 projects; and member of 6 projects), my broad network with over 30 experts from 14 institutions, among others IVPP, NHM, Musée de l'Homme, National Museum of Georgia, Tel-Aviv University, Oxford University, and ANSTO. In addition, I am engaged in other research activities and initiatives. Since 2016, I teach the Dental Anthropology module in the MSc Human evolution at Burgos University and I have supervised 10 students at various levels, including PhD, MSc and TFG. I am committed to the EU-FAIR principles, making research data openly accessible through platforms, such as CENIEH-ARIADNEplus and consistently sharing datasets in publications to promote transparency and reproducibility. I actively engage in science communication through diverse platforms, participate in public outreach events such as European Researcher's Night and in STEM programs.

Resumen del Currículum Vitae:

Scientific production metrics (Scopus January 2025):

- h-index = 20
- 53 articles in peer-reviewed journals (+1 accepted and 3 submitted)
- Over 40 Conference presentations
- Citations = 1,344 (in 910 documents)
- 93.8% of the articles are co-authored with international researchers
- 18 articles (37.5%) within the top 25% most cited documents worldwide
- 20 articles cited at least 20 times
- 10 publications related to Goal 17 (Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development) of the UN-Sustainable Development Goals

Competitive funding as PI and Co-PI

- 2024-26 EU-MSCA-GF (PI): BITE-101060482.
- 2023 Leakey Foundation grant (co-IP): 3D analysis of dental stress markers in the Atapuerca hominins
- 2022-23 MICIU-Juan de la Cierva Incorporación (PI): IJC2020-043979-I
- 2021-22 MICIU-Excelencia María de Maeztu (PI): CEX2019-000945-M
- 2019 CNRS-INSERM-Bordeaux International Support (BIS) (co-PI): TEETH
- 207-19 CNRS-INSERM Initiative d'Excellence Université de Bordeaux (PI): Dental tissue proportions in Atapuerca species and their relationship with Neanderthals and H. sapiens
- 2012 EU-SYNTHESIS (PI): Palaeopathological analysis: the study of diseases in the human fossil species-GB-TAF-1950

Awards

- 2017 Extraordinary PhD award, University of Alcalá (Madrid, Spain)
- 2013 Best Poster Prize, 3rd Annual ESHE meeting, 19-21 September, Vienna (Austria)
- 2012 Jóvenes Excelentes Award (Gutiérrez Manrique Foundation and Obra Social Caja Burgos)



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Featured Publications

- Herskovitz et al. 2021. A Middle Pleistocene Homo from Nesher Ramla, Israel.
- Martín-Torres et al. 2021 Earliest known human burial in Africa.
- Martín-Francés et al. 2020. Ectopic maxillary third molar in Early Pleistocene H. antecessor from Atapuerca-Gran Dolina site (Burgos Spain).
- Herskovitz et al. 2018. The earliest modern human outside Africa.
- Martín-Francés et al. 2014. Palaeopathology of the Plio-Pleistocene specimen D2600 from Dmanisi (Republic of Georgia).

Teaching and supervision

- 2016- Dental Anthropology module, MSc in Human Evolution, UBU
- 2017-19 Biological Diversity and evolution of the human populations, MSc in Bio-Geosciences, UBx
- 2020-21 P. Gómez, TFM in MSc in Human Evolution, UBU
- 2017- S. Kamath, PhD in Biological Anthropology UCL
- 2018-19 K. Dardinier, TFM in MSc in Bio-Geosciences, UBx
- 2016-17 M. Hernáiz, TFM in MSc in Human Evolution, UBU
- 2015-16 M. Hernáiz: TFG in BSc in Biology, UAM

PhD Committee

- 2020 C. García Campos, UBU
- 2017 M. Martínez de Pinillos, UBU
- 2016 K. Górká, UB

Outreach

- Book: Martín-Francés, L. Homo habilis. El creador de herramientas. Biblioteca de Evolución Humana. Ed. Salvat. (Science book for non-experts)
- Martín-Francés, L. Homo antecessor y neandertales comparten características del tejido dental. Periódico Atapuerca, p. 4.
- Guest on Activa tu neurona radio show https://www.ivoox.com/en/activa-tu-neurona-radio-n-12-evolucion-humana-audios-mp3_rf_3204290_1.html
- 2022-23 Mentor STEM program
- 2010- Participation in European Researchers' Night, Open Day Labs, etc.

Fieldwork

- 2023- La Malia rockshelter, Guadalajara, Spain.
- 2007- UNESCO-Atapuerca complex sites, Burgos, Spain.
- 2018 Sirogne cave, Rocamadour, France.



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Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: WALKER VADILLO, VERONICA
Referencia: RYC2024-051199-I
Correo Electrónico: v.walker.vadillo@gmail.com
Título: Anchoring Identity: Nautical Archaeology and the Craftsmanship of Southeast Asia's Maritime Cultural Heritage

Resumen de la Memoria:

The proposed line of research investigates the maritime cultural landscapes of Southeast Asia through an innovative interdisciplinary framework that integrates nautical archaeology, socio-ecological systems theory, and traditional ecological knowledge (TEK). It moves beyond existing techno-functional approaches to boatbuilding studies, emphasizing the cultural, social, and ecological dimensions of these practices. This novel perspective seeks to establish a deeper understanding of how human communities conceptualize their environments, develop maritime cultures, and shape historical seascapes. Boats occupy a central role as mediators between land and water, often imbued with cultural meanings and symbolic significance. In Southeast Asia, these vessels are crafted and utilized within socio-ecological contexts that connect human behavior to aquatic environments. The proposed research examines how traditional practices and informal institutions influence boat construction, design, and usage, highlighting the spiritual beliefs and rituals that guide these processes. By framing boats as active agents within maritime networks, the project demonstrates their integral role in shaping social interactions and cultural practices, moving beyond the prevailing notion of vessels as mere technological tools. The project employs a socio-ecological systems framework to explore the dynamic interactions between humans and their environments, conceptualizing them as complex adaptive systems. This interdisciplinary approach draws on behavioral ecology, archaeology, anthropology, and geography to address questions about the entanglements of human and non-human entities in maritime contexts. Ethnoarchaeological methods bridge the gap between material culture and broader cultural practices, offering insights into the performative roles of boats and the broader social structures that influence their construction and use. By analyzing case studies in the Philippines, Cambodia, and Indonesia, the research develops comparative models for interpreting boatbuilding practices and maritime traditions across the region. One of the key contributions of this research is its emphasis on non-Western epistemologies and traditional ecological knowledge, situating maritime archaeology within culturally specific contexts. This perspective provides a counterbalance to conventional approaches that often prioritize material and functional characteristics over socio-cultural factors. By integrating social, ecological, and cultural dimensions, the research offers a transformative paradigm for understanding maritime cultural landscapes in Southeast Asia. The project has several anticipated outcomes, including a monograph titled "Sentient Ships of Southeast Asia", three articles in leading academic journals, and the development of collaborative networks that link European and Southeast Asian researchers and heritage practitioners. These outputs will advance theoretical and methodological approaches in maritime archaeology, foster interdisciplinary dialogue, and provide new models for analyzing human-environment interactions. Through its innovative methodology and interdisciplinary scope, the research lays the groundwork for future studies and fosters collaborations that will transform maritime archaeology and cultural heritage scholarship globally.

Resumen del Currículum Vitae:

I earned my Licenciatura in History from the University of Alcalá in 2005, igniting a passion for exploring Asia's rich maritime history and archaeology. This enthusiasm led me to pursue a Master's Degree in Maritime Archaeology at University College London (UCL) in 2008, where I delved into the nautical iconography of Angkor's temples in Cambodia under the mentorship of Joe Flatman. Seeking to expand my regional expertise, I completed a postgraduate specialization in Far East Asian Studies at the Open University of Catalonia (UOC), where I explored the histories, religions, and cultures of China, Korea, and Japan. These experiences have defined my interdisciplinary approach to Southeast Asian history and archaeology.

My academic journey took a transformative turn when I joined the Oxford Centre for Maritime Archaeology at the University of Oxford. Working alongside esteemed scholars like Professors Chris Gosden and Dan Hicks, I developed innovative theoretical frameworks for understanding Angkor's fluvial landscapes and broader Southeast Asian archaeology. This work culminated in a doctoral degree that laid the foundation for my Core Fellowship at the Helsinki Collegium for Advanced Studies (2018-2020). During this time, I received international recognition, including the prestigious Early Career Award from the Institute of Southeast Asian Archaeology (ISEAA) in 2020.

Building on my maritime archaeology expertise, I have contributed to major international initiatives, such as a 2017 UNESCO experts' meeting in support of the Maritime Silk Road's World Heritage nomination. In 2023, I authored a key desk report for ICOMOS to further this cause. Additionally, I have shared my research through workshops on early Pacific navigation at the Harvard Yenching Institute and "Knowledge Traditions in the Indian Ocean," organized by Himanshu P. Ray in collaboration with the Ashmolean Museum and the Oxford Centre for Hindu Studies. Invitations to lecture at leading institutions, including the School of Oriental and African Studies (SOAS) and the École Française d'Extrême-Orient (EFEO) in Paris, underscore the growing impact of my work.

I am committed to fostering global collaboration in maritime archaeology. As co-chair of the Asia-Pacific Regional Conference on Maritime and Underwater Cultural Heritage (APConf), I have helped shape its strategic agenda since its inception. Since 2020, I have coordinated the webinar series "Down by the Water: Global Conversations in Maritime Archaeology," creating a vibrant platform for scholarly exchange. Beyond academia, I am dedicated to engaging wider audiences, contributing to National Geographic Historia and authoring books for National Geographic Spain since 2010. These efforts reflect my commitment to advancing Southeast Asian archaeology and making its fascinating narratives accessible to diverse audiences.

With this grant, I hope to illuminate the intricate stories of Southeast Asia's maritime past, bringing together voices from diverse fields to uncover its hidden connections to the wider world. This support will enable me to mentor aspiring researchers and build bridges between academia and the public, inspiring new generations to explore the profound relationship between people and the sea.



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Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: DALLE MULLE, EMMANUEL
Referencia: RYC2024-049295-I
Correo Electrónico: edalle@ucm.es
Título: From Heterogeneity to Diversity: A History of the Geographical and Semantic Evolution of the Concept of Minority, 1930s-2000s

Resumen de la Memoria:

My research has run along two axes each coinciding with a major research project. The first and most recent line of research has focused on majority-minority relations in interwar Europe. This has crystallised into a project entitled The Myth of Homogeneity (MoH), which I began at the Geneva Graduate Institute and I am finalising at the Complutense University of Madrid (UCM). Until now, this has led to the publication of four peer-reviewed articles in international journals and one edited volume (all in the last two years, which bears witness to my academic productivity). These publications have contributed to re-writing the history of minorities in interwar Europe as a pan-European phenomenon, rather than one that concerns only Central and Eastern Europe. Most of these works have appeared in prestigious journals such as The Historical Journal, The Nationalities Papers and European History Quarterly, which is a guarantee of their standard of quality. In the last year, I have written three more articles that are currently under review at the journals Ayer, Contemporary European History and Past & Present. I have also finalised my second monograph (as part of the MoH project) and I am in the process of approaching a publisher.

My second line of research, developed during my PhD and in the first two years after it, has focused on the “resurgence” of nationalism in the last quarter of the 20th century, notably on a peculiar type of nationalist ideology that I have called the “nationalism of the rich” (NoR). This has led to the publication of my first monograph and nine peer-reviewed articles in international journals. These publications have contributed to explaining why nationalism has become a more visible force in Europe in the last quarter of the 20th century and the early 21st. My PhD thesis and my first book have won awards at the Geneva Graduate Institute and the University of Geneva. The book has been defined as “an indispensable academic tool for all students of nationalism”.

The new line of research that I would like to develop during my fellowship will consist in a global conceptual and political history of minority as a category of practice from the 1930s to the 2000s in Europe, North America and India. The project suggests the category of minority, which was dominant in interwar European discourses about diversity, was progressively abandoned in the old continent after 1945, but it simultaneously acquired salience in the United States where it shaped debates on intergroup relations from the early 1960s. Furthermore, minority became again a driving term in European debates not from the 1990s (as it is often suggested in the historiography), but already from the late 1970s, with greater emphasis on non-discrimination and a broader scope that included migrants and groups defined around gender. I suggest that following the itinerary of the concept of minority can illuminate shifts in the perception of difference in various societies in the second half of the 20th century. More concretely, the project can illuminate current debates about diversity and inclusion. By extending the analysis beyond the Euro-Atlantic world, it can also allow us to study alternative vocabularies of diversity in postcolonial contexts that have resisted the (neither natural nor neutral) categories of majority and minority.

Resumen del Currículum Vitae:

I am an historian of 20th century Europe specialised in the history of nationalism, minorities, human rights and the welfare state. I privilege international, comparative and transnational approaches. I taught and conducted research at 10 universities in 6 countries including: the Geneva Graduate Institute of International and Development Studies, the London School of Economics, Boston University, Sciences Po Paris and KU Leuven. I have thus built a broad network of contacts and collaborations with fellow historians across Europe and North America. Through these experiences I have also learned several languages. I am fluent in English, French, Italian and Spanish. I can read Dutch and Catalan. I have a lower-intermediate proficiency in German.

I have obtained multiple grants from the Swiss National Science Foundation (SNSF) (the grant that I obtained with Davide Rodogno at the Geneva Graduate Institute was worth more than 500,000 euros) and the EU’s Horizon 2020 Programme. In terms of leadership, I coordinated a research team (at the Geneva Graduate Institute). I also played a leading role in several collaborative publications (both disciplinary and interdisciplinary), including the organisation of a special issue of the prestigious journal Nations and Nationalism and of an edited volume with contributions from important historians such as Omer Bartov, Pieter Judson and Xosé Manoel Núñez Seixas. I have also organised four international conferences/workshops and I am a member of multiple research centres and networks.

Furthermore, I have a solid teaching experience. I have conceived, prepared and delivered various types of courses, including general courses in contemporary history and specialised courses on the history of nationalism and the history of human rights, at universities in different countries (the Geneva Graduate Institute, the University of Geneva, and the Complutense University of Madrid). I have taught both big bachelor’s degree classes (50-115 students) and seminar-like courses to small groups (5-10) within master programmes. Hence, I am at ease with different audiences, formats and languages of instruction.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: MORALES HIDALGO, JUAN IGNACIO
Referencia: RYC2024-048167-I
Correo Electrónico: jignacio.morales@gmail.com
Título: Under Pressure: Technological innovation and Adaptive Responses of Pleistocene Humans

Resumen de la Memoria:

My research explores the technological evolution, adaptation, and innovation of Pleistocene humans. I specialize in developing and applying innovative quantitative approaches to the study of lithic assemblages, leveraging 3D modeling and statistical analysis, and focusing on two pivotal research contexts: (1) the emergence and cultural evolution of Homo sapiens in Africa, and (2) the biogeography and technological evolution of Neanderthals in Iberia. I pioneered the application of these methods in the national research context, and pursuing the consolidation of the Spain's first specialized research group in this field. These research lines have been further enriched through national and international collaborations, encompassing fieldwork and research projects in regions such as Spain, Morocco, Equatorial Guinea, Egypt, and Argentina.

Building on these research lines I have generated key relevant contributions:

1. Through Quantitative Technology, I have advanced methodological frameworks in how lithic artifacts are studied globally. My research has set new standards in understanding reduction intensity, mobility patterns, and site formation processes. Training early-career researchers and organizing international symposia have established this approach as central to lithic analysis.
2. In Africa, my work in Equatorial Guinea and Morocco is unveiling the adaptive strategies of early Homo sapiens across diverse ecological landscapes. By addressing the technological adaptation of humans in tropical rainforests and semi-arid regions, my research underscores the resilience and adaptability of Homo sapiens to overcoming environmental challenges.
3. In the field of Neanderthal studies, my excavations at Cova Simanya represent a significant contribution in the understanding of Neanderthal biogeography through the discovery of the largest Neanderthal assemblage in the region. This opens new research avenues for exploring their symbolic behavior, demographic dynamics, and interactions with their environment.
4. The Middle-to-Upper Paleolithic Transition remains a focal point of my research, with key findings at Cova Foradada redefining the spatial and temporal boundaries of the Châtelperronian and Early Aurignacian cultures, contributing to a broader understanding of cultural transitions during the Upper Pleistocene.

My career has been marked by progressive institutional milestones that highlight both research leadership and academic impact. At IPHES-CERCA, under the Maria de Maeztu Unit of Excellence (2022-2024), I led research that culminated in the discovery and publication of the Simanya Neanderthals. During my tenure at the University of Barcelona (2017-2021) through the Juan de la Cierva programs, I directed projects at key sites such as Cova Foradada, contributing to debates on Paleolithic transitions.

Competitive funding from both public and private sources, and international collaborations with institutions like the University Mohammed Premier, the National University of Equatorial Guinea, and the Tropical Archaeology Lab at the U. of Calgary have expanded my research scope, enabling multidisciplinary studies on Homo sapiens' adaptability to diverse ecological contexts. These partnerships, have supported fieldwork and interdisciplinary research, reflecting my capacity to lead impactful projects while fostering global scientific networks.

Resumen del Currículum Vitae:

My research focuses on the technological evolution, adaptability, and innovation of Pleistocene humans facing two critical contexts: (1) the emergence and cultural evolution of Homo sapiens across Africa, and (2) the biogeography and technological transitions of Neanderthals and early Homo sapiens. I have authored over 107 scientific publications (h-index: 24, >2.000 citations), including articles in leading journals such as Science, Science Advances, PLoS ONE, or Frontiers in Earth Science. Key contributions include:

Human Adaptation in Africa: Led excavations in Equatorial Guinea's tropical rainforests and Morocco's semi-arid regions, establishing robust chronological frameworks for Middle Stone Age sites. These studies provide critical insights into Homo sapiens' ecological adaptability to diverse environments.

Neanderthals in Iberia: Directed research at Cova Simanya, unearthing the largest collection of Neanderthal remains in NE Iberia.

Middle-to-Upper Paleolithic Transition: Discovered the southernmost evidence of Châtelperronian and Early Aurignacian cultures at Cova Foradada, reshaping our understanding of Neanderthal extinction and early symbolic behavior.

I have led funded research across Europe and Africa, fostering international collaborations and advancing archaeological methodologies through innovative material analysis techniques and fieldwork recording systems. Committed to open science, I ensure public access to publications, datasets, and models via platforms like Zenodo.

My research connects archaeology with society through heritage conservation, technology transfer, and public engagement. Collaborations with public administrations and private entities have resulted in museum exhibitions, interpretative trails, guided tours, 3D reconstructions of archaeological sites, and digital tools for local communities. Educational programs like "Apadrinem el nostre Patrimoni" promote social inclusion and cultural awareness, securing over €120,000 for site conservation, sustainable tourism, and educational initiatives, reflecting my commitment to cultural sustainability and public education.

I have supervised one award-winning PhD and currently mentor two PhD candidates and several master's theses. Combining hands-on excavation experience from over 45 campaigns with advanced laboratory training, I equip students with skills in lithic analysis and documentation methodologies. By fostering international collaborations, I help mentees publish in high-impact journals and access interdisciplinary networks, enabling them to secure competitive grants and establish independent research careers.



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Recognized as an independent researcher through the R3 Certificate, I lead innovative projects, mentor early-career scientists, and drive impactful research aligned with the Ramón y Cajal program. My achievements include the European Commission's Seal of Excellence (2018, 2019), Juan de la Cierva Grants, and the Extraordinary Doctorate Award, supported by certifications from ANECA and AQU Catalunya. Active in international PhD panels and evaluative committees, I foster global research initiatives and cross-regional scientific networks through collaborations with institutions in Africa, Europe, and North America. These efforts reflect my commitment to advancing knowledge transfer, open science, and interdisciplinary collaboration.



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Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: CASTILLO CAÑIZ, ASSUMPCIÓ
Referencia: RYC2024-048634-I
Correo Electrónico: assum.castillo@gmail.com
Título: Violencia política, maniobras estatales de desarme y rearme de la población civil y planteamientos corporativistas en España desde una perspectiva global (1867-1936)

Resumen de la Memoria:

La solicitante cursó su doctorado entre 2017 y 2021 en la Università degli Studi di Padova dentro del proyecto ERC The Dark Side of the Belle Époque. Political Violence and Armed Associations before the First World War. Obtuvo el título de doctora en mayo de 2021, con una calificación de excelente cum laude. A lo largo de 2021 fue investigadora posdoctoral en la misma universidad, dentro del proyecto Un monopolio fragile? Armi da fuoco, legittima difesa, porto d'armi e monopolio statale della violenza legittima in Italia, Spagna e Regno Unito (1860-1960). En 2023 inició un contrato posdoctoral Juan de la Cierva Formación en la Universitat de Girona, donde entró a formar parte del proyecto La democracia y sus enemigos (1918-1931): España, la primera posguerra, la dictadura de Primo de Rivera y sus articulaciones con Italia, Portugal y Argentina. Recientemente, Castillo ha obtenido un contrato posdoctoral en la Università degli Studi di Padova, dentro del proyecto ERC EU-GUNS ¿A Continent Disarmed? Gun Culture, Gun Control and the Making of Western Europe (ca. 1870-1970).

En el marco de cada uno de estos proyectos, la solicitante realizó en primer lugar una tesis doctoral sobre grupos armados que ejercieron funciones de orden público en paralelo a las instituciones estatales en España y en Portugal durante el periodo 1867-1914. Posteriormente, merced a un primer contrato posdoctoral, la investigadora solicitante abordó la cuestión de la circulación de armas y las políticas estatales de control de armamento en España, particularmente durante el periodo tardorrestauracionista. Más recientemente, la solicitante entró a formar parte de un proyecto cuyo cometido era, entre otros, estudiar la dictadura primorriverista y los nuevos regímenes contemporáneos a partir de su evolución desde la crítica a la democracia hasta el tránsito hacia una democracia orgánica.

Por otro lado, la trayectoria de la solicitante se ha distinguido hasta la fecha por el trabajo realizado en torno a dos líneas de investigación: 1) orden público, grupos armados y circulación de armas a caballo entre los siglos XIX y XX, con particular atención en los casos español y portugués; y 2) una segunda línea de investigación en torno al movimiento anarcosindicalista español, en particular durante los años treinta, comprendido el periodo de la guerra civil española. En ambos casos, el trabajo desarrollado se inserta en una perspectiva de renovación historiográfica y tiene como objetivo situar los casos peninsulares en un escenario global.

Actualmente, a través del encaje entre las líneas del último proyecto y los ejes de investigación llevados a cabo hasta ahora, la solicitante se plantea dos objetivos de estudio: a) El análisis de un discurso antipolítico por parte de los sectores patronales español y portugués dentro de un marco global, continental y mundial, basado en la impugnación de los principios democráticos, del parlamentarismo y del reformismo social; b) Analizar pormenorizadamente una de las principales inquietudes del sector patronal y propietario que más explican su deriva hacia posiciones ultraconservadoras en ambos países, siempre teniendo presente una dimensión transnacional: la del mantenimiento del orden público, cuestión concebida cada vez más en términos de autodefensa propietaria y en términos antidemocráticos y de disciplinamiento social y productivo.

Resumen del Currículum Vitae:

La solicitante cursó sus estudios de doctorado entre 2017 y 2021 en la Universidad de Padua dentro del proyecto ERC The Dark Side of the Belle Époque. Political Violence and Armed Associations before the First World War. Obtuvo el título de doctora en mayo de 2021, con una calificación de excelente cum laude. A lo largo de 2021 fue investigadora posdoctoral en la misma universidad, dentro del proyecto Un monopolio fragile? Armi da fuoco, legittima difesa, porto d'armi e monopolio statale della violenza legittima in Italia, Spagna e Regno Unito (1860-1960). En 2023 inició un contrato posdoctoral Juan de la Cierva Formación en la Universitat de Girona, donde entró a formar parte del proyecto La democracia y sus enemigos (1918-1931): España, la primera posguerra, la dictadura de Primo de Rivera y sus articulaciones con Italia, Portugal y Argentina. Recientemente, Castillo ha obtenido un contrato posdoctoral en la Universidad de Padua, dentro del proyecto ERC EU-GUNS ¿A Continent Disarmed? Gun Culture, Gun Control and the Making of Western Europe (ca. 1870-1970).

Ha participado en diversos congresos internacionales y ha publicado trabajos sobre la violencia política de finales del siglo XIX y primer tercio del XX, sobre el desarrollo de las culturas políticas antidemocráticas y sobre el discurso y tejido de alternativas colectivas al modelo capitalista occidental durante el siglo XX. Sus publicaciones incluyen un artículo en una revista indexada en Scopus (Q1), dos artículos en una revista indexada en JCR (Q2) y Scopus (Q1) y un artículo en una revista indexada en JCR (Q1) y Scopus (Q2). También un capítulo de libro en un volumen colectivo publicado en una editorial internacional que ocupa el puesto 2/76 en Historia (SPI 2022), editorial en la que publicará próximamente una monografía basada en su tesis doctoral. Recientemente, ha coordinado dos dossieres monográficos en dos revistas españolas clasificadas en el Q1 en el índice JCR y Q2 en Scopus, y Q1 en Scopus y Q2 en JCR, respectivamente, dossieres que verán la luz a lo largo de este 2025. Desde 2014 hasta la actualidad, ha sido también revisora de nueve propuestas de artículo para cinco revistas académicas, entre ellas una revista indexada en el Q1 de Scopus, una revista indexada en el Q2 de JCR y el Q2 de Scopus y una revista indexada en el Q2 de Scopus, además de una propuesta de libro para una editorial universitaria. Por otro lado, desde enero de 2015 y hasta diciembre de 2022 ha sido miembro del Consejo Redactor de la Revista Universitaria de Historia Militar (Q4 JCR). En diciembre de 2022 pasó a formar parte del consejo editor de la revista.

Está desarrollando una carrera con una fuerte proyección internacional: ha estado vinculada a instituciones académicas de tres países (España, Italia y Portugal), ha realizado su trayectoria doctoral en el marco de un grupo de investigación financiado por el ERC, cuyo enfoque comparativo y transnacional implicaba el estudio de caso de siete países distintos (Italia, Reino Unido, Austro-Hungría, Alemania, Francia, España y Portugal), y está



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realizando parte de su investigación posdoctoral en una universidad extranjera, nuevamente en el marco de un proyecto europeo. Por último, es importante señalar que compagina sus actividades estrictamente académicas con actividades de divulgación dirigidas a un público más amplio.



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Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: MORELL ROVIRA, BERTA
Referencia: RYC2024-050576-I
Correo Electrónico: morell.berta@gmail.com
Título: Chronology, mobility, and dietary patterns of Neolithic communities in Central Europe and the Western Mediterranean. Scientific outreach targeting groups at risk of social exclusion.

Resumen de la Memoria:

I hold a PhD in Prehistoric Archaeology from the Autonomous University of Barcelona (2019) and specialize in Neolithic funerary contexts in Central Europe and the Western Mediterranean. My research integrates 14C dating, Bayesian modelling, and isotopic analyses ($^{87}\text{Sr}/^{86}\text{Sr}$, $\delta^{13}\text{C}$, $\delta^{15}\text{N}$) to investigate the temporal dynamics, mobility, and dietary patterns of early farming communities. By combining these methods, I have developed a multi-proxy approach to understanding Neolithic societies and their transformation with the adoption of agriculture and livestock.

My work has significantly advanced the field, challenging traditional interpretations of Neolithic funerary practices and mobility. In northeastern Iberia, I identified temporal discontinuities that questioned periodizations based on chrono-typologies. In Central Europe, I reevaluated theories linking mobility to patrilocal exogamy, demonstrating instead that mobility was tied to short-distance subsistence activities. These findings have redefined how we understand burial practices, dietary and mobility in Neolithic communities.

I am one of the few specialists integrating these methods in Spain and pioneering the chronological analysis of funerary contexts in the Iberian Peninsula using Bayesian modelling and 14C data.

The recognition of my research is evident in 25 peer-reviewed articles (19 in Q1 journals), co-editing a book on chronological methods (Barceló & Morell, 2020), and six book chapters with leading academic presses. I have delivered over 35 presentations at conferences (30 international) and am editing a volume with Oxbow Press to be published in 2025. My h-index is 10 (Google Scholar, 315 citations), reflecting the impact of my work.

International mobility has been a cornerstone of my career, with 34 months of research stays at institutions such as the University of Tübingen, the Max Planck Institute, and the University of Cologne. These stays were pivotal in mastering advanced analytical techniques and fostering collaborations with U. York, U. Basel, and the Moravian Museum. In 2024, I was awarded a Fulbright Fellowship to train in dental micro-texture analysis (DMTA) at Loyola University Chicago, further advancing my expertise and expanding my methodological scope.

My independence and leadership are demonstrated by securing 7 competitive research projects as PI or Co-PI, totalling 172.776,24€. I lead a Generación de Conocimiento 2023 project, heading a multidisciplinary team of 9 experts from institutions such as U. Glasgow, U. Tübingen, and Loyola U. Chicago. This project investigates the intersection of mobility and dietary patterns in Neolithic communities using innovative techniques like DMTA. Beyond research, I am dedicated to outreach and inclusion. As PI of projects funded by FECYT and FCRI, I have developed initiatives for socially excluded groups, such as incarcerated individuals, to make Science accessible. I also created open-access tools like the AgriChange 14C Database. These efforts reflect my commitment to open science and education.

My trajectory highlights a dedication to advancing Neolithic studies through interdisciplinary approaches, fostering collaborations, and engaging diverse audiences. My future goals include consolidating my research line, expanding bioarchaeological methodologies in Spain, and mentoring the next generation of researchers.

Resumen del Currículum Vitae:

I am an archaeologist specializing in how the adoption of agriculture and livestock impacted past human communities in the Western Mediterranean and Central Europe. My expertise lies in integrating radiocarbon dating (14C), Bayesian modelling, and isotopic analyses ($^{87}\text{Sr}/^{86}\text{Sr}$, $\delta^{13}\text{C}$, $\delta^{15}\text{N}$), enabling groundbreaking insights into the temporal dynamics, mobility, and dietary patterns of Neolithic societies. These methods have allowed me to refine funerary chronologies, and reassess periodizations based on chrono-typologies. Moreover, my research has redefined Neolithic funerary practices, uncovering temporal discontinuities and challenging the notion of cemeteries as static sites, long-term sites for sedentary communities. In Central Europe, my work questioned the theory of patrilocal exogamy, demonstrating that mobility was more closely tied to short-distance subsistence activities than kinship structures. These findings have reshaped interpretations of burial practices, mobility, and exchange networks, contributing to a paradigm shift in the field.

The impact of my research is demonstrated by 25 articles (19 in Q1 journals), six book chapters with prominent publishers, over 35 oral communications at conferences (30 international), and co-editing a book on chronological analysis (Barceló and Morell, 2020). I am currently editing another book with Oxbow Press, scheduled for publication in 2025. My h-index is 10 (Google Scholar, 315 citations) reflects the influence of my work.

I have completed 34 months of international research stays, including postdoctoral fellowships at the University of Tübingen, the Max Planck Institute, and the University of Cologne. These stays provided access to leading laboratories and collaborations with institutions like U. York, U. Basel, the Moravian Museum, among others. In 2024, I was awarded a prestigious Fulbright Fellowship for a research stay at Loyola University Chicago in 2025, where I will train in dental micro-texture analysis, further advancing my expertise in dietary studies.

My independence and leadership are demonstrated through securing seven research projects (four internationals, three nationals) as PI and co-PI, totalling 172.776,24€. I am currently the sole PI of a "Generación de Conocimiento 2023" project, leading a multidisciplinary team of nine experts from institutions such as U. Glasgow, U. Pisa, U. Tübingen, and Loyola U. Chicago. I have also contributed to national and international scientific committees, reviewed articles for high-impact journals (Q1, JAS), and evaluated projects for the AEI.

I actively engage in outreach and education, giving courses and seminars at Universities like U. York, U. Tübingen, and U. Cologne. I co-supervise the undergraduate thesis of Carla Queralt (UDL) and, as a founding member of the IMF-CSIC Mentoring Group, I actively promote the academic development of emerging scholars.

Additionally, I am committed to open science, demonstrated by the creation of the open-access AgriChange 14C Database (975+ downloads on Zenodo). I have also led dissemination projects funded by FECYT and FCRI, focusing on engaging vulnerable groups, including individuals in penitentiary centres. These initiatives demonstrate my commitment to public engagement, education, and making archaeology accessible to diverse audiences.



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Área Temática: Estudios del pasado: historia y arqueología
Nombre: LE MAIGNAN DE KERANGAT, ZOÉ
Referencia: RYC2024-049927-I
Correo Electrónico: zoe.kerangat@gmail.com
Título: Mass graves exhumations in Spain from a historical perspective: Memory, Care, Women

Resumen de la Memoria:

My research field is Memory Studies and as such is transdisciplinary, bridging Contemporary History and Social Anthropology mainly. I have become specialized in the study of mass grave exhumations in Spain from a historical perspective. In this sense, my research contributes to the study of the Spanish transition, since the analysis of the exhumations of the 1970s and 1980s in Spain provides an enlightening perspective on this period, showing that the practices in relation to the victims of Francoism that took place from below actually dismantle the idea of a tacit "Pact of Silence" and of a consensus. From there, I have also specialized in the analysis of women in relation to memory practices and mass graves of violence. In order to build this last analysis, I also develop a theoretical approach to the notion of care in relation to memory and remembrance.

Since I started my research career in 2012, I have been organising academic activities and events. I have organised several workshops, two international conferences as part of the scientific and organising committees, PhD training schools, and coordinated two seminar series. I have also coordinated two projects:

(1) "Culturas de la memoria", funded by the Memoria Democrática subventions of the Ministerio de la Presidencia (4000€). The aim of the project was to publish the collective volume *Culturas de la memoria en España. Genealogías, evocaciones y contratiempos* (Catarata, 2024). To this end, we organised the conference "Culturas de la Memoria en España. Imaginarios, genealogías y des/Encuentros" in September 2023.

(2) EXHUMA, of which I am co-PI with the French anthropologist Dorothée Delacroix. The project focuses on the cases of "failed exhumations" in different European countries, including Spain. We managed to secure 9000€ (2024-2026) from the Ecole des Hautes Etudes Hispaniques et Ibériques - Casa de Velázquez through their scientific programme. We also received funding from the Maison des Sciences de l'Homme - Paris Nord (8000€, 2024-2025). Our tasks in this project consist of the scientific and practical organisation of different activities such as workshops, conferences, fieldwork and will result in several high impact publications in Spanish, French and English.

The aim of this new project is to develop and deepen three lines of research that I have opened up within the analysis of mass grave exhumations, but which require further research: Care, Women and Public History. As such, they follow on from the foundational work of my PhD, but also open up new paths of reflection that have emerged in the context of the postdoctoral period and as a result of various collaborations. The main differences with my previous trajectory will be in terms of leadership, seeking to lead larger projects. In this sense, the general objectives of this project are to extend the analysis geographically and to involve more international researchers, maintaining and expanding the existing research networks through different collaborative projects. All in all, the expected results include publishing a special issue and several high impact articles, a documentary, a book, and a Spanish I+D+i project leading to the submission of an ERC project.

Resumen del Currículum Vitae:

PhD in Contemporary History (UAM/CISC, 2020), I am currently a UNED postdoctoral researcher in the Department of Contemporary History. My research focuses on the analysis of mass grave exhumations in Spain, especially those that took place in the 1970s and 1980s. This contributes to filling an important gap in research on memory and exhumations in Spain during the transition to democracy, as well as developing ideas in line with a critical perspective. More recently, I have developed a line of research on the role of women in the memory of mass graves. Both my academic training and my research interests have led me to work in a transdisciplinary way, mainly in History and Social Anthropology, but also very much linked to Memory Studies. The results of this research have been made available in several high impact publications (JCR Q1), including two books (Comares, 2023 and Brill, 2025), and a large number of academic presentations.

During these years of research experience, including one pre-doctoral and three post-doctoral contracts, I have consolidated various scientific skills, ranging from writing and publishing results to organising scientific events. I have also gradually acquired a more consolidated status as a researcher and taken on scientific responsibilities, especially in planning, organising and running scientific events. In 2024, I took the lead of an international research project when I became co-PI of the EXHUMA project, for which we managed funding from two institutions. I am also co-editor of the journal *Espacio, Tiempo y Forma* (serie V Historia contemporánea).

I have an international profile: I come from a French background and did my undergraduate degree at University College Utrecht in the Netherlands. After completing my Master's degree at the UCM in Spain, I began developing a research project on memory discourses in museums in Spain at the University of Portsmouth (UK) from 2012 to 2014 (17 months). In 2015, I benefited from a 3-month research stay (funded by a competitive call) at the Centro de Investigaciones Sociales in Buenos Aires. During my postdoctoral career, I have been particularly interested in promoting international scientific collaboration. I have participated in a European project (UNREST) and two European COST Action networks (ISTME and TRACTS), as well as several national projects with an international team and scope, including the EXHUMA project, which I coordinate. I have co-organised several international scientific events, including two international conferences (Madrid 2015, Donostia 2018). In addition, at the beginning of 2025, I carried out a 3-month research stay at the Université Bordeaux Montaigne. Finally, I have presented and published my results in Spanish, English and French and in different countries and continents, allowing for a wide dissemination.

Since the beginning of my research career, I have been actively involved in a large number of dissemination initiatives. I have organised and participated in events aimed at the general public, including public talks, an exhibition (Matadero 2016), guided visits, film screenings, media interviews and courses



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(Memorias en Red 2018, Museo Nacional de Antropología 2019). In terms of innovation, I am also a member of a teaching innovation project at UNED since 2023. One of my lines of research is also related to Public History.



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Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: GREGÓRIO DE SOUZA, JONAS
Referencia: RYC2024-049010-I
Correo Electrónico: jonas.gregorio@gmail.com
Título: Integrating Multidisciplinary Data to Reconstruct South America's Ethnolinguistic Past

Resumen de la Memoria:

Throughout my career, I have explored the dynamic interplay between human populations, cultural practices, and environmental changes in shaping the diverse ethnolinguistic landscapes of South America. My research integrates archaeology, linguistics, and computational approaches to address fundamental questions about the origins and evolution of human societies in the neotropics. Using innovative methods such as agent-based modeling, Bayesian phylogenetics, and machine learning, I have contributed significantly to understanding demic diffusion processes, cultural resilience, and the impact of environmental changes on societal development. My work has been disseminated in high-impact journals, including Nature Communications, Science, and PLOS ONE, and has consistently adhered to open science principles, ensuring that data, methods, and tools are accessible to the global research community.

In the early stages of my career, I focused on archaeological modeling and the role of demic diffusion in the spread of cultures and language families, such as the Tupí-Guaraní expansion. This led to groundbreaking insights into the connections between radiocarbon chronologies, climatic changes, and migration patterns. Subsequently, I expanded my scope to include interdisciplinary collaborations with linguists and geneticists, producing integrative frameworks that combine archaeological, linguistic, and genetic data. These collaborations have illuminated the complex evolutionary trajectories of South America's ethnolinguistic groups and agricultural practices, such as the secondary domestication of maize.

Building on this foundation, my proposed research line seeks to integrate multidisciplinary datasets to reconstruct the origins of South America's lowland ethnolinguistic landscape. While my previous research focused on computational simulations and hypothesis testing, this project will leverage recent advancements in artificial intelligence and machine learning to unify big data across archaeology, linguistics, genetics, and paleoecology. Key objectives include refining chronological models for archaeological cultures, integrating these timelines into linguistic phylogenies, and developing new computational frameworks to model scenarios of cultural diffusion. These innovations aim to bridge disciplinary divides, providing a holistic reconstruction of the processes that shaped the modern ethnolinguistic mosaic of the neotropics.

The expected outcomes include the creation of open-access datasets, computational tools, and interdisciplinary models that will transform our understanding of South America's past. By addressing long-standing questions about the region's cultural and demographic history, this research will significantly advance knowledge in archaeology, linguistics, and historical ecology, while promoting open science and fostering collaboration across disciplines.

Resumen del Currículum Vitae:

Dr. Jonas Gregorio de Souza is an archaeologist with extensive expertise in computational approaches, Geographic Information Systems (GIS), and modeling techniques applied to archaeological research. With a strong foundation in the archaeology of tropical South America, his research primarily focuses on the emergence of complex societies, pre-Columbian population dynamics, and their interactions with climatic and environmental changes. Dr. de Souza earned his PhD in Archaeology from the University of Exeter, where he investigated settlement dynamics in the southern Brazilian highlands. His dissertation, supported by a Wenner-Gren Dissertation Fieldwork Grant, provided the first fine-grained chronology for pit house villages in the region. Building on this work, he has since expanded his research to examine population expansions and collapses across lowland South America, leveraging computational modeling and radiocarbon data as proxies for demographic and environmental trends. In his postdoctoral career, Dr. de Souza has been involved in multiple high-profile international projects. At the University of Exeter, he contributed to the AHRC-FAPESP Jê Landscapes Project and the ERC PAST Project, integrating archaeological, paleoecological, and remote-sensing data to model human-environment interactions. His contributions include developing predictive models for the distribution of archaeological sites, exploring climate-driven human migrations, and testing hypotheses on anthropogenic landscape changes. These efforts have resulted in numerous publications in leading journals, such as Nature Communications, Science, and Nature Ecology and Evolution. As a Marie Skłodowska-Curie Fellow at Universitat Pompeu Fabra, Dr. de Souza led the ExPaND project, which compiled the largest radiocarbon dataset for the late Holocene in the Neotropics. Using agent-based models, he simulated demic diffusion processes and compared these scenarios with empirical data. This project also fostered interdisciplinary collaborations, including work with linguists and archaeologists across Europe and South America. Dr. de Souza's international experience extends beyond South America. As a researcher in the Arcadia-funded MAHSA project, he applied remote sensing techniques to map archaeological sites in South Asia, broadening his methodological expertise and contributing to global archaeological research. Currently, he manages the Arcadia-funded MAPHSA project, coordinating a team across four countries to create an open-access database of South American archaeological sites, further advancing open science principles. Beyond research, Dr. de Souza has contributed to academic development through teaching and mentorship. He has lectured on prehistory, archaeology, and GIS at institutions in Brazil and Spain, addressing gaps in digital humanities education. His leadership in integrating computational methods into archaeological pedagogy underscores his commitment to advancing the field.



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Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: RUFÀ BONACHE, ANNA
Referencia: RYC2024-048749-I
Correo Electrónico: arufabonache@gmail.com
Título: Expanding perspectives about the role of small prey in the Iberian Palaeolithic

Resumen de la Memoria:

Throughout my research career, I have been actively engaged in international collaborations and have contributed significantly to the evolution of my research field on small prey analysis. Since I started my PhD studies, I have been collaborating with respected international researchers. I had established connections with researchers at the MNHN of Paris, as part of my PhD work at the sites of Payre, Abri des Pêcheurs and Grotte des Barasses II. Also, as part of my commitment to international scholarly exchange, I took part in organising sessions at international meetings and conferences. Post-PhD, during my time at PACEA-UMR5199 and ICArEHB, I deepened my expertise in bird taphonomy, fostering collaborations and leading the "BirdTaph" project, where I could explore the study of bird remains from a neo-taphonomic perspective. It has allowed me to search for potential factors that could help in the diagnosis of small prey accumulations produced by different types of predators (including humans). This endeavour resulted in publications, and presentations at international meetings, but also consolidated collaborations with researchers at the PACEA UMR-5199 and the CEPAM UMR7264 laboratories for the study of bird remains from Tourtoirac and Lazaret archaeological sites. Transitioning to ICArEHB in 2021, I expanded my fieldwork projects, collaborating on the faunal analysis at different archaeological sites in Portugal (e.g. Vale Boi, Lapa do Picareiro or Cabeço da Amoreira), and opening new research perspectives in the Cantabrian region in collaboration with the University of Salamanca, among others.

As part of my commitments in ICArEHB, since 2023, I have coordinated the research theme "Dynamics of Palaeolithic People in Eurasia" at the centre, showcasing leadership and engagement in research and knowledge transfer activities. My involvement in organising workshops like the training on Advanced Methods in Zooarchaeology, and my active participation in scientific associations underline my commitment to the field.

As an independent researcher, I have secured competitive projects, emphasising my roles in neo-taphonomy, Palaeolithic archaeology, and small prey analysis. In the academic realm, I have served as a professor, course coordinator, and supervisor. I also contributed to recognised academic institutions, reflecting my dedication to education.

Looking ahead, I now want to expand my research perspective and include new ways to analyse small prey archaeological assemblages. The inclusion of new experimental protocols, as well as the application of multidisciplinary methods (e.g. the incorporation of GIS in taphonomic studies) are areas to be explored. The unique conditions of the Iberian Peninsula provide an ideal setting for studying small prey accumulation dynamics. The complete quantitative and qualitative data available at different sites in the region will allow the development of new research lines that, for sure, will contribute to the understanding of population dynamics during the Palaeolithic period.

Resumen del Currículum Vitae:

Having completed my PhD at Institut Català de Paleoecologia Humana i Evolució Social (IPHES)-Universitat Rovira i Virgili (URV) in 2013, I embarked on a journey of international mobility that significantly enriched my academic and research pursuits. Already during my doctoral studies, I undertook a research stay at the MNHN of Paris, consolidating my skills on the study of small prey, and where I have started collaborating with international researchers. This was followed by post-doctoral roles at the PACEA-UMR5199 lab (Université de Bordeaux, France), and at ICArEHB (Universidade do Algarve, Faro, Portugal), where I started developing my own research lines on small prey taphonomy and applying new neo-taphonomic methodologies to the study of the archaeological record. These experiences fostered collaborations with researchers from diverse institutions in Spain and abroad, leading to a robust network and solidifying my status as an experienced researcher.

The result of this collaborative effort has already culminated in 51 publications, with at least half of them accessible in open access. It comprises 31 papers in peer-reviewed journals, 3 papers in non-peer-reviewed journals, four book chapters, nine papers in conference proceedings, the co-edition of one conference proceeding book and the publication of three pre-prints/data files in open repositories. Those contributions received a total of 551 citations (2014-2025) and an H-index of 14 (Google Scholar, January 2025). Furthermore, I actively presented my research at 31 national and international conferences and organised conferences and sessions in international meetings. I also served as a reviewer for 14 peer-reviewed journals, and I have contributed as a jury member in different evaluation panels (for research grants and PhD thesis).

As part of my consolidation as a researcher, in 2023 I started management commitments at ICArEHB, assuming the new role of Theme Coordinator for the Dynamics of Palaeolithic People in Eurasia group, tasks that also involve commitments as part of the board of directors at the same centre. My responsibilities encompass coordinating student affairs. In addition, since 2018, I also co-direct fieldwork excavations at Toll and Teixoneres sites, and I contribute to the study of faunal remains at various sites in Spain, Portugal, and France.

Alongside my research commitments, I have actively engaged in university lecturing since my doctoral training, teaching at URV and later at Universidade do Algarve (UALg). I am also involved in thesis supervision, co-supervising two PhD students (UALg), two master students (one at UALg and one at Université de Bordeaux), and an undergrad student (UALg). In addition, I have been officially qualified with the tenure-track Lector accreditation by different higher education entities. Since 2018, I have also supervised undergraduate, master and PhD students, and post-doctoral research stays at IPHES and ICArEHB. My involvement in outreach includes participation in open days, science fairs, Science Week, the European Science Night or the Half Pint of Science Faro initiatives, showcasing a commitment to sharing scientific knowledge with the broader community. As a member of ICArEHB, I co-organise the ICArEHB Dialogues and have contributed to the creation of science outreach initiatives.



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Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: AMICONE, SILVIA RITA
Referencia: RYC2024-048478-I
Correo Electrónico: silvia.amicone.83@gmail.com
Título: Craft, Connectivity, and Cultural Transformation in the Iron Age Mediterranean
Resumen de la Memoria:

I am an archaeologist and materials scientist specialising in archaeometry and experimental archaeology. My research explores how ancient technologies shaped past societies, focusing on the intersections of craft production, cultural integration, and social transformation. Through leading interdisciplinary projects such as Crafts and the City and GraphTEC, I have successfully secured competitive funding and led diverse international teams, generating significant insights into prehistoric and early historic technological innovations.

International collaboration has been central to my career. I have built extensive research networks across Europe and beyond, fostering partnerships with leading institutions in Germany, Italy, Serbia, and Spain. My honorary affiliation with University College London and my role at the University of Tuebingen have enabled me to bridge disciplines and national borders, integrating scientific methodologies into archaeological research. Securing prestigious funding from the Baden Wurttemberg Foundation, the German Research Society (DFG), and the Gerda Henkel Foundation reflects my leadership in advancing innovative and impactful research.

Teaching and mentoring are equally vital aspects of my work. I founded and direct the Ceramic Petrography Laboratory at the University of Tuebingen, establishing it as a dynamic hub for interdisciplinary research and hands-on training in archaeometry and experimental archaeology. I have developed research-led teaching programmes that combine theoretical learning with practical experimentation, inspiring and mentoring students at all levels. My dedication to teaching has been recognised through student nominations for teaching awards, and I have actively supported my students in securing research funding and publishing in high-impact journals.

Looking ahead, I plan to expand my research in two primary directions. Firstly, I will investigate the role of craft technology in driving social transformation and cultural integration in the early Iron Age Mediterranean, incorporating gender archaeology perspectives to explore how gendered practices influenced technological exchange. Secondly, as a key investigator in the Experimental Studies in Ceramic Technologies, Innovation, and Art (ESTIA) project, I will advance experimental archaeology through hands-on reconstruction of ancient ceramic production techniques, securing significant funding to support this innovative research and mentor early-career researchers.

Spain offers an ideal environment for the next stage of my career. Its rich Iron Age heritage and vibrant research landscape provide the perfect setting to establish a cutting-edge research hub and interdisciplinary teaching programme. I am committed to fostering international collaboration, enhancing Spain's leadership in Mediterranean archaeology, and developing educational initiatives that connect archaeological research with broader societal interests. Through public engagement and innovative teaching, I aim to inspire the next generation of researchers and promote wider appreciation of Spain's archaeological heritage. My experience in leading research, fostering international partnerships, and integrating teaching with cutting-edge scientific methods positions me to make a lasting and transformative contribution to the fields of archaeology and archaeometry.

Resumen del Currículum Vitae:

I am a Lecturer and Researcher (Akademische Rätin) at the University of Tuebingen's Institute of Prehistory, Early History and Medieval Archaeology. My research bridges archaeology and material science, focusing on ancient ceramic technologies to explore cultural connections, trade, and technological transfer from the Neolithic to modern times across the globe.

I hold a PhD in Archaeology and an MSc in Technology and Analysis of Archaeological Materials from University College London, as well as an MA and BA in Archaeology and Classics from Università degli Studi di Milano. My work integrates archaeological theory with laboratory-based scientific analysis and experimental archaeology, enabling the accurate interpretation of ancient materials.

Over the past eight years, I have secured c. 900,000 Euro in funding from leading organisations, including the German Research Society (DFG), the Gerda Henkel Foundation, and the Baden-Wuerttemberg Foundation. I founded and currently manage Germany's first ceramic petrography laboratory, where I run several projects across 18 countries. My research has been widely published, with two books, two edited volumes as well as 32 articles and book 26 chapters in high-impact journals.

Knowledge transfer and public engagement are central to my work. I have delivered over 100 conference presentations and 41 invited talks and actively collaborate with museums, heritage institutions, and to make archaeology more accessible. Through experimental archaeology projects in Germany and Serbia, I engage local communities, students, and early-career researchers, fostering hands-on education, cultural exchange, and greater public appreciation of archaeology's relevance to contemporary issues such as cultural integration and sustainability.

Teaching and mentoring are integral to my academic career. I have developed and taught innovative courses at the University of Tuebingen, including modules on ceramic analysis, experimental archaeology, and online courses during the COVID-19 pandemic. I have supervised numerous students at all levels. Many of them have produced impactful theses and advanced into successful research careers. I also initiated a Memorandum of Understanding with University College London to promote collaborative research and academic exchange, enriching student opportunities.

Beyond my research and teaching, I actively contribute to the academic community. I mentor PhD and postdoctoral researchers, serve on departmental committees, and manage laboratory operations. I am a reviewer for 12 international journals and reviewer for the Israel Science Foundation. My administrative responsibilities include managing research laboratories, coordinating departmental planning, and advocating for student well-being, particularly for those facing cultural and institutional challenges.

Looking ahead, I am committed to increasing interdisciplinary research that bridges archaeology and material science while fostering an inclusive and supportive academic environment. My goal is to continue training the next generation of scholars, promoting innovation, collaboration, and societal impact through my work in research, teaching, and public engagement. I am committed to advancing academic knowledge while enriching public understanding and preserving cultural heritage.



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Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: HOFMANN, ANNA CATHARINA
Referencia: RYC2024-049613-I
Correo Electrónico: annacatharinahofmann@gmail.com
Título: Authoritarian Developmentalism in the 20th Century

Resumen de la Memoria:

Already during her time as a university student and research assistant, Anna Catharina Hofmann specialised in the comparative analysis of National Socialism and other mass dictatorships of the 20th century that pursued the ideal of 'authoritarian modernity'. She completed her PhD within the prestigious research group on the comparative history of 20th-century Europe, led by Ulrich Herbert at the Albert Ludwig University of Freiburg. After years of intensive on-site research in archives and libraries, combined with a thorough engagement with the latest studies on the history of 'development' after 1945, Hofmann presented a novel interpretation of the so-called Second Francoism in her doctoral thesis. By consistently situating the history of the dictatorship within the European and international context of the post-war period, she effectively demonstrated how the regime successfully re-legitimised itself both internally and externally, capitalising on the global enthusiasm for economic growth and 'development'. The revised version of her research was published in German (2019, Wallstein Verlag, Göttingen) and Spanish (2023, PUV, Valencia), garnering significant attention and receiving highly favourable reviews in both Germany and Spain. At the 53rd Historikertag in 2021, her book was honoured with the Hedwig Hintze Prize for the best doctoral thesis by the Association of German Historians (VHD). Building on the success of her book, she quickly established herself in Spain as an esteemed expert on the history of Francoist developmentalism and built up a solid network with Spanish colleagues. Since 2021, she has been gradually incorporated into seven different competitive research groups at renowned universities. As part of her work in these research groups, she has been able to expand upon many of the key findings from her doctoral thesis, drawing on new archival and library research. This activity has resulted, over the past three years, in eight publications in English and Spanish in indexed journals and academic anthologies, eight lectures at research seminars and four presentations at international conferences in Spain. Besides, she conceived and chaired congress panels and coordinated a special issue on Francoist developmentalism published in the academic journal *Historia del Presente*. By presenting her research at European conferences, discussing with recognised experts in the field, and intensively engaging with recent research she has substantially expanded the scope of her work. Her new project is aimed at writing a genuinely comparative and transnational study of developmentalism and planning in post-war Europe, drawing on the examples of three different political regimes: a right-wing authoritarian dictatorship with fascist roots (Spain), a democratic regime (Gaullist France) and a socialist dictatorship (Romania). Finally, she is deeply committed to fostering stronger connections between Spanish and German academia and to disseminating German scholarly debates and research findings in Spain. In this context, she has, for instance, published an article in the prestigious journal *Ayer* on the so-called Hohenzollern controversy and delivered a lecture on contemporary historical revisionism in Germany. To strengthen the ties between Spanish and German historiography, she also works as a translator of academic works.

Resumen del Currículum Vitae:

Anna Catharina Hofmann studied History and Romance Philology and Literature (Spanish/French) at the universities of Leipzig, Madrid (Complutense), and Freiburg. She worked as a research and teaching assistant in the Department of Contemporary History at the Albert Ludwig University of Freiburg and as research assistant and lecturer in the Department of 19th-Century European History at Humboldt University of Berlin. Additionally, she received scholarships from the Gerda Henkel Foundation and the Baden-Württemberg Graduate Fund. She is currently an research assistant and lecturer at Martin Luther University Halle-Wittenberg. With her innovative doctoral thesis on Francoist developmentalism, Hofmann has provided a new interpretation of this period, particularly by systematically situating the Franco regime within a European and international context. On the one hand, her work explains the regime's longevity, showing how it gained renewed internal and external legitimacy by 'reinventing' itself as a 'developmental dictatorship'. On the other hand, her focus on development policy as a central political field of the regime uncovered new factors contributing to its gradual decline. Her thesis was published in 2019 by the renowned Wallstein Verlag (Göttingen). In 2021, she was awarded the Hedwig Hintze Prize for the best doctoral thesis by the German Historians' Association. In 2023, her monograph *Una modernidad autoritaria. El desarrollismo en la España de Franco (1956-1973)* was published by PUV (Valencia). Although Hofmann built her academic career in Germany, she quickly established herself as a leading expert on the history of Francoism in Spain, building a strong network of collaboration with Spanish specialists. Following the success of her book, she was subsequently incorporated into a total of 7 state-funded research groups at renowned universities such as Complutense Madrid, Santiago de Compostela, Seville, UOC, Zaragoza, Valencia, and Granada. Her strong international profile is also evident in her 45 presentations in German, English, and Spanish at seminars and conferences across Germany, Austria, Switzerland, the Netherlands, France, Spain, Italy, and Portugal. She has published in high-ranking academic journals such as *Historia y Política*, *Ayer*, and *European Review of History*, as well as in edited volumes. Additionally, she has served as an external reviewer in peer review processes for journals and publishers in Spain, the Netherlands, England, Germany, and Brazil. Hofmann is now publicly recognised as an expert on 20th century Spanish history. To disseminate her research findings, she has given interviews on radio and television (Deutschlandfunk, Deutsche Welle, etc.), participated in podcasts, and organised events for wider audiences. Besides, she promotes academic exchange between Spanish and German academia by publishing on current historiographical debates in Germany, delivering lectures on this topic, organising Spanish-German conferences, and translating academic studies. Beyond her work on late Francoism, her research interests include the comparative history of dictatorships and fascism, as well as a global perspective on developmentalism in the 20th century. Her new research project aims to write a history of developmentalism in post-war Europe, expanding the comparative perspective of her previous work.



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Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: HERRERO CORRAL, ANA MERCEDES
Referencia: RYC2024-050083-I
Correo Electrónico: anamercedes.herrerocorral@oeaw.ac.at
Título: Archaeology of Childhood in the funerary record of 3rd and 2nd millennia BCE

Resumen de la Memoria:

My main research focuses on the study of childhood in the past to understand the social role that children would have played in the processes of social hierarchization during 3rd and 2nd millennia BCE. Since 2020 I am involved in another research line, complementary to Childhood Archaeology focusing on gender differences and sex/gender systems during 3rd millennium BCE in Iberia and since 2017 in a secondary research line on the Archaeogenetics of prehistoric populations on the Iberian Peninsula, with three publications.

My trajectory as a researcher is marked by various milestones in mobility and internationalization, reflected not only in my publications with interdisciplinary and international teams but also in my stays and participation in European projects, including the one for which I am currently the Principal Investigator (PI) at the Austrian Archaeological Institute in Vienna. In February 2023, I joined the Prehistoric Identities team in Vienna with a Marie-Curie postdoctoral fellowship to carry out my project "SKIN: Social Kinship and Cooperative Care in Recent Prehistory Iberia". Working together with Prof. Rebay-Salisbury in the context of her projects on motherhoods and sex-based differences in Bronze Age childcare has allowed me to expand my research focus towards engendered childhoods. This stay, beyond providing me with the necessary environment to develop my project, has served to boost my scientific networks in Europe. Partly favoured by its geographical location, Vienna is a crucial scientific hub for the study of prehistoric populations, bringing together researchers from across Central Europe. This allows me to be in contact not only with researchers from my institute but also with those from many neighbouring countries such as the Czech Republic, Hungary, or Slovakia, whom I regularly meet at the conferences organized here, as well as in various projects in which my team participates. I have been invited to deliver two lectures on the archaeology of childhood and my SKIN project at Comenius University in Bratislava, Slovakia, and the Institute of Archaeology at the University of Budapest, respectively. Engaging with other research teams and projects has provided me with fresh perspectives and even introduced me to new techniques that I hope to integrate into my own research in the future.

Due to my research maturity, I have been able to organize my own networks of collaborations with national and international colleagues, entirely independent of those from my predoctoral trajectory and supervisors. This is reflected in the projects, funded by various national and international sources, in which I participate as part of the research and working team. Additionally, since 2022, I have led as PI two projects, securing a total of 204.400€. Apart from my Marie Curie project, in 2022 a project on Peptide analyses for sexing non-adult individuals from Humanejos was founded by the Palarq Foundation. My involvement in this project, as the PI, has been comprehensive, encompassing the design of the proposal, development of the research plan, selection and analysis of samples, interpretation of results, and the design and coordination of publications. The first publication from this project, where I am both the first and corresponding author, has already been accepted for publication in Journal of Archaeological Science: Reports

Resumen del Currículum Vitae:

In 2011, I graduated in History from the Universidad de Valladolid. Thanks to my outstanding academic record, I had the opportunity to benefit from two collaboration grants in the Department of Prehistory of the same University. Following my undergraduate studies, I pursued a Master's in Physical Anthropology and Human Biodiversity at Autónoma, Complutense and Alcalá de Henares Universities. In 2014 I was awarded a FPU predoctoral contract to conduct my thesis on non-adult burials in the interior of Iberia during the 3rd and 2nd millennia BCE. Throughout my doctoral studies, I enjoyed two international stays of three months each at the Universities of Basel (Switzerland) and Bradford (United Kingdom) (see section 3). During these years, I also had the opportunity to improve my teaching skills by delivering 120 hours of instruction in the Archaeology undergraduate program at the Universidad Complutense. In November 2019, I defended my doctoral thesis under the guidance of Drs. Ruiz Zapatero, González Martín and Garrido Pena, earning the distinction of 'cum laude.' The same year, I was also awarded the Extraordinary Doctoral Prize. In 2021, following a temporary interruption in my research career due to the birth of my daughter, I obtained a postdoctoral position to join the prestigious team led by Prof. Manuel Rojo at the Universidad de Valladolid. Since February 2023 I am a Marie-Curie postdoctoral fellow at the Institute of Archaeology of the Austrian Academy of Sciences in Vienna where I am carrying out my project "SKIN: Social Kinship and Cooperative Care in Recent Prehistory", as part of the Prehistoric Identities team led by Prof. Katharina Rebay-Salisbury.

Since 2017, I am part of the research team of Humanejos which has been funded by the Ministry of Science through the project "Life and Death in Humanejos". In 2023 I was also PI of a project funded by the PALARQ Foundation for the identification of biological sex of non-adult individuals through peptide analysis at this same cemetery. Since 2020, I have been actively involved in a supplementary research line focusing on gender differences and sex-gender systems during 3rd millennium BCE in Iberia. In this regard I am part of the research project "MEMORIES: Recuperando Identidades Singulares en la Prehistoria" funded by the Spanish Ministry of Equality and I am author to three articles published in international journals such as Journal of Archaeological Method and Theory or Journal of Anthropological Archaeology. Finally, and thanks to the network of European contacts that I have woven during my pre and postdoctoral stays, I have been involved since 2017 in a research line on Archaeogenetics of recent prehistory Iberia. I am part of the ERC StG project "MICROSCOPE" led by Stephan Schiffels at the Max Plank Institute in Leipzig and I am co-author of several of the most cited works in recent years on this issue, such as Olalde et al. 2019 in Science.

The relevance of my academic career is demonstrated by 48 scientific publications of which I am a co-author, lead author (23), or only author (12): 22 articles in scientific journals, 15 of them indexed IN JCR Q1, 2 books, 19 book chapters, and 5 reviews. I have presented the results of my research at 25 conferences. The impact of my scientific output is high, as indicated by the metrics GSc H-index 9, Cit. 1648.



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Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: LAFFRANCHI, ZITA
Referencia: RYC2024-049307-I
Correo Electrónico: zitalaffranchi@gmail.com
Título: Bioarchaeological investigation of health condition, diet and territorial mobility and their social correlates during European Prehistory and Protohistory

Resumen de la Memoria:

My research focus lies in the exploration of the intersection between social differentiation and biological variability in the past. Specifically, I am interested in the types and degrees of association between variable funerary practices, exposure to developmental stressors and adult life quality, differential access to food resources, trauma and activity patterns. I have been working on this line of research on Iron Age, Preroman, Roman and Early Medieval contexts from Italy (Frappicini et al. 2015, Laffranchi, Mazzucchi et al. 2020; Laffranchi et al. 2016, 2018, 2019, 2020, 2021, 2022, 2024), Switzerland (Laffranchi et al., 2021, 2024), Siberia (Milella et al. 2022), on Calcolithic (Cámara et al. 2010, 2012) and Bronze Age contexts (Jiménez Brobeil et al. 2008, 2009, Nájera et al. 2010, 2012; Laffranchi 2010; Rubio et al. 2017) from the Iberian Peninsula. Starting from 2021 I expanded my research to the exploration of territorial mobility, (Laffranchi et al. 2022; 2024a, b) and the comparison of short-time perspectives on residential changes offered by isotopic data (Oxygen, Sulfur and Strontium) with inferences on kinship and long-term population dynamics provided by ancient DNA analyses.

My scientific network and range of collaboration with Spanish Institutions concretized in the following research lines, some of which still ongoing:

1- the bioarchaeological exploration of dietary, health and activity patterns in the Medieval population of Al Andalus (especially from the Nazari necropolis of Sahl Ben Malik in Granada and province e.g. La Torrecilla) (Charisi et al 2016; Laffranchi et al. 2016; Jiménez Brobeil et al. 2016, 2020; Alonso et al. 2024). This research was developed in collaboration with prof. Sylvia Jiménez Brobeil of the University of Granada and Dr. Antonio Delgado Huertas of the Instituto Andaluz de Ciencias de la Tierra (IACT-UGR-CSIC) for the stable isotope analytical protocols.

2- The osteological and taphonomic analysis of secondary funerary practices and possible social meaning in cave contexts dated from the Neolithic to the Bronze Age of Southern Spain (with a specific focus on the province of Cordoba, e.g. la Cueva de los Marmoles de Priego de Cordoba: Laffranchi et al. 2023). This research line stems from my collaboration with Prof. Rafael Martínez Sánchez (University of Córdoba) and Prof. Juan Antonio Cámara Serrano (University of Granada).

The line of investigation I propose for the RYC 2024 focuses on the exploration of how biological and sociocultural variables shaped the lives of children in the Iberian Peninsula from Prehistory to the Middle Ages. This research stems from the above scientific interests, at the same time incorporating in my research a new focus and analytical methods. Building on recent advances in amelogenin peptide analysis for biological sex estimation, I aim to explore sex and gender patterns in the non-adult archaeological collection stored at the University of Granada. This diachronic study will combine dental enamel hypoplasia, proteomics, and incremental dentine isotopic analyses to investigate socio-cultural aspects, resource access, and stress patterns during growth. The collection comprises ~400 individuals, offering a robust dataset for exploring these dynamics across time.

Resumen del Currículum Vitae:

My academic path started with a Bachelor's degree in Archaeology at the University of Padua. This was complemented by a Master's degree in Physical and Forensic Anthropology and a Master's degree in Archaeology, both at the University of Granada. I attended courses in Forensic Anthropology and Human Osteology at the Universidad Nacional Mayor de San Marcos and at the Pontificia Universidad Católica del Perú (Lima). In 2015 I obtained my PhD degree (Magna Cum Laude) in Physical Anthropology from the University of Granada, with a thesis on the bioarchaeological study of a Preroman/Celtic population from Verona. My research interests center on the bioarchaeological reconstruction of lifestyle and cultural practices, and on isotopic estimation of dietary patterns and territorial mobility. I did internships at the Stable isotopes biogeochemistry laboratory of the Instituto Andaluz de Ciencias de la Tierra (CSIC), learning protocols for the extraction of collagen and phosphate from bone samples. I worked as archaeologist and anthropologist for commercial archaeological companies in different countries (Italy, Peru, Spain and Switzerland). I also performed research stays at the Museum of History, Archaeology and Anthropology of Peru in Lima, at the Antonini Museum of Nazca, at the site of Cahuachi (Nazca) and at the site Huaca Pucclana in Lima. Throughout my studies and work experience, I developed a range of skills in the anthropological analysis of skeletal remains from different archaeological settings (European Prehistory and Roman times, Iberian Islamic period and Pre-contact Peru). My teaching portfolio includes the delivery of classes on anthropology and isotopic methods to both bachelor's and master's degree students of the University of Granada, and the organization of introductory lessons on Physical Anthropology for high school students in Italy. I also organized national and international workshops and sessions (University of Bern, Annual meeting of the European Association of Archaeologists). During my postdoctoral contract (2021-2024) at the University of Bern, I focused on mobility patterns in Celtic populations from Switzerland and Northern Italy. I presented my work through oral communications at various international congresses, and delivered invited talks for the University of Bern, University of Basel, LMU University of München, University of Lausanne, University of York (UK) and University of Verona. As part of my dissemination activity, I gave interviews on my research output to local and international news outlets and in 2016 I appeared in a short documentary on my research publication for the TV program ConCiencia (Canal Sur) and in 2024 for ARTE channel. I also curate the scientific contents of the website www.celtudalps.com. I obtained in 2016 the accreditation of "Profesor Ayudante Doctor" by the Agencia Nacional de Evaluación de la Calidad y Acreditación (ANECA). Since September 2024 I am scientific collaborator in the department of the archaeological collections of the Bernisches Historisches Museum of Bern leading a project on archaeozoological remains stored in the Naturhistorisches Museum of Bern. Published articles in JCR: 27: 19 of them in Q1 (in JCR or SJR). I am reviewer for J Archaeol Sci Rep., Plos One, Scientific Reports and Frontiers in Environmental Archaeology. I collaborated to 11 I+D projects in Spain.



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Turno General

Área Temática: Estudios del pasado: historia y arqueología
Nombre: CALDERÓN ORDÓÑEZ, ALEJANDRA
Referencia: RYC2024-050098-I
Correo Electrónico: alejacalderono@gmail.com
Título: African Diaspora: Between Past and Present Identities, An Archaeological, Biomolecular, and Bioarchaeological Challenge

Resumen de la Memoria:

This project proposes an interdisciplinary study of the African Diaspora. This historical phenomenon signified the largely involuntary and some voluntary migration of African populations to European colonial territories during the Trans-Oceanic Trade. Traditionally based on written sources, I suggest an Archaeology-centered approach that utilizes various proxies to reconstruct these groups' identities, lifestyles, population dynamics, and social behaviors. I aim to analyze different enclaves of the African Diaspora, starting with sites in the Canary Islands and Mauritius, followed by Colombia. Colombia has the second largest Afro-descendant population in Latin America after Brazil. My research will begin at the port of Honda, in collaboration with Colombian archaeologists, exploring spaces related to the lives of enslaved populations and trans-Atlantic commerce, such as the port area, church burials, cemeteries, haciendas, and period houses from this period. In the long term, I plan to incorporate sites in Brazil and the Caribbean (Bahamas), where I have already established contacts with local researchers. The project will include three complementary research lines. 1. The study of Human Remains will include a Bioarchaeological approach for reconstructing past populations and Biomolecular Studies (Ancient DNA, Isotopes, and peptides). We will apply a gender perspective, which means analyzing the African Diaspora by considering the varying experiences of women, men, and children. There is a tendency to underrepresent Afro-descendant women in academia and the narratives produced about the past. They further argue that these intersecting identities subject Black women to various overlapping forms of oppression. Additionally, they highlight that archaeological studies that fail to account for the intersecting identities of Afro-descendants explicitly risk homogenizing diverse individual experiences, often using men as the standard for the entire society. To tackle this issue, Black feminists emphasize that individuals, particularly Black women, possess multiple axes of identity, such as race, gender, class, and sexuality, among others. Our methodological proposal will allow us to identify women and children and differentiate between boys and girls. This differentiation, combined with other archaeological and anthropological data, will enable us to conduct an accurate intersectional study that accounts for different identities and experiences following the Black Feminists' proposal. 2. The archaeological record will analyze different spaces for the living and the dead and other sources of information like material culture and faunal remains. Therefore, zooarchaeological studies will be included in the project. These studies can address issues like diet and resource management, highlighting the resistance and resilience strategies these communities developed. 3. Working with Afro-descendant communities and recovering lost identities, as this project is grounded in the belief in the urgent need for collaborative archaeology, which requires establishing a relationship with Afro-descendant communities in Colombia and emphasizing the role that African communities have played in shaping current Canarian society and to shed light on that part of history that has been overlooked and neglected in the development of Canarian identity.

Resumen del Currículum Vitae:

The interdisciplinary nature of archaeology is undeniable, and my research career has therefore focused on integrating various sciences and disciplines, such as genetics and bioanthropological studies, into historical interpretation. Consequently, the early years of my career were dedicated to training in the different fields I aimed to combine. This included participating in numerous archaeological excavations across various chrono-cultural contexts, ranging from Neanderthals to the Spanish Civil War. In 2005, I also joined the Bioanthropology research group at the University of La Laguna (ULL), where I acquired techniques for studying human remains. Throughout my master's and Ph.D. studies, I learned ancient DNA techniques at the Genetics Department of ULL. After completing my Ph.D., I secured a postdoctoral researcher position in the Paleogenomics laboratory (PGULL) through a competitively awarded contract in 2019. I contributed to establishing the new laboratory, one of the few in Spain implementing genomic techniques for studying ancient remains. At PGULL, I designed sampling protocols to minimize heritage damage for future studies and gained expertise in the genomic analysis of aDNA. My research has integrated archaeology, genetics, and bioanthropology through a multidirectional approach. I have worked on projects where the primary questions arise from a genetic perspective but where archaeological context is fundamental, such as those concerning the Canary Islands peopling. Additionally, I have conducted research where genetics assist in addressing bioanthropological issues, such as those involving discriminant functions and aDNA. I have also studied segments of society that are often overlooked, including children, women, and enslaved populations.

The relevance of my research is evident in my publications in high-impact journals such as Nature Communications, Archaeometry, and the JAS. I have 33 peer-reviewed publications and 47 works in international and national scientific conferences. As a principal investigator, I have led projects with a clear archaeological focus, including two from the PALARQ foundation within the PGULL. I have contributed to writing several granted projects, including an ERC grant (ISOCAN). In 2021, I did a research stay at UNAL (Colombia) to analyze materials from historical periods. I have coordinated the bioanthropology team at the Pollentia site (2021-2023).

Additionally, I coordinated the excavation of human remains at the Neolithic site of Kharaysin (Jordan) (2022-2024). In 2022, I completed a research stay at Stanford to study human remains from a slave cemetery in Mauritius (Indian Ocean). In 2023 and 2024, I was the principal investigator of a PALARQ project excavating a burial site in Florianópolis (Brazil). I also conducted research at UFSC and joined the rede da arqueologia negra. I have participated in numerous outreach activities, including fairs, talks, bioanthropology workshops, and interviews for radio and television.

Regarding the training of young researchers, I co-direct two doctoral theses at ULL. I have mentored two TFTs in the School of Tourism and two in History. My research career demonstrates my versatility in exploring various contexts and methodologies while maintaining History and Archaeology as a common thread and focusing on human remains as a pillar of my research.



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Turno General

Área Temática: Estudios del pasado: historia y arqueología

Nombre: MARTINO MARTÍN, ENRIQUE

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Título: África in Global History

Resumen de la Memoria:

Mi trayectoria académica se ha desarrollado principalmente en torno al estudio de la historia social, política y económica del África occidental y central, con un énfasis especial en la antigua colonia española de Guinea Ecuatorial. Inicialmente, enfoqué mi formación doctoral en la exploración de archivos coloniales en varios países, lo que me permitió adentrarme en las dinámicas imperiales y en la configuración de mercados laborales en el Golfo de Guinea. A lo largo de este proceso, he procurado combinar métodos de la historia global con aproximaciones de la antropología económica y la teoría social, con el fin de obtener una visión más matizada de los intercambios de personas, bienes y servicios en contextos coloniales y poscoloniales.

El desarrollo de mis investigaciones ha puesto de relieve el papel de los intermediarios laborales en las plantaciones cacaoteras, así como las tensiones entre el trabajo forzoso, la contratación por deudas y los proyectos políticos de las potencias coloniales. Este interés inicial me llevó a indagar en fenómenos más amplios, como las migraciones internas en África y las formas en que diversas comunidades negociaban la inserción en redes transnacionales de producción y comercio. He abierto una vía de investigación que vincula la circulación monetaria con la transformación de relaciones sociales, contribuyendo a debates sobre la "neo-esclavitud", las economías en transición y la construcción de la autoridad colonial.

En la etapa actual, mi línea de investigación se bifurca en dos vertientes complementarias. Por un lado, examino la historia poscolonial de Guinea Ecuatorial, prestando especial atención a la manera en que este país se insertó en la Guerra Fría y en la economía petrolera, así como a la influencia de actores internacionales como China y Rusia. Por otro lado, me centro en el estudio de redes comerciales y monetarias anteriores a la imposición colonial directa, para analizar cómo distintos pueblos africanos establecían mecanismos de intercambio basados en monedas locales o no estatales, y las implicaciones que ello tuvo en la formación de estados y en las resistencias frente a la colonización.

Con el fin de difundir este conocimiento, mantengo un firme compromiso con la ciencia abierta y la transferencia de resultados. He impulsado la creación de repositorios digitales que facilitan el acceso a fuentes primarias y fomentan la colaboración entre historiadores y especialistas de otras disciplinas. A través de estos proyectos, mi objetivo es conectar la investigación histórica con la reflexión sobre el presente, invitando a repensar las dinámicas globales a la luz de las experiencias africanas en materia de trabajo, migración y sistemas monetarios. Mediante la combinación de trabajo de archivo, enfoques teóricos interdisciplinarios y herramientas digitales, confío en que estas líneas de investigación aporten una visión renovada sobre la construcción del poder colonial y las alternativas que comunidades africanas han desplegado para negociar su lugar en el mundo.

Resumen del Currículum Vitae:

Soy historiador especializado en África occidental y central, con atención especial a Guinea Ecuatorial y la presencia española en la región. Tras formarme en el London School of Economics, obtuve mi doctorado en la Universidad Humboldt de Berlín mediante una beca ERC. He disfrutado de contratos posdoctorales en la Universidad de Göttingen (Volkswagen Foundation) y el Freiburg Institute for Advanced Studies (Balzan Prize), además de ser investigador invitado en el Max Planck Institute de Halle y en la Universidad de Leipzig.

En la Universidad Complutense de Madrid, desempeñé contratos Juan de la Cierva (formación e incorporación) y obtuve una evaluación final "excelente" en 2025. Mi posterior solicitud al programa Ramón y Cajal (2023) logró una puntuación de 83,75/85, situándome en una posición destacada en la lista de reserva. Mis investigaciones se han plasmado en dos monografías, más de once artículos en revistas indexadas (tres en Q1 y dos en Q2) y siete capítulos de libro. Asimismo, he participado en más de 65 congresos internacionales, y mis trabajos acumulan alrededor de 140 citas (con un h-index: 8 según Google Scholar).

Mis proyectos han renovado el estudio de la contratación laboral en las plantaciones coloniales del Golfo de Guinea y han abordado cuestiones de migración, esclavitud y sistemas monetarios. A través de la plataforma digital www.opensourceguinea.org, he promovido la transparencia en la investigación, siendo citado en guías de instituciones como Columbia University y Leiden University, y en foros como The American Historical Review. He colaborado con el Parlamento Europeo y el Tribunal Internacional de Justicia en temas relacionados con Guinea Ecuatorial, así como en la organización de conferencias internacionales en Ghana y Madrid. Además, presido la junta directiva de la Society for Ethnographic Theory (SET), donde gestiono la revista HAU: Journal of Ethnographic Theory y su serie de libros, fortaleciendo su impacto académico. Por último, he impartido docencia en la Universidad Humboldt y en la Complutense, supervisando trabajos de grado y apoyando a jóvenes investigadores, al tiempo que desarrollo nuevas líneas de investigación sobre la economía política, la historia monetaria y la transformación poscolonial de África.



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Turno General

Área Temática: Mente, lenguaje y pensamiento

Nombre: COSKER-ROWLAND, RACH

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Correo Electrónico: rachcoskerrowland@gmail.com

Título: Rach Cosker-Rowland

Resumen de la Memoria:

My top 10 research contributions include 7 Q1 journal articles & 3 books:

Gender Identity: What It Is and Why It Matters (Oxford University Press, forthcoming 2025) - this is the first philosophical book on the important concept of gender identity

Moral Disagreement (Routledge, 2020) - this book investigates the implications of moral disagreement for metaethics, moral epistemology, political philosophy, and applied ethics

The Normative and the Evaluative: The Buck-Passing Account of Value (Oxford University Press, 2019) - this is the first thorough investigation of the buck-passing account of value which analyses all value in terms of reasons

I have had research visits to Monash University, the Australian Catholic University (ACU), Macquarie University, and the Australian National University in Australia which have tangibly benefitted my research. I have run several events that have had a large international component. I co-ran a joint University of Leeds/ACU conference on Normativity; I co-ran a joint ACU/University of Oxford conference on hybrid views in animal ethics in Oxford; and I worked with faculty from Stanford University and University of Canberra to run a deliberative poll. I have also run several other international conferences including conferences on Fittingness, Demoralizing Ethical Theory, Moral Epistemology, Companions in Guilt Arguments in Metaethics, and Wittgenstein and Moral Philosophy; these conferences have resulted in 3 edited volumes and a journal special issue.

My future research is on changing social norms and stereotypes that harm trans and gender-diverse people. My previous research, such as in my book Gender Identity: What It Is and Why It Matters, has argued that trans and non-binary people have a range of distinctive rights, such as to gender-affirming healthcare, freedom of legal gender, and to non-discrimination, grounded in rights to live and act with integrity. However, none of these legal mechanisms promises to mitigate several of the most severe harms that trans, non-binary, and gender-diverse people face. Namely, (1) high levels of assault and murder, especially of black trans women; (2) bullying, harassment, and discrimination in (inter alia) their schools, workplaces, in job, housing, and adoption applications, and in the media; (3) ostracization from their friends and/or family; and (4) misgendering which has been shown to have a strong negative effect on the mental health and well-being of trans and non-binary people. Part A of my project investigates the idea that social norms and stereotypes are responsible for (1-4). Part B of the project investigates particular actions, policies, and other means through which the social norms and stereotypes responsible for (1-4) can be mitigated, drawing on a range of interdisciplinary literature as well as philosophical literature. Part C investigates individual, state, and group obligations to take actions and adopt policies that change social norms and stereotypes responsible for (1-4). The project forwards research on several more general philosophical topics and issues including the constitution of social norms, the relationship between individual and institutional responsibility, and state obligations to combat stigma and harmful stereotypes and to promote egalitarian social relationships

Resumen del Currículum Vitae:

Education and Employment: I have been an Associate Professor in Philosophy at the University of Leeds in the UK since 2020. Previously, I held positions at ACU and La Trobe in Australia, as well as at the University of Oxford and the University of Warwick. I obtained my PhD in Philosophy from the University of Reading in 2014.

Research: I have published 20 refereed journal articles, 3 sole-authored books, and 3 edited volumes in philosophy. 16 of these articles are published in Scimago Q1 journals. 2 of these sole-authored books and 1 of the edited volumes are published with Oxford University Press, the others are published with Routledge. My work has been cited 538 times and I have a h-index of 14. I have presented over 70 oral presentations at conferences, workshops, and external departmental workshops, including 3 keynote addresses, at Universities in the UK, USA, Sweden, Australia, the Netherlands, China, and Turkey.

Funding: I have been a Co-I on a large Swedish Research Council grant, a collaborator on a large Kone Foundation grant, and a PI on several internal grants and several small external grants. I have come close to being awarded a large external grant as a PI: In 2020 I applied for a Marie Curie Individual Fellowship; I was on the reserve list for funding having attained a score of 90.60%.

Dissemination: I have disseminated my research through a public exhibition, which I curated, as well as through award winning podcasts, popular articles, and talks.

Research Leadership: I have supervised 3 PhD students, 1 to successful completion, 2 are in progress. I have been Director of the Centre for Aesthetic, Moral, and Political Philosophy at the University of Leeds, as well as Director of the Philosophy Program at the Australian Catholic University, a research-only program. I have evaluated research applications for national schemes and external University schemes. I evaluate several research proposals every week as part of my role as Chair of the Arts, Humanities and Cultures Faculty Research Ethics Committee at the University of Leeds.



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Turno General

Área Temática: Mente, lenguaje y pensamiento
Nombre: HERMOSA RAMÍREZ, IRENE
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Correo Electrónico: irenehermosaramirez@gmail.com
Título: Media accessibility: from a corpus linguistics to a user-centred and a community-based participatory research approaches

Resumen de la Memoria:

Media Accessibility (MA), originally a subarea of (Audiovisual) Translation Studies and increasingly an interdisciplinary research area concerning access to media and cultural products for people who cannot completely access them in their original form (through audio description, subtitles for the deaf and hard of hearing, sign language interpreting, etc.), has placed the focus on user-centred studies and participatory practices in the cultural industries. The line of research to be developed takes a step forward in this direction and seeks to advance knowledge cocreation in MA through research instruments such as community-based participatory research and insider research/lived experience research, drawing MA closer to Disability Studies. Disability Studies is yet another interdisciplinary area of inquiry which understands disability as a social and political category and examines beliefs and attitudes towards disability (Ferguson and Nusbaum, 2012), often through emancipatory approaches.

There are three main objectives to be developed within this line of research: 1) to offer a theoretical reflection on the shared and divergent aspects of these two interdisciplinary research areas, and to locate fruitful domains for collaboration, 2) to apply emancipatory research practices in MA and 3) to define a research agenda for the field of MA by means of collaboration with disabled people organisations.

In terms of impact, it is expected to foster collaboration with insider (lived experience) researchers and associations and look for current accessibility barriers and ways to overcome them. The expected outcomes are to be presented both as traditional research papers and conference presentations as well as policy papers and documentation in the preferred format of the organisations, an outmost priority given the general lack of accessibility of academic publications. In terms of mentoring, it is expected that this line of work will result in the supervision of PhD students interested in the intersection between MA and Disability Studies, or with lived experience with accessibility themselves.

Linking this line of research to my previous contributions, the development of this project would materialise the execution of the epistemological approach already established in the publication "Leading by example: Embracing community-based participatory research in media accessibility" and in the coming mobility activity on community-based participatory research on AI accessibility at the University of Warwick. The difference between these and the line to be developed lie in the venturing beyond the disciplinary boundaries and interests of MA and in the collaboration with Disability Studies scholars both internationally and in Spain.

Resumen del Currículum Vitae:

I am a Media Accessibility researcher that completed her PhD on the language and semiotics of audio description at the Autonomous University of Barcelona in 2022 (Cum laude, international mention) with funding from the Catalan Government through the FI scheme (2019FI_B 00327). Throughout my predoctoral and postdoctoral years, I have worked for two national and one Erasmus+ projects at two leading research groups in my area, TransMedia Catalonia (Autonomous University of Barcelona) and TraDiLex (Universitat Pompeu Fabra). I have also collaborated with the TricS research group at the University of Antwerp (in the scope of a three-month predoctoral research stay) and at the Canada Research Chair in Media, Disabilities and (Self) Representations (Centre de recherche CulturesArtsSociétés, Université du Québec à Montréal) (in the scope of a two-month postdoctoral research stay). Since 2024, I am a Juan de la Cierva fellow (JDC2022-049546-I) working on sensory accessibility barriers in university. My internalisation activities will continue in 2025 with a José Castillejo Mobility Grant for Early-Stage Researchers at the University of Warwick, where I will be developing a community-based participatory research project on AI applications for accessibility.

I have published 11 peer-reviewed articles (5 of them in SJR Q1 journals), 3 book chapters (in high-ranking SPI publishers), mainly as a single or first author and favouring open access journals (6 diamond open-access articles). I also have two forthcoming articles and two book chapters. As of 2025, I have joined the editorial board of the Journal of Audiovisual Translation. Additionally, I have presented my research in 12 national and international conferences.

Knowledge transfer is one of my main lines of work. I belong to Xarxa AccessCat (Accessibility Innovation Network of Catalonia, a knowledge transfer network funded by AGAUR, the Agency for Management of University and Research Grants), where Dr. Blanca Arias-Badia and I have developed the project PlanAccess (Planning Communicative Accessibility: A new methodology based on research for the educational and cultural sectors) within the network-funded Accessibility Solutions Awards scheme. Subsequently, we have received a Knowledge Industry Grant for 2024 (Modality Llabor) from AGAUR to continue developing PlanAccess and launch the spin-off. Regarding standardisation, I am a member of the CTN-UNE 153/SC 5 committee updating the Spanish standards for subtitles for the Deaf and hard of hearing and audio description. Finally, my commitment to accessibility goes beyond technological development and innovation. I am one of the founding members and the current secretary of the Catalan Association for the Promotion of Accessibility. My work in the association has been partially devoted to knowledge transfer activities, disseminating advancements in Media Accessibility to cultural institutions such as the National Art Museum of Catalonia and the Barcelona LGTBI centre.

In terms of mentoring young researchers, I have taught general and audiovisual translation and applied linguistics courses at BA and MA level with positive student satisfaction surveys. Within my previous department at the Autonomous University in Barcelona, I was a member of the executive board representing PhD students. I am currently supervising two BA and three MA thesis.



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Turno General

Área Temática: Mente, lenguaje y pensamiento
Nombre: JAQUET, FRANÇOIS
Referencia: RYC2024-048493-I
Correo Electrónico: francois.jaquet@outlook.com
Título: Speciesism, Racism, and the Grounds of Moral Standing
Resumen de la Memoria:

Since I obtained my PhD in 2016, most of my research has focused on metaethics and on animal ethics.

In metaethics, I have been mainly interested in moral error theory and its practical implications. Moral error theorists maintain that all our moral judgments are false. Assuming that they are correct about that, what should we do with these judgments, from a purely prudential standpoint? In relation to this question, I have defended three claims. First, such prudential questions make sense even on the assumption that moral questions do not, for prudential claims are immune to the kind of worries raised by moral claims. Second, we should replace our moral beliefs with fictional attitudes rather than replace them with other types of attitudes, such as non-moral beliefs or desire-like attitudes. Third, with respect to the content of these fictional attitudes, we should accept the set of moral principles whose general adoption would maximize well-being. These research outputs are the subject of 1 monograph, 4 articles published in top-tier peer-reviewed journals, and 1 chapter in an edited book published by Oxford University Press.

In animal ethics, I have worked on ontological, ethical and epistemic questions about speciesism: What exactly is speciesism? Is speciesism morally acceptable? Are we epistemically justified in having speciesist beliefs? In response to the first question, I have argued that speciesism is best construed as unequal treatment caused by species membership or assignment and that this definition fares better than other extant accounts insofar as it meets two desiderata: matching a good account of racism and making the concept of speciesism useful for discussing our duties to nonhuman animals. I have also claimed that speciesism is not wrong as a matter of mere definition. In response to the second question, I have argued that speciesism is immoral because the only difference between humans and other animals—namely, species membership—is merely biological and therefore morally irrelevant. Besides, I have argued that speciesism cannot be justified by appeal to other differences between humans and other animals. Finally, in response to the third question, I have contended that the widespread speciesist belief that humans matter more than other animals is due to a couple of irrelevant influences—the cognitive dissonance that results from loving animals and yet eating meat and the tribalistic psychology that we inherited from our ancestors—and is therefore epistemically flawed. These research outputs are the subject of 1 monograph, 7 articles in top-tier peer-reviewed journals, and 4 chapters in edited books.

My future research will be in the continuity of my recent work in animal ethics. It will center on the relationship between speciesism and racism and on theoretical issues regarding the grounds of the moral standing of animals. On the one hand, I will defend the accounts of the nature and ethics of racism that correspond to my accounts of the nature and ethics of speciesism. I will also defend the use of the analogy between speciesism and racism against the challenges it has received. On the other hand, I will provide an original set of arguments to the effect that the moral standing of animals is grounded in their sentience, and I will reject competing accounts of the foundation of moral standing.

Resumen del Currículum Vitae:

In 2016, I obtained a PhD in philosophy from the University of Geneva. Supervised by Prof. Julien Deonna, my thesis focused on the moral error theory and its practical implications. It was awarded the mention Summa cum laude, the highest distinction at the University of Geneva, as well as the Adolphe Neuman Prize, which is awarded every three years to an excellent work in ethics. After obtaining my PhD, I was a postdoctoral researcher at four universities.

First, in 2016-2017, I was recruited by the University of Geneva's Swiss Centre for Affective Sciences. The aim of this research project was to test new predictions of Joshua Greene's dual-process model of moral judgment, according to which utilitarian judgments typically result from rational episodes while deontological judgments follow emotional reactions.

Then, in 2017-2019, I was a visiting postdoctoral researcher at the Universities of Birmingham and Stockholm, where I continued the work on error theory begun in my PhD thesis. My research was funded by an Early Postdoc-Mobility fellowship from the Swiss National Science Foundation.

Finally, from 2019 to 2021, I was a postdoctoral researcher at Montreal's Center for Research on Ethics. Funded first by a postdoctoral fellowship from the University of Montreal, then by a "Postdoc-Mobility" grant from the Swiss National Science Foundation, my project focused on the notion of speciesism. Its aim was to demonstrate that the belief that humans count more than other animals is epistemically flawed because it is caused by disruptive factors. During my time in Montreal, I also sat on the executive committee of the Research Group in Environmental and Animal Ethics.

In 2021, I joined the Faculty of Social Sciences at the University of Strasbourg, where I am currently a non-tenure-track assistant professor and the deputy head of the Ethics Master's program. In Strasbourg, I am a statutory member of the Laboratoire en études culturelles (LinCS) and an associate member of the Archives Henri Poincaré-Philosophie et Recherches sur les Sciences et les Technologies. When I arrived in France, I also joined the Observatoire de la recherche sur la condition animale, a national network of researchers working on issues surrounding non-human animals. Since 2023, I've also been a member of the Oxford Center for Animal Ethics.

In total, I have obtained funding for 7 individual research projects—some of which I had to decline—for a total of €425,800. My work has resulted in 40 past or forthcoming academic publications: 3 monographs; 18 peer-reviewed articles; 11 book chapters; 6 encyclopedia entries; 2 book reviews. Of



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my publications, 11 appear in Q1 journals and 5 in D1 journals (based on Scimago rankings). According to Google Scholar, my publications have been cited 396 times, my h-index is 8 and my i10 index is 7.

Over the years, I have also acquired solid teaching skills. At the University of Strasbourg, I am in charge of all the philosophy courses and seminars in the multidisciplinary Master's program in ethics. My teaching covers all areas of moral philosophy, from metaethics and normative ethics to applied ethics. So far, I have supervised 23 Master's dissertations, and I am co-supervising a PhD. As for my most recent research, it pertains to animal ethics and concerns conceptual and ethical issues related to the notion of speciesism.



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Turno General

Área Temática: Mente, lenguaje y pensamiento
Nombre: SANTOLIN, CHIARA
Referencia: RYC2024-050126-I
Correo Electrónico: chiara.santolin@upf.edu
Título: Perceptual foundations of mechanisms of early language acquisition

Resumen de la Memoria:

My research projects have always had one aspect in common: the study of language. I began my research trajectory focusing on language acquisition and evolution in 2013, during my pre-doctoral training, under the supervision of Prof. Lucia Regolin (University of Padova). I worked on different projects investigating statistical and rule learning mechanisms in domestic chicks as animal model. There is a general consensus in that such mechanisms are fundamental in the acquisition of linguistic structures (e.g., word forms, grammatical rules). My PhD studies demonstrated that statistical and rule learning are fully functioning in other species at birth, paralleling evidence on human neonates.

To broaden my research portfolio on language development, and gain knowledge of linguistics, I did a training period abroad at the University of Wisconsin-Madison (USA), under the supervision of Prof. Jenny Saffran. I attended doctoral courses and received training on language research as well as behavioral paradigms used with infant populations (familiarization-discrimination procedures, eye-tracker). At the beginning of my post-doctoral activity (2016), I developed a research project focused on nonlinguistic mechanisms of grammar learning in infants, with Prof. Saffran (University of Wisconsin-Madison, USA). This project showed that 12-month-old infants learn phrase structure-like patterns from nonlinguistic strings of sounds that simulate the basic structure of phrases. I also developed a collaborative project with Prof. Eloisa Valenza (Infant Cognitive Lab, Univ. of Padova) to study the acoustic mechanisms at the basis of the speech bias in early infancy. I showed that, before 6 months of age, infants are attracted to prosody-like features of sounds regardless of whether such sounds come from a human or nonhuman source.

I continued my post-doctoral research at the University Pompeu Fabra (Spain; 2017-2024), where I expanded my research on learning of linguistic structures in early infancy. I developed 3 research lines to explore the perceptual foundations of early learning of linguistic structures in infants, focusing on syllables, phonetic categories, and syntax. Additionally, I initiated a research line investigating the phylogenetic origins of these mechanisms in rats, in collaboration with Prof. Toro. These studies resulted in 5 journal articles and 8 conference papers. I also collaborated on evaluating the feasibility of the fDCS/EEG system for studying infant language development, which led to four conference papers and a manuscript currently in preparation. I implemented a novel paradigm for online behavioral testing of infants in partnership with Prof. Waxman (Northwestern University, USA), with a manuscript in preparation. Additionally, I was awarded a Juan de la Cierva Incorporación fellowship (2021-2024). I now have an ERC Starting Grant and am a Senior Researcher (R4) & Group Leader at the Institut de Recerca Sant Joan de Deu (Barcelona).

Resumen del Currículum Vitae:

I obtained a bachelor degree in psychology (2010) and a master degree in experimental psychology and cognitive science from the University of Padova (Italy). In 2013, I obtained a 3-year pre-doctoral fellowship, funded by the Italian government (Ministero Università e Ricerca). In 2016, under the supervision of Prof. Lucia Regolin, I was awarded the PhD degree (University of Padova), with a thesis entitled "Learning regularities from the visual world". After defending my PhD in 2016, I obtained a competitive mobility post-doctoral fellowship by the Marica De Vincenzi onlus, which funded a 1-year position in an international university (University of Wisconsin-Madison, USA) to conduct research on psycholinguistics. I joined the Infant Learning Lab directed by Prof. Jenny Saffran, where I worked on mechanisms of grammar learning in infants. In 2017, I moved to the University Pompeu Fabra (UPF, Spain) to work at the Speech Acquisition and Perception Group (director: Prof. Nuria Sebastian-Galles). There, I began my own research line on learning of linguistic structures in early infancy. I obtained a Juan de la Cierva Incorporación post-doctoral fellowship that allowed me to continue my research at UPF (May 2021-April 2024), opening new lines of research on the impact of early bilingual exposure on other cognitive skills, and the study of abstract processing of syllabic structures). I obtained an ERC Starting Grant (101115991) funded by the European Research Council (EU). The project started in June 2024 at the Institut de Recerca Sant Joan de Deu (Barcelona), where I obtained a Senior Researcher (R4) & Group Leader position. I am the Director of the Neurodevelopment and Comparative Cognition Group of the Neuroscience program.

I have led multiple research projects in all the institutions I have worked in/visited, and published journal articles and conference papers with all the research groups I have worked with. I am first and corresponding author in 11 journal articles, amongst all my publications. Eight of these articles do not include my PhD supervisor, proving my capacity to lead projects from start to finish, and independent thinking. My publication record has been stable since my last year of PhD, through mobility across laboratories, and in spite of the challenging of conducting in-person research during a global pandemic. I have produced innovative results and generated new knowledge about the origins of the mechanisms serving the acquisition of language. I disseminated results at international scientific conferences and seminars for the public. I have obtained my own fundings, developing new ideas and turning them into successful research proposals. I moved across laboratories. I have gained solid theoretical knowledge on several topics related to language, and substantial experimental and methodological skills. I have acquired strong analytical and writing skills, proven by the high quality of my publications. I have gained teaching experience of several subjects related to language development at bachelor and master level as teaching assistant and guest lecturer. I am supervising 1 PhD student and mentoring 1 Post-Doc. I have co-supervised 4 master and 6 bachelor students, and tutored 2 research interns, at national and international universities.



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Turno General

Área Temática: Mente, lenguaje y pensamiento

Nombre: POLITI, VINCENZO

Referencia: RYC2024-051056-I

Correo Electrónico: vin.politi@googlemail.com

Título: Democracy for Science

Resumen de la Memoria:

My background is in History and Philosophy of Science. I specialise on the philosophy of Thomas Kuhn. Specifically, I focus on Kuhn's view on the structure of scientific communities and his social epistemology. Recently, I established a new way to use the social epistemology framework to understand the distribution of responsibilities within research groups. I call my approach the 'Social Epistemology of Responsible Science' (SEReS). SEReS makes use not only of concepts from social epistemology, but also of concepts from moral philosophy as well as qualitative research methods. Indeed, I have even designed and conducted my own qualitative case study.

The current philosophy of science literature studies epistemic responsibility (the duty of producing reliable knowledge) and moral responsibility (the duty not to harm). Through SEReS, I contributed to the debate on social responsibility. In my future research, I will expand towards the political philosophy of science and I will introduce the concept of political responsibility (the duty of shaping society in a responsible and just way), through my project 'Democracy for Science' (DeS).

Philosophers of science look at the science/society relationship from a value-centred perspective. They argue that scientific reasoning is value-laden, but also that scientists ought to use the values upheld by democratic society. DeS overcomes the value-centred perspective and investigates the political nature of the science/society relationship. While political decisions involve values, politics is conceived more broadly, often in terms of power. The challenge is to provide a normative framework that relies on an explicit and viable theory of democracy for science and that explains how science can constitute itself as both a knowledge-producing and a political agent.

DeS will do so by investigating: (1) Scientists' own self-conceptualisation as epistemic and political agents. I will conduct a qualitative study, based on semi-structured interviews, on scientists working in both public and autonomous research contexts. (2) The (often neglected) political models developed in the history of philosophy of science. (4) Contemporary political theories developed in opposition to the deliberative model at the basis of the democratisation of science. By synthesising the results from (1)-(3), I will establish a new normative model for the science/society relations, which characterises science as an autonomous yet responsible epistemic/political agents amidst other political agents. DeS establishes the political philosophy of science as a new sub-branch of philosophy of science and opens future research lines about the political aspects of the science/society relationship.

Resumen del Currículum Vitae:

I contribute to two main research areas. The first is Kuhn's scholarship. My work expands on Kuhn's insights, often drawing conclusions that he did not consider or would not agree with. I focus on Kuhn's view on the scientific community. From there, I develop a Kuhnian account of specialisation and interdisciplinarity as instances of scientific revolutions driven by methodological (rather than semantic) incommensurability. In my forthcoming book, I also make explicit Kuhn's model of the science/society relationship and his criticisms of Quine's extreme holism. Contrary to what the Kuhnian scholarship assumes and to what Kuhn maintains, I also argue that scientific progress, as a process 'pushed from behind', can also move 'towards an objective', even though such an objective is not the truth. My contributions to the Kuhnian scholarship have been original research articles in world leading philosophy journals, my forthcoming book (to be published by Springer in the book series Boston Studies in the Philosophy Science), and several presentations in international congresses, both as an invited and as a peer-reviewed speaker.

The second research area I contribute to is the debate on the social responsibility of science. My approach is quite unique, since it synthesises social epistemology and the debate about values in science. Social epistemology develops models about the distribution of cognitive labour to solve the philosophical problem of the tension between individual and collective rationality. However, it does not consider the role of values in scientific decisions: it misses a 'moral dimension'. The debate about values in science does not tell who is supposed to use values in scientific reasoning, or how. Furthermore, it does not account for the tension between individual and collective responsibility: it misses a 'social dimension'. In my approach, which I call 'Social Epistemology of Responsible Science', I bring the moral dimension to social epistemology and the social dimension to the debate on values in science. I recently published several original research articles on these topics, and others are under review/in preparation. I have also refined and defended my unique approach by conducting a 2-year qualitative research, based on ethnographic observations and semi-structured interviews, on PINPOINT, an interdisciplinary research group on personalised oncology.

My experience at PINPOINT allowed me to expand towards the Philosophy of Medicine. For the project Science, Technology, and Medicine in the Twentieth Century (UAB), I invited prof. Aliseda (my postdoc supervisor in Mexico and now long-time collaborator) and prof. Saborido as external speakers in workshops about the philosophy of medicine. Together with prof. Levy (Hebrew University of Jerusalem), whom I met at PSA24 (New Orleans, November 2024), I set up the reading group Science & Values, which meets on-line every 2 weeks. I collaborate with prof. Marchionni, whom I met at EPSA23, and who also works on issues about social responsibility (especially in economics). She invited me to be an external collaborator to RAISE, a project under review at the Academy of Finland. Prof. Shan, who invited me as a speaker to a conference on Kuhn in 2022, invited me to be an external advisor to the Hong Kong Philosophy of Science Research Group.



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Turno General

Área Temática: Mente, lenguaje y pensamiento
Nombre: ROMERO RIVAS, CARLOS
Referencia: RYC2024-050478-I
Correo Electrónico: romeriv@gmail.com
Título: Journey from language to brain to gene: Unraveling semantic processing in Williams syndrome
Resumen de la Memoria:

Williams syndrome (WS) is a rare genetic neurodevelopmental disorder, with a prevalence of approximately 1 in 7500 births, caused by the microdeletion of a critical region on chromosome 7q11.23. This usually (~90% of the cases) encompasses 25-27 protein-encoding genes, but atypical deletions might encompass larger or smaller segments of the critical region, and could result, for instance, in a more severe (or absence of) intellectual disability, or in a subset of the phenotypic characteristics of WS. The clinical manifestations of WS usually involve the cardiovascular, central nervous, gastrointestinal and endocrine systems, and the cognitive phenotype is normally characterized by intellectual disability and visuospatial deficiencies, while showing relative strengths in verbal skills and nonverbal reasoning skills.

Thus, language skills in WS have been of great interest because they have traditionally been described as relatively spared (and even as "intact" in early studies), compared to serious deficits in other non-verbal cognitive domains. Although people diagnosed with WS usually show mild to moderate intellectual disability and serious processing deficits at the visuospatial level, they appear to have a large vocabulary and good linguistic comprehension and production skills. In this way, the syndrome has been regarded as evidence for the existence of separate modules for language and cognition, the two being dissociated and independent of each other, thus fueling the evolving debate between cognition and language over the past four decades.

In a recent meta-analysis we showed that, in general, people diagnosed with WS have worse lexical-semantic skills than typically developing (TD) individuals, but better than people diagnosed with other cognitive disabilities; moreover, while vocabulary skills may be relatively unaffected in WS, they would have difficulties in semantic processing and integration, and in tasks involving semantic memory organization or verbal working memory. Nevertheless, it remains unclear whether the organization of semantic memory itself (i.e., semantic networks, and how semantic connections are established in the mental lexicon) is modulated in WS.

This is directly related to the main scientific objectives of this project: (1) to establish whether semantic memory is anomalously organized in WS, through the study of semantic networks; (2) to analyze whether newly learned concepts are appropriately related to lexical-semantic representations already stored in the mental lexicon of people diagnosed with WS; (3) exploring whether the development of brain areas related to lexical-semantic processing is atypical in WS; (4) to determine whether the neural organization of semantic representations is altered in WS; and (5) to establish which specific genes within the 7q11.23 region may be responsible for semantic processing deficits in WS. Related to this last objective, genes such as GTF2I and GTF2IRD2 could have a special relationship with a cognitive phenotype characterized by the appearance of deficits or above-normal abilities in conceptual and verbal skills. Nevertheless, so far, no causal relationship has been established between the deletion of any specific gene of the WS critical region and the particular semantic processing profile present in this syndrome.

Resumen del Currículum Vitae:

I have published a book chapter and 18 scientific articles in high impact international journals (all indexed in JCR), and I currently have three other articles under review, also in high impact international journals. Of the 18 published articles:

- In first decile: 5 (27.78%).
- In first quartile (not including the above): 7 (38.89%)
- As first author: 10 (55.56%)
- Number of citations (20/01/2025): 396; h index: 10; i10 index: 11

I have pursued three main lines of research: (1) foreign accent processing; (2) processing in the native language vs. a foreign language, and how it affects various cognitive processes; and (3) cognitive and linguistic development in Williams syndrome. In these three lines of research, I have generated knowledge, ideas and hypotheses of impact. In all these lines of research I have maintained and/or maintain international collaborations with several researchers: e.g., Dr Craig Thorley (University of Adelaide, Australia), Dr Marc Lluís Vives Moya (Leiden University, Netherlands), or Dr Alejandro Pérez (McMaster University, Canada).

I have obtained funding as principal investigator in two calls for Knowledge Generation Projects from the Ministry of Science, Innovation and Universities. I have been principal investigator of an emerging research group at the Universidad Autónoma de Madrid. Currently I am supervising a doctoral thesis associated with a FPU contract, I have supervised a postdoctoral researcher, and I have also supervised 9 master's degree theses and 23 bachelor's degree theses. In addition, having combined this work in research with teaching, I have also taught more than 1200 hours of teaching in undergraduate studies, and more than 200 hours of teaching in graduate studies. I have also carried out university management tasks, having been deputy director of a department and coordinator of a postgraduate degree at the Universidad Autónoma de Madrid.

As for my contributions to society, I have been and am actively involved in outreach activities with the community of patients and families of people with Williams syndrome. Thus, for example, I collaborate in the annual editions of the magazine of the Asociación Síndrome de Williams España; I have participated in family schools organized by this association, in which I have disseminated the results of our research projects and have given therapeutic guidelines to work on language development in this population; and I have participated in outreach conferences on Williams syndrome in clinical settings. In addition, my research has been reported in prestigious media, such as Psychology Today, The Daily Mail, The Times, Welcome to the Jungle, or the Spanish radio station COPE.

In terms of editorial and evaluation activities, I belong to the bank of experts who evaluate projects for the calls for Knowledge Generation Projects of the Ministry of Science, Innovation and Universities. In addition, I am editor of the journals Psicológica and British Journal of Educational Psychology, I have been guest editor of the journal Plos One, and I have reviewed scientific articles for more than 20 journals, all of them indexed in JCR.

Finally, I became a father on July 31, 2023, and was on paternity leave until March 2024.



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Turno General

Área Temática: Mente, lenguaje y pensamiento
Nombre: SORIA RUIZ, ANDRÉS
Referencia: RYC2024-049881-I
Correo Electrónico: andressoriaruiz@gmail.com
Título: Between thought and expression (Entre el pensamiento y su expresión)
Resumen de la Memoria:

TRAJECTORY

My research program has been largely devoted to exploring the meaning of evaluative terms, words like “good”, “beautiful”, or “fun”. I divide my interests in 4 axis:

- AXIS 1: In my thesis, I studied some of their core semantic properties, such as their gradability, multidimensionality, and connection to action, and I used those insights to inform debates in metaethics and philosophy of language.
- AXIS 2: Motivated in part by its relation to evaluativity, I have also published on the topic of metalinguistic usage and negotiation.
- AXIS 3: In addition, alongside my doctoral work, I have maintained an interest in the semantics of propositional attitude verbs, especially ‘believe’ and ‘know’.
- AXIS 4: And more recently, I have become interested in certain forms of indirect speech, which I have studied with tools from semantics and pragmatics.

Further interests include the semantics of explanations, conditionals, and the theory of emotions.

LINE OF RESEARCH: BETWEEN THOUGHT & EXPRESSION

The objective of the present project is to explore the interaction between the linguistic representation of value, thought, and language itself. More precisely, I purport to illuminate the meaning of certain types of discourse and expressions exploring its connection to the language of psychology, that is, the expressions we use to say what we think, want, and feel.

My research program has been largely devoted to exploring the meaning of evaluative terms, words like “good”, “beautiful”, or “fun”. I have studied some of its core semantic properties, such as its gradability, multidimensionality, and connection to action, and I have used those insights to inform recent debates in the philosophy of language. In addition, I have studied the meaning of various psychological verbs as well as metalinguistic uses of language, that is, situations in which we use language to talk about language itself.

This project combines these different interests into a coherent whole. My guiding aim is to adopt a core insight from metaethics (the philosophical subdiscipline that studies moral concepts), understood as a testable, empirical hypothesis. The core insight is what the philosopher Allan Gibbard called the “oblique strategy”: “to explain the meaning of a term, explain what states of mind the term can be used to express” (Gibbard 2003, p. 7). Understood as a thesis about language, the oblique strategy suggests that we can shed light on the meaning of various linguistic expressions by considering their relation to attitudinal language, the language of belief, intention, affect, or action.

The originality of my project is two-fold. On the one hand, I will incorporate philosophical insights into linguistic theorizing, so that these philosophical insights can inform linguistic theories in a richer way than before. On the other hand, I adopt expressivism as a general working hypothesis about language, instead of discussing its conceptual viability.

My project will contribute to the study of two main parcels of human language: (a) Our knowledge of evaluative, normative and subjective expressions, through its connection to attitudinal language. Conversely, this project will (b) contribute to the study of attitudinal language by studying its connection to specific subclasses of expressions.

Resumen del Currículum Vitae:

- Current position: Postdoc (Beatriu de Pinós), U. Barcelona
- Previous positions: Postdoc (Juan de la Cierva), U. Barcelona; postdoc, U. Nova Lisboa
- Education: PhD in Philosophy, Institut Jean Nicod (2019). Supervisor: Isidora Stojanovic

I am a philosopher with extended knowledge of contemporary debates in metaethics and philosophy of language and with a sound command of contemporary formal semantics and pragmatics. I have published (or have had accepted for publication) 14 peer-reviewed scientific articles (7 of which in top journals, such as Synthese, Ergo, Australasian Journal of Philosophy, Inquiry, or Mind & Language), 3 peer-reviewed proceedings articles (on Springer’s Lecture Notes on Computer Science series; as well as on the prestigious conferences Sinn und Bedeutung and Amsterdam Colloquium), and 3 book chapters (one at Cambridge University Press; one at Springer). I have given 17 invited talks and +30 talks in mostly international conferences and seminars. I have 110 citations on Google scholar; with an average of 20.2 citations/year in last 5 years (h-index: 7; i10-index: 6).

- Areas of specialization: philosophy of language , formal semantics, metaethics
- Areas of competence: pragmatics, epistemology.

Publications (10 most relevant)

1. Soria-Ruiz A. (2024). I know how to withstand the skeptic. Forthcoming in Synthese.
2. Soria-Ruiz, A. (2024). Expressive inferences & mighty obstacles. Proceedings of Amsterdam Colloquium 2024, 358-364.



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3. Soria-Ruiz, A., & Franzén, N. (2023). Moral and Moorean Incoherencies. *Ergo*, 10.
4. Soria-Ruiz, A. (2023) Is Metalinguistic Usage a Conversational Implicature?. *Topoi* 42(4), 1027-1038.
5. Soria-Ruiz, A. (2023) Evaluative and Metalinguistic Dispute, *Australasian Journal of Philosophy*, 101:1, 165-181.
6. Soria-Ruiz, A. (2023). On Mates's puzzle. *Mind & Language*, 38(2), 515-544.
7. Soria Ruiz, A., & Faroldi, F. L. (2022). Moral adjectives, judge-dependency and holistic multidimensionality. *Inquiry*, 65(7), 887-916.
8. Soria-Ruiz, A., Cepollaro, B., & Stojanovic, I. (2021). The semantics and pragmatics of value judgments. In Stalmaszczyk, P. (Ed.) *The Cambridge Handbook of Philosophy of Language*, Cambridge University Press, 434-449.
9. Domínguez-Armas, Á., & Soria-Ruiz, A. (2021). Provocative insinuations. *Daimon Revista Internacional de Filosofía*, (84).
10. Soria-Ruiz, A., & Stojanovic, I. (2019). On linguistic evidence for expressivism. *Royal Institute of Philosophy Supplements*, 86, 155-180



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Turno General

Área Temática: Mente, lenguaje y pensamiento
Nombre: CARLS DIAMANTE, SIDNEY
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Título: Suicidality in bipolar disorder: The philosophical dimensions

Resumen de la Memoria:

The project investigates the structure of suicidality from the perspectives of the philosophies of mind and biology, cognitive science, and psychiatry, using bipolar disorder (BD) as a case study. The overall objective of the project is to explore issues of agency, construal of suicidality, and the causal and ontological status of suicidal mental states in light of the interactions between physiological and cognitive suicidogenic factors. Suicidality is defined as the cognitive and behavioural processes motivated by the desire to end one's own life.

The population with BD is one of the highest suicide risk groups, and it is well-documented that in BD, the predisposition to suicidality can be due to genetic as well as psychosocial factors. The BD population can thus be viewed as a group with diverse suicide risk factors, ranging from a "hard-wired" biological predisposition to a distinct psycho-cognitive profile. As such, suicidality in BD raises philosophical questions about the extent to which suicidality is a free or agential act, whether suicidality is deterministic, how biological and neural processes give rise to the phenomenology of suicidality, and whether mental states such as volitions and beliefs are a distinct ontological category with genuine causal influence over suicidal behaviour and cognitions. The project synthesizes empirical findings from psychiatry, neuroscience, and biology with philosophical ideas about agency, determinism, mind-body interaction, and mental states to generate new insights about the structure of suicidality.

BD is a mood disorder characterized by the alternation of pathologically elevated (i.e., manic) or depressed mood episodes that are accompanied by profound changes to cognition, neural activity, behaviour, and personality. It has been linked to increased suicidality: it is estimated that the suicide rate in the BD population is about 10-30% higher than in the general population, and that a third to half of the BD population dies due to suicide. Importantly, in addition to psychosocial factors (e.g., poor quality of life, relationships or social support, childhood abuse or neglect), suicidality in BD can have a genetic basis.

The project's aims fall under two themes: investigating 1) how biological and neural factors contribute to the phenomenology of suicidality, and 2) their wider implications for the extent to which agency and mental causation are exhibited within suicidality. The first theme studies the nature of mind-body interactions, in particular how certain biological and neural features contribute to the experience of suicidality, and whether suicidality is a biologically-determined phenomenon. The second theme examines, based on the findings of the first theme, the extent to which suicidal behaviour and ideation are free or agential acts, and whether mental states play a substantive causal role in aggravating or mitigating suicidality. Together, these themes fulfil the overall objective of the project, which is to understand what the interactions between biological and cognitive suicidogenic factors imply for issues of agency, construal of suicidality, and causal and ontological status of suicidal cognitions.

Resumen del Currículum Vitae:

I am a philosopher working at the intersection of philosophy of mind and biology, cognitive science, and psychology. I am attracted to important yet neglected issues about the mind, its biological substrates, and its humanistic implications. I have a substantial track record of pioneering, creative, and interdisciplinary research that has sparked discussions that have steadily been gaining traction. Among these are consciousness in octopuses and more recently, the philosophical issues surrounding bipolar disorder. I am one of the first philosophers to work in these areas, for which I have won several grants and prizes. Moreover, I have a successful track record of securing external funding, including the Research Award of the Messmer Foundation, a prestigious regional award in Germany, and a 6-year government-funded research grant from the Foundation for Science and Technology (FCT) in Portugal.

I am experienced at independently developing robust and novel research projects that bridge gaps in the literature and open up new areas of discussion. Following standard practice in New Zealand, I independently proposed consciousness and cognition in octopuses as the topic of my doctoral thesis at the University of Auckland, where I was awarded my PhD in Philosophy in 2018. All my postdoctoral research has been independent. During my first postdoctoral fellowship at the interdisciplinary Konrad Lorenz Institute for Evolution and Cognition Research in Austria (2018-2020), I first became interested in disordered human behaviour and cognition. My research in this area matured through a subsequent postdoctoral fellowship (2020-2024) at the Zukunftscolleg, an interdisciplinary institute for advanced studies within the University of Konstanz (Germany). Here, I began an extended, systematic philosophical research project on bipolar disorder, concentrating on its relationships with the self, creativity, and suicidality. I delve deeper into the subject of suicidality in bipolar disorder through the aforementioned Portuguese research grant, which began in November 2024 and is based at the University of Lisbon.

I have a strong track record of publications in top-ranked journals and presentations on diverse topics within the philosophy of mind and cognitive science. Many of my publications are invited contributions to special issues of prestigious journals that integrate the philosophy of mind with the brain, cognitive, and biological sciences. Likewise, I have been an invited speaker at several major interdisciplinary conferences and workshops in the same vein.

My research has introduced novel ideas that have since become influential in philosophy, biology, neuroscience, cognitive science, and robotics. These ideas challenge received views, present new perspectives, and open up new areas of discussion. My recent research has rapidly drawn philosophical attention to the philosophical significance of bipolar disorder and the distinctive and novel perspectives on human experience it yields. Until recently, bipolar disorder has been largely neglected by philosophy, and its potential as a source of rich philosophical insights has gone untapped. However, there has been a marked increase over the past few years in philosophical interest in bipolar disorder, much of which is traceable to my research.



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Turno General

Área Temática: Mente, lenguaje y pensamiento
Nombre: SALDAÑA GASCÓN, CARMEN
Referencia: RYC2024-048320-I
Correo Electrónico: carmen.c.saldana.gascon@gmail.com
Título: Uncovering the cognitive roots of linguistic universals and diversity in the morphosyntactic structure of the inflected lexicon

Resumen de la Memoria:

Trajectory:

I am currently a Beatriu de Pinós Postdoctoral Research Fellow in the Computational Linguistics and Linguistic Theory (COLT) research group at Universitat Pompeu Fabra (UPF), where I am the principal investigator of the awarded project Elementary Particles of Morphology (ELEMOR). As an evolutionary linguist and experimental morphologist, I have developed a robust research program within experimental linguistics, focusing on how the human cognitive system shapes the typology and evolution of morphosyntax. My work has significantly advanced our understanding of cognitive biases—such as speakers' preferences during language learning and processing—that influence typological tendencies. Specifically, it addresses paradigmatic morphological relationships (e.g., which inflectional categories are distinguished) and syntagmatic relationships (e.g., the order of affixes within words). Additionally, my research has shed light on the domain-general cognitive mechanisms relevant to language processing shared between human and non-human primates, helping us understand what makes language unique. With methodological expertise spanning theoretical linguistics, typology, formal and statistical modelling, experimental linguistics, and comparative cognition, I am well-positioned to conduct interdisciplinary research that bridges these fields.

Line of research to develop:

How does the way we think shape the way languages work? Languages inflect words to express distinctions based on number (singular vs. plural), gender (feminine vs. masculine), animacy (animate vs. inanimate), or person (speaker vs. addressee), but the paradigms they use to express these distinctions vary widely. For example, English distinguishes singular and plural number in pronouns (e.g., I vs. we) but uses you for both, and distinguishes masculine and feminine gender in he and she but not in they. Remarkably, however, we find cross-linguistic trends concerning which distinctions are systematically maintained and which are more likely coexpressed by a single form.

This project aims to uncover whether these trends are merely historical accidents or whether they reflect deeper cognitive principles that guide how inflectional paradigms are learned, used, and represented in the human mind. To answer this, I address three main challenges. First, I identify the cognitive biases that influence how people learn and use the inflected lexicon (flexicon) and test their universality. To do so, I capitalise on recently developed online experimental methods, and extend them for the first time to speakers of maximally diverse languages. Second, I build a cross-linguistic database of (co)expression patterns across a large representative sample of the world's flexicons. Finally, I use statistical and computational models to evaluate the causal link between the uncovered cognitive biases and large-scale cross-linguistic trends, both synchronically and diachronically.

The results of this project will make significant strides toward advancing a central goal of modern linguistics: revealing the core cognitive principles underlying language. Using cutting-edge behavioural, statistical and computational tools, my project will establish a new empirical standard for understanding the evolution of inflection over time and space, and will uncover how the human mind shapes this unique feature.

Resumen del Currículum Vitae:

I am currently a Beatriu de Pinós Postdoctoral Research Fellow in the Computational Linguistics and Linguistic Theory (COLT) research group at Universitat Pompeu Fabra (UPF). Previously, I was a postdoctoral researcher and lecturer at the Department of Comparative Language Science at the University of Zurich (UZH), heading the Morphological Domains research group. My work there focused on the cognitive and historical processes underlying the stability of linguistic patterns in morphology over time. Prior to the position at UZH, I contributed to two ERC-funded projects at the University of Edinburgh (UoE) as a postdoctoral and predoctoral researcher. I hold a PhD in Linguistics from UoE (2018), an MSc in Evolution of Language and Cognition (2013), and a BA in Linguistics (2012).

Throughout my career, I have developed a research program within experimental linguistics that investigates how the human cognitive system influences the typology and evolution of morphosyntax. My contributions have advanced our understanding of how cognitive biases during language learning shape cross-linguistic morphosyntactic structures. My research also explores cognitive mechanisms underpinning language learning and use in humans and non-human primates, offering insights into what makes human language unique. I work within a comprehensive interdisciplinary framework that bridges theoretical linguistics, typology, experimental linguistics, evolutionary biology, and cognitive science.

In experimental morphosyntax and typology, I have published seven research articles, with two more forthcoming, in top-ranked journals in linguistics and cognitive science. I have also published ten papers in the proceedings of prestigious international conferences. These publications use experimental methods as well as formal and statistical models to advance our understanding of how cognition drives cross-linguistic regularities in morphosyntactic structure.

In comparative cognition, I have published two articles in high-profile biology and multidisciplinary journals, alongside two conference proceedings papers. My work in this field involves developing non-invasive experimental techniques to compare humans and non-human primates using matched cognitive tasks via touch screens. This allows me to test the domain- and species-generalizability of mechanisms relevant to language which might not be language-specific.



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I have extensive teaching experience, having taught 15 courses at the BA and master's levels at UoE in the UK (2014–18), UZH in Switzerland (2019–23), and currently at UPF in Spain. I have coordinated six of these courses at UZH and UPF. My supervision experience includes three internships, one BA thesis, four MA theses, and the mentoring of four PhD students across international institutions.

I have contributed to fostering cross-linguistic and interdisciplinary research by co-organising five international conferences, including the annual Cross-linguistic Perspectives on Processing and Learning, and the upcoming CogSci 2026. Additionally, I have organised workshops promoting Open Science and best practices within experimental linguistics and beyond. My outreach activities include events for non-specialists, such as in Scottish primary schools, Switzerland's Scientifica science fair, and Spain's #científiques initiative.



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Turno General

Área Temática: Mente, lenguaje y pensamiento
Nombre: VICIANA ASENSIO, HUGO
Referencia: RYC2024-050624-I
Correo Electrónico: Hugo.Viciana@normalesup.org
Título: Filosofía, cultura y psicología moral

Resumen de la Memoria:

Hugo Viciana's research focuses on the intersections of philosophy, moral psychology, and the naturalistic study of cultural evolution. His research has aimed to explore how evolutionary dynamics, cognitive, cultural, and philosophical factors shape social norms, social learning, and moral attitudes. His work is deeply interdisciplinary, drawing on insights from philosophy, psychology, and the social sciences to address questions at the interface of philosophy and the behavioral and cognitive sciences.

His research trajectory is marked by exceptional international mobility, with appointments at more than 9 institutions, including renowned international institutions such as Cornell University's Sage School of Philosophy, the École Normale Supérieure, at the Rue d'Ulm in Paris, the University of California, Los Angeles (UCLA) or the University of Pennsylvania among others. This global academic experience has enabled him to build a robust network of collaborations with scholars across several countries, resulting in high-impact publications in well respected journals or a highly innovative edited volume for which he has been the lead editor and which includes contributions from top scholars from Harvard University, London School of Economics, Rutgers, CUNY, Macquarie and other top universities.

Previously, he published original contributions using methods of conceptual analysis and digital humanities to trace the term "animal culture" in studies of animal ethology since the 1970s and assess its epistemic role and metaphysical status. He has also published original work on the evolution of ethological "teaching" or cultural "pedagogy" together with the French biophysicist Claude Loverdo at the CNRS. These models based on the work first detailed in his Ph.D. dissertation, illuminate interesting aspects of the evolution of cultural skills, underlining their mutualistic nature. Some of his work on naturalistic studies of human exceptionalism has also looked at the roots of human altruism or the evolutionary and cognitive underpinnings of religious prosociality.

Dr. Viciana's recent work has covered the development of experimental moral philosophy and addressed the role of moral psychology in understanding public disagreements and societal controversies. He has co-authored foundational texts such as *Una introducción a la ética experimental* and edited the Routledge volume *Experiments in Moral and Political Philosophy*, both of which bridge theoretical and empirical approaches to moral and political questions.

In addition to his academic contributions, Dr. Viciana has been deeply involved in disseminating philosophical and scientific knowledge. He developed an online course on effective altruism, supported by the Open Philanthropy Foundation, and has been a key organizer of international conferences promoting interdisciplinary dialogue. His recent work in Science & Education emphasizes the importance of promoting epistemological literacy to foster a better understanding of scientific communication among the public.

He has been the Principal Investigator of no less than four projects funded in competitive calls. His interdisciplinary approach positions him as a leader in leveraging philosophy and cognitive science to address complex moral and cultural questions in contemporary society.

Resumen del Currículum Vitae:

Hugo Viciana (Ph.D. in Philosophy, University of Paris 1 Panthéon-Sorbonne, 2014) is Emergia postdoctoral research fellow working at the intersection of philosophy and the cognitive and behavioral sciences. His academic career is characterized by extremely high mobility across prestigious research institutions and a distinctly international trajectory. He has held research or teaching positions at the University of Paris 1 Panthéon-Sorbonne, the Institute for Advanced Social Studies of the Spanish National Research Council (IESA-CSIC), the Instituto de Filosofía (IFS-CSIC) at the National Research Council, Spain, the Institut de Recherche pour le Développement (IRD-Paris, France), the UCLA Center for Behavior, Evolution, and Culture (Los Angeles, US), the Psychology Department of the University of the Balearic Islands, or the Philosophy Departments at the University of Seville, and Malaga. He has been a visiting scholar at Cornell University, Sage School of Philosophy, and at the Philosophy, Politics and Economics Program of the University of Pennsylvania. He has published in several international peer-reviewed journals including *Biology & Philosophy*, *Science & Education*, *Review of Philosophy and Psychology*, *Ethical Theory and Social Practice*, *Philosophia*, *Proceedings of the National Academy of Sciences*, *PLoS ONE*, *Social Neuroscience*, *Annals of the New York Academy of Sciences*, *Psychological Science*, *Behavioral and Brain Sciences*, *Nature Scientific Reports*, etc. His work in moral psychology has been referenced at the Stanford Encyclopedia of Philosophy. In 2024, he has been the chief editor of the Routledge-published academic volume *"Experiments in Moral and Political Philosophy"*. In 2020, he co-authored the monograph *"Una introducción a la ética experimental"* (Editorial Cátedra) with Antonio Gaitán and Fernando Aguiar. He was a keystone founding member of the Spanish Experimental Philosophy Association. He has served as a sitting member in the International Expert Panel for the Humanities and Social Sciences at Nordforsk. In addition, Hugo has also done extensive popularizing and scientific dissemination work, including the creation of a podcast series on academic philosophy in Spanish, an online course on the science and ethics of effective altruism supported by the Open Philanthropy Foundation, and a self-edited kindle book on the moral psychology of cooperation. His research on experimental philosophy and public disagreements has been covered by major Spanish media outlets, including *El País*, *La Vanguardia*, *Onda Cero*, *La Sexta*, *CincoDías*, *RNE*, *Cadena Ser*, *ElPeriodico*, *Eldiario.es*, etc.



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Turno General

Área Temática: Mente, lenguaje y pensamiento
Nombre: MÜLLER, JEAN MORITZ
Referencia: RYC2024-050467-I
Correo Electrónico: jean.moritz.mueller@gmail.com
Título: La naturaleza y normatividad de las actitudes mentales

Resumen de la Memoria:

Mi investigación explora la naturaleza de las actitudes mentales y su conexión con nuestra capacidad para responder a razones. Hasta ahora, mi trabajo se ha centrado específicamente en la naturaleza de las actitudes emocionales. En mi monografía "The World-Directedness of Emotional Feeling" (2019), critico una tendencia generalizada a suponer que las emociones son experiencias perceptuales de propiedades evaluativas. Basándome en consideraciones de la fenomenología temprana, sostengo que las emociones y las percepciones difieren en cuanto a su intencionalidad: a diferencia de las percepciones, las emociones son respuestas a su objeto intencional. En este contexto, responder equivale a interactuar con razones.

La profunda conexión que he descubierto entre razones y la intencionalidad de la emoción jugará un papel clave en mi investigación filosófica en el futuro. En mi investigación más reciente, he estado explorando la idea de que las actitudes intelectuales (creencias, conjeturas) y conativas (deseos, intenciones) son respuestas en un sentido análogo. Esta perspectiva general sobre las actitudes mentales se opone radicalmente a la noción predominante de que, bajo condiciones favorables, constituyen formas de acceso epistémico. Mientras que esta tendencia sigue siendo prevalente en epistemología, encarnada en la imagen estándar del conocimiento proposicional como una forma adecuadamente calificada de creencia, también se ha defendido en metafísica en relación con el deseo y la emoción (siendo la visión perceptiva de la emoción la variante más común). El objetivo principal de mi futura investigación es desarrollar esta perspectiva opuesta, elaborando un enfoque fresco y unificado tanto de la naturaleza como de la normatividad de las actitudes mentales. Según esta visión, su papel principal no es transmitir conocimiento, sino responder y, de esta manera, reconocer lo que sabemos. Anticipo que esto será un esfuerzo altamente prometedor que tiene como objetivo reorientar fundamentalmente el pensamiento actual sobre la metafísica de las actitudes y su perfil normativo.

Tres principios fundamentales caracterizan mi investigación: (1) Compromiso con la excelencia: he publicado una monografía muy exitosa con Palgrave Macmillan, junto con numerosos artículos en destacadas revistas internacionales de revisión por pares de categoría Q1, como *Synthese*, *European Journal of Philosophy* e *Inquiry*. (2) Impacto integrador: la mayoría de mis publicaciones impulsan discusiones contemporáneas en la filosofía analítica de la mente al poner en contacto aparentemente diferentes corrientes de investigación, abarcando tanto la investigación actual en la teoría de las razones como las ideas poco notadas de la fenomenología temprana. (3) Enfoque sistemático: guiada por un tema general, mi trayectoria de investigación tiene como objetivo desarrollar una perspectiva integral y sistemática de la mente humana y su relación con el mundo.

Resumen del Currículum Vitae:

He desarrollado un sólido portafolio de investigación, con más de veinticinco publicaciones, incluidas doce investigaciones originales como autor único en revistas internacionales Q1 con revisión por pares. Además, soy autor de una monografía innovadora, *The World-Directedness of Emotional Feeling*, que recibió críticas muy positivas en revistas generalistas de filosofía de renombre internacional y fue objeto de un simposio en *Emotion Review*, una revista Q1 y la más prestigiosa en su campo. Mi artículo "The Spontaneity of Emotion" estuvo entre los más citados en la *European Journal of Philosophy* en 2021/2022 (también Q1 y una de las 15 mejores revistas generalistas), según las estadísticas de la propia revista. Otros artículos míos han sido publicados en revistas de alto prestigio, como *Synthese*, *Inquiry* y *Philosophical Explorations*. Mi historial de publicaciones destaca a pesar de las importantes responsabilidades docentes y administrativas que he asumido en mis roles de posdoctorado. Solo en los últimos dos años (2022-2024), he publicado nueve artículos como autor único, seis de ellos en revistas Q1.

También presento ponencias en congresos, talleres y seminarios internacionales. Expongo regularmente mi trabajo en congresos destacados, como el Congreso Europeo de Filosofía Analítica y la reunión anual de la Sociedad Europea de Filosofía para el Estudio de las Emociones. Además, he sido organizador principal o coorganizador de tres talleres internacionales sobre mis líneas principales de investigación en la filosofía de las emociones y la teoría de las razones, celebrados en Mánchester, Bonn/Würzburg y Tübinga.

He trabajado como investigador posdoctoral en tres proyectos internacionales localizados en Ginebra/Friburgo, Göttingen/Ratisbona y Berlín. También fui investigador principal y coordinador de un proyecto multianual sobre género y diversidad en mi antiguo departamento en Bonn durante tres años. Actualmente, como profesor visitante en Tübinga, estoy a cargo de la Cátedra de Filosofía Práctica, gestionando un equipo de dos investigadores posdoctorales y de uno a seis asistentes académicos o estudiantiles, dependiendo de las necesidades docentes. Este puesto me ha permitido liderar actividades departamentales y orientar a jóvenes investigadores, consolidando mi experiencia en liderazgo.

También difundo mi experiencia a una audiencia no académica. Por ejemplo, he publicado en revistas de filosofía dirigidas al público general y he ofrecido una entrevista para el canal de YouTube de la aseguradora pública de salud más grande de Alemania.

Finalmente, he formado con éxito a numerosos jóvenes investigadores como supervisor de tesis de grado y maestría en diversas disciplinas filosóficas. Varios de mis supervisados han sido aceptados en programas de posgrado competitivos y totalmente financiados, como los de la London School of Economics y la Universidad de Edimburgo.



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Turno General

Área Temática: Mente, lenguaje y pensamiento
Nombre: SERANGELI, MATILDE
Referencia: RYC2024-050729-I
Correo Electrónico: matilde.serangeli@uni-jena.de
Título: Anatolian languages

Resumen de la Memoria:

My planned research consists of two pillars, which are the natural continuation of my previous research lines: 1. A synchronic and historical-comparative grammar of the Lycian language. This reflects my research line in the synchronic, diachronic and comparative analysis of the ancient Anatolian languages and of the linguistic milieu of Anatolia in the 1st Mill. BC, including non-Anatolian languages like Greek. 2. The identification and linguistic analysis of Anatolian medical language. This grows out of my interest in the reconstruction of cultural traits that developed in the Anatolian languages of the 2nd-1st Mill. BC as a result of local innovation and language and cultural contact modifying the Indo-European (IE) heritage.

Apart from several studies on linguistic aspects of the Luwian languages (Luwian, Lycian, Carian, Pysidian, Sydetic, and perhaps Lydian), a comprehensive synchronic and diachronic grammar is available only for Carian, which is not a well attested Luwian language. I plan to write a monograph A Grammar of the Lycian language, for which I already have a preliminary contract with the Brill's series Handbook of Oriental Studies. A Lycian grammar is a desideratum because its unique phonology allows us for a better understanding of Luwian morphology and dialectology. Over the years, I have collected material about Lycian, especially as regards the nominal classes, word-formation, and onomastics that will allow me to submit the volume within the first two years. The analysis will be conducted with reference to the entire Anatolian branch and to the other IE languages; I will pursue an autoptic analysis of the epigraphic sources.

Is it possible to identify a medical language in the Anatolian languages (esp. Hittite, Luwian) of 2nd-1st Mill. BC Anatolia? This semantic area has been less underexplored so far because the Anatolian medical texts are highly fragmentary and strongly influenced by Mesopotamian medical knowledge. In my view this is just the result of a methodological flaw. Instead of limiting the research to reconstruct medical knowledge, thus being restricted to the medical vocabulary *sensu stricto* (e.g. disease) and related texts, I believe that a successful investigation of the medical language should be extended to all text types and that it should include all those specific and non-specific terms and expressions describing body's conditions. I aim to investigate to what extent we can identify and analyse this language and what this tells us about the culture behind, and to determine, beside the identification of its foreign or local character, which elements are innovations of the Anatolian branch and which ones could reflect an IE heritage. The comparative method of historical and areal linguistics will be applied, with a focus on the analysis of phraseological patterns and etymological reconstructions. I expect to find a highly metaphoric language. This research will serve as a springboard for a future project on the development of the medical language of the cultures of the Ancient Mediterranean.

Alongside these projects, I will maintain an active interest in other research areas, e.g. the role of Anatolia in the exchange of influences between the East and the West. As previously, my results will be presented at main conferences and at thematically focused ones and published in the leading journals of my field.

Resumen del Currículum Vitae:

I am a classicist (MA 2009, Univ. Rome "La Sapienza", Italy) and a historical-comparative linguist (Ph.D. 2015, summa cum laude, Univ. Cologne, Germany). My main area of research lies in the Indo-European (IE) languages of Asia Minor and of the Aegean in the 2nd and 1st mill. BC, with a focus on Greek and Anatolian lexicon and morphology, by means of comparative investigation with neighboring languages (areal linguistics) and sister languages (IE heritage). Since 2018 I serve as a research associate at the Dept. of IE Studies at the Inst. for Oriental Studies, IE Studies, Prehistoric and Early Historic Archaeology of FSU Jena, where I am pursuing the German habilitation to full professorship. I already hold the Italian habilitation, 2nd level. I am also adjunct lecturer at Univ. G. Marconi (Rome). After my Ph.D., I served as a research associate at the Inst. of Linguistics in Cologne. Then I was Marie Curie Individual Fellow at Univ. Copenhagen (2016-2018); in 2019 and in 2025 I received a Danish and a German research grant.

My teaching and research cover a wide range of IE languages and the interfaces between historical linguistics, philology, and epigraphy. I contribute to my research field in four main areas: language contact and cross-cultural interaction; semantic change, as combined with phraseology, etymology, and word-formation; comparative mythology and poetics; split of the IE branches from the proto-language. I have published extensively on Anatolian and Greek and disseminated my results in 20 papers in high-ranked journals, collective volumes, and proceedings, 2 edited books, 7 dictionary entries, translations and review articles, 45 talks at main conferences/institutions of my field in Europe and overseas.

While my Ph.D. focussed on language contact in Lycian, my postdoctoral projects expand my focus to the entire Anatolian branch, and to broader debates within IE studies by introducing the concept of root families, i.e. a system of roots that are either synonymous or that share a base form, as a heuristic device.

I am internationally recognized as an emergent scholar in Anatolian and IE studies, as witnessed by 6 national and EU/international fellowships (Germany, Italy, Denmark), 8 research collaborations (Italy, Denmark; ongoing: Germany, Austria, Spain), 2 research stays (Harvard, Vienna) and 23 invitations to conferences/lectures at major institutions. I organized the first interdisciplinary conference in IE studies on the split of the IE languages from the proto-language as witnessed by linguistic, archaeological, and genetic evidence, and edited the volume *Dispersals & Diversification* (Brill 2020).

I am devoted to academic service, teaching, and mentoring of young colleagues. I serve as a peer-reviewer for papers at international conferences, leading journals, and for Ph.D. thesis awards. I am member of the directive board of the Society for IE Studies (2020-). I have taught 30 courses in general and specialized topics of Anatolian and IE Studies (Germany, Denmark, Italy), and I supervise MA theses (Germany, Italy). Until 2023 I have been faculty member at the International Research School of the MPI for the Science of Human History in Jena. I am training in order to grow my skills as a research leader, mentor of young scholars, project and resource manager, and in applying to national and international grants.



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Turno General

Área Temática: Mente, lenguaje y pensamiento
Nombre: GIOVANNINI, EDUARDO
Referencia: RYC2024-048378-I
Correo Electrónico: engiovannini@conicet.gov.ar
Título: Philosophy of Formal Sciences: Historical, Foundational, and Logical Perspectives
Resumen de la Memoria:

During the funded period, my research will be organized into three lines of research or streams.

The first line of research concerns the philosophy of mathematics, with a particular focus on the philosophy of geometry. The topics to be investigated include historical, philosophical, and foundational issues in modern axiomatic geometry (especially 19th and 20th centuries); the geometrical roots of the model-theoretic conception of theories in logic and mathematics; epistemological and methodological issues pertaining to mathematical practice (e.g., purity of proofs, mathematical styles, visualization, and diagrammatic reasoning). Moreover, these investigations will be put in connection with central positions in the contemporary philosophy of mathematics, particularly mathematical structuralism and abstractionism. This is the most substantive stream of research so far, with articles appearing in *Synthese*, *Theoria* (Sweden), and *Archive for History of Exact Science*, among others. I have also published two books in this area (Springer (2024), College Publications (2015)).

The second stream focuses on early analytic philosophy, with an emphasis on the philosophy of formal sciences. I will investigate several proposals to provide a logicist foundation of geometry, particularly in the works of Russell and Carnap (and other logical empiricists). More generally, I will reassess the interplay between the emergence of modern mathematical logic and the philosophies of mathematics elaborated by these central figures in early analytic philosophy. Research outputs on this more recent stream have been published in *Erkenntnis* and two book chapters.

The third line of research pertains to the fields of logic and formal philosophy of science, with the overarching goal of achieving conceptual elucidations via logical analysis. Work on this research stream will focus specifically on the notion of formal mathematical content, both from syntactic and semantic perspectives. In addition, the resulting logical account will be tested against the backdrop of recent results on criteria of equivalence of formal theories in the philosophy of science and logic. Research outputs from this stream have appeared in *The Review of Symbolic Logic*, *Principia*.

A fundamental aspect of my work is a distinctive methodological stance combining three approaches to its subject: historical reconstruction, philosophical analysis, and logical analysis or formalization.

Resumen del Currículum Vitae:

I am an Associate Researcher at the Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET, Argentina) and an Assistant Professor at the Universidad Nacional del Litoral (Argentina). I have been a Postdoctoral Research Fellow at the University of Vienna (2020-2022, 2017) and at CONICET (2013-2016). I have held multiple Visiting Scholar positions at leading international research institutions, including the Munich Center for Mathematical Philosophy (2021), the University of California at Berkeley (2014), and the Max Planck Institute for the History of Science (2013). I obtained my Ph.D. in Philosophy (04/2008-03/2013) from the University of Buenos Aires.

My main research areas include the history and philosophy of mathematics, the history and philosophy of logic, and the formal philosophy of science. I also have research interests in early analytic philosophy. My publication record demonstrates a strong focus on quality and impact. I have published in prestigious, world-leading journals such as *Erkenntnis*, *Synthese*, *The Review of Symbolic Logic*, *Archive for History of Exact Sciences*, *Theoria* (Sweden), and *Theoria* (Madrid). In addition, my publications include two books in prestigious publishing houses (Springer, College Publications), fifteen book chapters, and three translations. My research has garnered 111 citations, with an h-index of 6 and an i10-index of 3 (Google Scholar). Fully committed to open science policies, I ensure that all my publications are either open access or freely available in repositories, maximizing their accessibility and impact.

My track record demonstrates my consistent success in attracting third-party funding. In 2023, I was awarded a Fulbright Research Scholar grant to be held at Princeton University. In 2020, the Austrian Science Fund awarded me the prestigious Lise Meitner Fellowship. In 2019, I won an Ernst Mach Fellowship funded by the OeAD. In 2017, I was distinguished by the Austrian Academy of Sciences with a Joint Excellent in Science and Humanities (JESH) fellowship.

Since 2016, I have been the Principal Investigator (PI) of seven funded research projects (2 ongoing) at national and international levels. Based on my academic visits and positions at various leading institutions in the field, I have created a solid network of world-class collaborators (based in Europe, the USA, and South America) and consolidated my reputation as an international scholar.

I have taught 22 courses since 2015, in Spanish and English, at the bachelor, master, and doctoral levels. I have experience supervising bachelor and postgraduate students (currently supervising one doctoral student). I have taught courses at different universities in Argentina, Uruguay, and Brazil.

Due to my global standing in the field, I am regularly invited to present my work at national and international conferences. I have given more than 58 talks at international conferences, workshops, and research seminars around the world (e.g., in Paris, Vienna, Budapest, Amsterdam, Los Angeles, Zürich, Berlin, Munich, St. Andrews, Irvine, Bologna, Pisa). Moreover, I have organized (Chair) more than 10 academic events, ranging from international symposia (e.g., CLMPST in Buenos Aires 2023) to workshops (e.g., Vienna 2021, 2022), and conferences (e.g., Salvador 2017, Rio de Janeiro 2019). I regularly participate in outreach events organized by my current department (e.g., talks in secondary schools, radios, and educational ac



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Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: ALVAREZ FERNANDEZ, ALBERTO
Referencia: RYC2024-050339-I
Correo Electrónico: alberto.alvarez@ehu.eus
Título: Nanostructured materials for advanced optoelectronic devices and biosensing

Resumen de la Memoria:

My research activity to date has focused on the fabrication of tuneable nanostructures and nanomaterials for bio-sensing and optoelectronic applications. Through these activities, I acquired skills and the passion to become an expert in fields such as material science, polymer chemistry, polymer physics, optics, biology, and advanced characterisation techniques such as Raman, X-ray scattering, ellipsometry, and microscopy. As an early career academic, I developed one of the first experimental examples of optical metasurfaces created by molecular self-assembly. Thus, high refractive surfaces were created by controlling nanoparticle array distribution, shape, and size through the combination of block copolymer lithography and aqueous metal reduction. Simultaneously, I have dedicated substantial efforts to the development of innovative experimental approaches based on block copolymer co-assembly for the fabrication of tailored inorganic mesoporous materials, with a special focus on reducing the synthetic effort necessary for this task. Parallel to this, I have also worked in expanding the applications of the created mesoporous architecture in sensing and biosensing fields. Thus, an important part of my work has been focused on enhancing the biosensing capabilities of Quartz Crystal Microbalance (QCM) through the nanostructuring of the sensor surface. More recently I have expanded the types of building blocks used for the fabrication of nanostructures with the incorporation of self-assembled peptides and nanoparticles, allowing the generation of novel structures. Complementary to that, my research has been focused also on the development of new structural characterization methodologies and their implementation. Thus, during my work, I established new theoretical approaches for the optical study of metasurfaces and introduced innovative approaches in the development of multimodal experimental characterization platforms for the characterization of mesoporous materials. My current and future independent research line, summarized as "Nanostructured materials for advanced optoelectronic devices and biosensing - NanoMaD" has the objective of expanding the applicability of self-assembled nanomaterials in creating non-classical 2D and 3D structures using advanced fabrication methodologies, with the purpose of designing new optoelectronic materials capable of integrating biosensing and biomolecule isolation. In this objective, new fabrication methodologies such as iterative block copolymer self-assembly or the use of innovative blocks such as peptides or nanoparticles will be developed for the fabrication of complex 2D and 3D nanostructures. The combination of these new platforms with novel biomarkers such as nucleic acids or extracellular vesicles supports clinical applications at the point of care, representing a powerful innovation to develop new diagnostic assays for early cancer, neurological or cardiovascular disease detection.

Resumen del Currículum Vitae:

Overall, my track record as a researcher is commendable and on an upward trajectory, with a total of 42 publications and 8 more submitted or in preparation. My ability to build my own research ideas is supported by my leadership as corresponding author on 11 publications. My capacity to develop innovative research proposals and attract research funding is exemplified in the award, in 2022, of the ADMIRE MSCA fellowship, founded by the EU Commission and Ireland Science Foundation (£130k). Other examples of funding obtention are my lead as Principal Investigator of a UCL Global Engagement Fund (£4.7k) and my participation as a co-investigator in the project "NANOINFECT", funded by the Spanish Research Agency (£181k). More recently, in 2023, I got a Gipuzkoa Fellowship (£120k) to develop an independent research project focused on the fabrication of metallic mesoporous electrodes by block copolymer self-assembly. During my academic career, I have established active collaborations with world-leading academics in nanomanufacturing (Prof. Christophe Sinturel, Univ. of Orleans, Dr Cristina Vicente Manzano, CSIC), chemical engineering (Dr Qilei Song, Imperial College), and biosensing (Dr Alfredo M. de la Escosura, Univ. of Oviedo; Prof. Roisin Owens, Univ. of Cambridge, Dr Silvain Ladame, Imperial College, and Prof. Beatriz Prieto-Simon, Univ. Rovira i Virgili). This is also reflected in a total number of 159 co-authors from more than 20 different research institutions in my current publication list. My contributions to Material Science and Nanotechnology have been recognized through prestigious awards, including the 2021 Young Researcher Award from the European Material Research Society for advancing structural characterization platforms for nanomaterials. In 2023, I was awarded the RSC Materials Chemistry Horizon Prize: Stephanie L Kwolek Prize for my contributions to fabricating and characterising polymeric porous membranes, with a focus on energy applications. Furthermore, my effective scientific communication skills have been acknowledged with awards such as "Best Poster Communication" at the UCL Chemical Engineering Research Day in 2021 and BPC2018 (Polymer Chemistry, RSC) in 2018. Moreover, my research valorisation has led to collaborations with companies like Semilab Inc. (Hungary), BASF (Germany), NSG Group (UK), and Universal Biosensors (Australia), and my role as a Technical Consultant for Vesynta Ltd. (UK) since 2023 highlights my experience in transferring academic research to industrial environments. I am committed to initiatives promoting equality and diversity within STEM, as evidenced by my role as an "In2ScienceUK" ambassador from 2018 to 2022, where I actively promoted STEM careers among young individuals from disadvantaged backgrounds. Additionally, I engage in scientific public outreach, participating in events like the "It's All Academic" festival (2019), the Bloomsbury Festival (2022), and the Royal Society Summer Science Exhibition (2023). In addition to my research, I have gained significant teaching experience during my academic career. My dedication and effectiveness in teaching were acknowledged in 2022 when I was awarded Fellow status by the High Education Academy (HEA). In terms of research supervision, I have co-supervised a total of 9 MEng and MSc theses and 3 PhD students.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: SIERRA FERNÁNDEZ, ARANZAZU
Referencia: RYC2024-048573-I
Correo Electrónico: a.sierra@nanogune.eu
Título: Advancing Sustainable Solutions for the Protection of Cultural Heritage and Construction Materials
Resumen de la Memoria:

My research focuses on developing multifunctional hybrid coatings with self-healing and antimicrobial properties for cultural heritage (CH) conservation and construction materials. This work addresses critical challenges, such as the degradation of historical and modern infrastructures caused by environmental stressors, aging materials, and the intensifying effects of climate change. By integrating advanced surface functionalization, biomimetic mineralization processes, and thin-film deposition technologies, my research aims to create adaptive, durable, and cost-effective coatings that ensure long-term protection and minimal maintenance.

During my PhD at the University Carlos III of Madrid (Spain), where I graduated with distinction (Premio Extraordinario) in 2017, I focused on nanoparticle-based formulations for stone conservation, successfully applying these technologies to real-world heritage sites such as the Mayan archaeological site of Chichén Itzá in Mexico. I also explored antifungal and photocatalytic coatings and modified cellulose-based materials for conservation purposes, contributing to national and European projects.

Following my PhD, I extended my expertise by developing lime mortars enriched with nanoparticles (Ca(OH)₂, SiO₂, Mg(OH)₂) designed to perform under diverse curing conditions, including high-CO₂ environments and underwater applications. These efforts bridged experimental research with practical implementations in the restoration of historical structures.

As an MSCA Fellow during my postdoctoral appointments at Johns Hopkins University (USA) and the Max Planck Institute (Germany), I led independent research on bioinspired nacre-like multilayered coatings for stone heritage protection. These systems enhanced structural resilience and adaptability, expanding my expertise in biomimetic approaches and advanced coating architectures. Currently, as a la Caixa Junior Leader Postdoctoral Fellow at CIC nanoGUNE (Spain), I focus on thin-film deposition techniques, such as Atomic Layer Deposition (ALD), to design nanostructured coatings with precise control over structure and functionality.

Building on this foundation, my proposed research line focuses on expanding the functional capabilities of coatings by incorporating autonomous self-repair mechanisms and responses to environmental stimuli. By optimizing electrochemical processes at the coating-substrate interface, I aim to develop coatings capable of promoting ion migration and controlled mineral deposition to seal cracks and fractures. Additionally, tailoring surface chemistry will improve resistance to microbial colonization and biofouling, providing enhanced protection against biodeterioration.

The ultimate goal of this research is to deliver transformative smart materials that dynamically adapt to their environment, combining advanced functionalization and self-healing capabilities. These innovations will significantly extend the lifespan of both modern infrastructures and historical landmarks, addressing contemporary challenges with sustainable, adaptive, and high-performing solutions.

Resumen del Currículum Vitae:

I completed my PhD in 2017 at the University Carlos III of Madrid (Spain), earning the prestigious "Premio Extraordinario" distinction. My research focuses on the design, synthesis, and development of bioinspired coatings for cultural heritage (CH) conservation and construction materials, integrating sustainability, durability, and environmental friendliness. Early in my career, I specialized in developing nanomaterials for the protection of stone heritage, contributing to national and European projects across multiple institutions.

I have extensive international experience, having lived, studied, and conducted research in five countries: Spain, Hungary, Germany, Mexico, and the United States. As a Marie Curie Fellow, I further developed my research and leadership skills by driving interdisciplinary projects and fostering collaborations across diverse fields. Since 2023, I have been a Research Fellow at CIC nanoGUNE in Donostia (Spain), leading my research as a la Caixa Junior Leader and principal investigator (PI). Additionally, I am the PI of a "Generación de Conocimiento" project funded by the Spanish Ministry of Science and Innovation (MINECO), further consolidating my leadership in research. In the same year, I achieved the R3 certification, which acknowledges advanced research expertise and leadership capabilities.

My work has resulted in 25 co-authored publications (70% in Q1 journals, including an invited book chapter), with an h-index of 12 and over 766 citations (Google Scholar). I have presented at 22 international conferences, including six keynote or invited talks, and have been recognized with awards for Best Oral Contribution and First Poster Prizes. Beyond academia, I actively disseminate research outcomes to various audiences—from citizens to industrial companies—promoting awareness of the importance of CH preservation.

I have been involved in eight national and international research projects, securing beamtime as PI at PSI (Switzerland) and BNC (Hungary). With teaching experience in CH and nanotechnology, I have mentored three undergraduate students, four master's students, and two PhD students, and currently supervise four PhD students. My interdisciplinary approach bridges microbiology, materials science, and cultural heritage preservation, advancing innovative and sustainable solutions to protect CH and construction materials.



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Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: MUÑOZ VELASCO, PEDRO
Referencia: RYC2024-049038-I
Correo Electrónico: pmunoz.ingenieria@ono.com
Título: Innovative Approaches to Decarbonize Construction: From Waste to CO2 Sequestration

Resumen de la Memoria:

My research career began in 2010 while working for a construction company. One of our ceramic suppliers approached me with the idea of developing a new brick. I contacted the University of La Rioja and joined the research group in the area of thermal machines and engines. While pursuing the first cycle of my Ph.D., we developed the interior and exterior geometry of the Termoarcilla® block. The manufacturer, Cerámicas Sampedro S.A., was satisfied with the product and sponsored my Ph.D., tasking me with reducing the thermal conductivity of the clay used. I collaborated with various companies, evaluated their waste materials, and introduced them as additives, assessing the properties of the resulting ceramics. This effort led, in 2013, to several high-impact publications and the creation of a new clay mixture that is still used today in the production of Termoarcilla® blocks. Continuing in this line of research, I sought new waste materials and improved the ceramic production process by assessing different processes (e.g., molding, drying, firing). I was then hired in Chile, where I began a new line of research on the energy valorization of organic waste through anaerobic digestion, leveraging the resources available at the Universidad Autónoma de Chile and my knowledge of different waste materials. The goal was to integrate this technology into buildings to reduce the impact of domestic waste management and decrease buildings' energy dependence. This new line of research was funded by several national competitive projects and culminated in the implementation of two pilot plants in Chile which incorporates innovative solutions such as microalgae posttreatment for digestate or novel reactors configurations. In addition, the impact of my research on construction products led to invitations to join various research groups and continue developing construction materials, funded by public competitive projects. However, at this time, the focus included not only ceramic products but also concrete and mortar solutions. The development of these materials gradually integrated into their evaluation as architectural solutions, investigating not only the materials' nature and characteristics but also their impact on buildings. Thus, research was conducted by considering the effect of these new materials on the whole building (e.g. mechanical response, thermal comfort, energy efficiency, and ecological footprint, among other factors). This line of research has continued to expand, incorporating increasingly environmentally friendly materials such as adobe, straw constructions, and green roofs. To date, both lines of research continue with various funding sources. In relation to the valorization of organic waste, we are evaluating the biomethane potential from food production chain waste in Spain, with results funded by regional funds and published in the last month (doi: 10.1016/j.renene.2024.121175). Meanwhile, in the development of construction products, we are involved in two national projects in Chile: one related to the production of high-performance concretes with graphene (GO) and TiO₂, and another concerning the rehydration processes of cement recovered from concrete recycling (latest publication doi: 10.1016/j.jobe.2024.111260).

Resumen del Currículum Vitae:

Dr. Muñoz graduated as an Electrical Engineer in 2003 and earned an MSc in Industrial Engineering in 2008. Both degrees were achieved at the Universidad de La Rioja, with additional studies at FH-Aachen (Germany) through the Erasmus Program. He then worked for five years at CEOSA, managing various civil engineering projects. Subsequently, he transitioned to freelance work while pursuing a Ph.D. focused on developing fired clay bricks with improved thermal properties. His thesis was partially funded by the company Cerámica Sampedro S.A., resulting in five original research articles published in top-tier Q1 JCR journals, despite some findings being protected as industrial secrets. After completing his Ph.D., Dr. Muñoz balanced his career with family responsibilities, including the neonatal care of two children. Despite these personal demands, he has maintained an intense and productive research trajectory. In August 2013, he was awarded a fellowship under the PAIR program at Universidad Internacional de Chile, joining the Faculty of Civil Engineering. Since 2018, he serves as a Full Professor at Universidad Internacional de La Rioja, a fully online university where the absence of physical laboratories has necessitated innovative approaches. Notably, Dr. Muñoz has secured experimental collaborations with companies that provide facilities and equipment, leading to successful competitive project funding in Spain. Dr. Muñoz's research focuses on low-cost, sustainable technologies to achieve Net Zero Energy Buildings, addressing technical, socio-economic, and environmental dimensions. His work prioritizes waste revalorization to produce biofuels and replace natural raw materials in construction, aiming to reduce the environmental footprint of buildings. He has been principal investigator in 10 competitive R&D&I projects, including highly competitive calls (e.g. FONDECYT, Erasmus+) awarded within a framework with success rates below 24%. His proposals achieved top positions (between 2nd and 8th place, respectively), underscoring his leadership and scientific rigor. Dr. Muñoz has participated in 16 competitive R&D&I projects and nine non-competitive ones involving private-sector partnerships accounting for approx. 2 million Euros. This research has produced over 60 jcr publications with more than 1800 citations and an h-index of 23 (WoS). Many papers were co-authored with international researchers (e.g. from Turkey, Chile, Italy, the US, and Spain), with Dr. Muñoz often serving as the first or corresponding author (40% and 53% out of total, respectively). His contributions include two book chapters, two teaching books, and dissemination activities through over 20 conference presentations, four by invitation. He has also served as a chairman and committee member for plenary sessions. In addition, he has been acted as chairman and member of the overseeing committee at 2 plenary sessions. Dr. Muñoz has supervised two Ph.D. students and over 20 MSc theses, highlighting student involvement in publications. He has also been involved in several cooperation and international platforms and has been responsible for the signature of several cooperation agreements, between academia and the industrial sector. Finally, Dr. Muñoz has participated in a patent and an industrial design which are currently exploited and owned by the Universidad Católica del Maule.



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Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad

Nombre: SAINZ-AJA GUERRA, JOSE ADOLFO

Referencia: RYC2024-049236-I

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Título: Low-Carbon Concretes for Marine Environments

Resumen de la Memoria:

Summary of Career and Research Line

My research trajectory has evolved through distinct stages, reflecting a continuous expansion of expertise and scope. During my predoctoral stage, I specialized in the study of special concretes, focusing on developing low-carbon concrete. In my postdoctoral stage, I expanded my focus to structural integrity, working on a broader range of structures and leveraging advanced tools such as finite element analysis (FEA) and artificial intelligence (AI). These tools have enabled me to address complex engineering problems that were previously unapproachable, opening new avenues for innovation and impact.

I have extensive experience in both competitive research projects and industry collaborations, having participated in 20 competitive projects and contributed to 34 knowledge transfer initiatives. The environment in which I work fosters a seamless exchange of knowledge between academia and industry. Competitive research projects generate cutting-edge insights that are subsequently transferred to industrial applications, while collaborations with industry provide valuable feedback and highlight key areas for future research. This cyclical and mutually beneficial relationship drives continuous improvement, ensuring that research remains relevant and impactful.

Proposed Research Line

Building on this foundation, my proposed research line focuses on applying advanced computational tools, including FEA and AI algorithms, to design and develop low-carbon concretes for marine environments. This research addresses the growing demand for sustainable materials in offshore wind energy infrastructure, particularly for concrete-based floaters.

The research will benefit greatly from the established flow of collaboration with industry, ensuring a constant exchange of ideas and priorities. Insights from competitive projects will inform innovative solutions for industrial applications, while industrial challenges will refine and guide the research objectives.

The main goals of the research line are:

Develop low-carbon concretes with high mechanical performance and durability tailored to offshore environments.

Optimize mix designs using AI, integrating recycled and innovative components to enhance sustainability.

Validate the developed materials through advanced simulations replicating extreme operational conditions, ensuring technical and economic feasibility.

Impacts and Vision

This research aims to advance academic knowledge on sustainable materials and computational techniques while providing high-impact solutions to the construction and energy sectors. By leveraging the synergy between academic research and industrial application, it will contribute to reducing the carbon footprint of construction, support the energy transition, and drive innovation in offshore wind energy.

With a strong foundation in sustainable concrete development, advanced simulation, and AI applications, and supported by a continuous exchange of knowledge with industry, this research line is poised to deliver transformative solutions to global sustainability challenges.

Resumen del Currículum Vitae:

I hold a Civil Engineering degree from the University of Cantabria (2009@2014), with expertise in mechanical and structural behavior, finite element simulation, and artificial intelligence. My academic achievements include an International Master's in Building Technology, Rehabilitation, and Management (2015), a Master's in Integrity and Durability of Materials (2019), and a doctoral thesis on "Recycling of traditional railway track for slab track production," which earned the Summa Cum Laude distinction, an international mention, and the Extraordinary Doctorate Award (2021).

B.1. Scientific Contributions and Relevance

My research spans advanced materials, sustainability, AI, and numerical simulation, addressing material durability, climate change, and structural optimization. I have authored 39 JCR articles (20 in Q1), 6 book chapters, and 27 conference contributions, with over 1,000 citations and an h-index of 16.

Key areas of expertise include:

Sustainable concretes: Developing recycled formulations with enhanced durability.

Predictive modeling in steels: Using ML to predict neutron embrittlement in nuclear environments.

Railway infrastructure: Combining finite element analysis and ML to reduce lifecycle costs.

My work, published in journals like Case Studies in Construction Materials and Cement and Concrete Composites, has been enhanced by collaborations with the University of Huddersfield and EDF Energy. Additionally, I have contributed as a committee member for Ph.D. defenses and events such as the VIII ACHE Congress and ISECC21.



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B.2. Contributions to Society

I have participated in 20 competitive projects and 34 industry collaborations, with a focus on technology transfer:

Railway: Predictive models for durability and lifecycle optimization.

Steel: Big data-driven process optimization for efficiency.

Construction: Developing eco-friendly concretes with reduced environmental impact.

I actively promote science-society connections through outreach events like European Researchers' Night, highlighting sustainability and innovation.

B.3. Contributions to Training Young Researchers

I supervise three Ph.D. theses on:

Steel fiber-reinforced concrete wind turbine towers.

Predictive railway maintenance using ML and finite elements.

Neutron embrittlement modeling in nuclear environments.

I've mentored 14 undergraduate and master's theses and edited 5 Special Issues in Q1-Q2 journals (Materials, Buildings), while serving on the Topical Advisory Panel for Buildings.

B.4. Additional Relevant Contributions

My international experience includes stays at FEUP, Heriot-Watt University, and the University of Huddersfield, supported by the Augusto González Linares Postdoctoral Fellowship. During this time, I developed ML-based predictive models, bridging research and technology transfer.

Entrepreneurial training has equipped me to effectively translate research outcomes into practical industry solutions, fostering collaborations and maximizing social and economic impact.



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Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: SCHENK, CHRISTINA
Referencia: RYC2024-048744-I
Correo Electrónico: christina.schenk@imdea.org
Título: BENEFICIARY - hyBrid LEarniNg approachEs For Improving effiClency And acceleRating discoverY

Resumen de la Memoria:

I hold a Ph.D. in Mathematics from Trier University (Germany, 2018), specializing in modeling, simulation, and optimization of fermentation processes. My Ph.D. research, conducted partly at Carnegie Mellon University (USA) with Prof. L. Biegler, resulted in a monograph, multiple articles, reports, book chapters, and presentations at international conferences, attracting industry interest and leading to advisory roles on fermentation process control. Post-Ph.D., I gained international research experience at Carnegie Mellon University (USA), the Basque Center for Applied Mathematics (Spain), and remotely at Lawrence Berkeley National Lab (LBL, USA). During this time, I organized 2 mini-symposia at ICCOPT and SIAM CT, secured an individual grant with LBL, and contributed to research articles and reports on data analytics, modeling and analysis, and probabilistic methods.

Currently, as a Senior Researcher at IMDEA Materials, I lead model and algorithm development for material science applications. I represent the institute on the technical board of the AID4GREENEST project and oversee its data management. I am actively involved in 7+ collaborative research projects. My publication record includes 21+ publications (all available in open access), 1 software patent, and 47+ (15 invited) presentations. In 2024, I earned the R3 Certificate from AEI.

With international mobility experience across 6 countries - USA, Australia, Germany, Luxembourg, Spain, and Rwanda, I have managed tasks, work packages, teams, and collaborations with industry partners. As a key developer of predominantly open-source software tools, I have facilitated knowledge transfer to industry. I have also played an active role in securing funding, succeeding in 9+ research grants (regional, national, EU, and global, including one individual international grant with LBL) and seven travel grants (SIAM, Mary-Kingsley, ICCOPT). Additionally, I serve as an independent external expert for COST and a reviewer for various high-impact journals like Computers & Electronics in Agriculture Journal.

Beyond research, I am engaged in academic service, including serving on boards and committees, such as the faculty council at Trier University, and fostering collaborations with renowned institutions like Zhejiang University of Technology and Pfizer Inc. (USA). I am committed to outreach and diversity initiatives, including the Ada-Lovelace Project promoting gender equality and volunteer teaching in Rwanda.

I have broad teaching and mentoring experience at graduate and undergraduate levels, such as teaching numerical mathematics at Trier University, and mentoring 5 Bachelor/Master's thesis and 2 PhD candidates.

My interdisciplinary research combines physical model-based, data-driven, and probabilistic methods to address complex systems, emphasizing modeling, algorithmic and analytical aspects. Key applications span green materials, energy efficiency, CO₂ reduction, and drug discovery, aiming to solve societal and industrial challenges. I am particularly interested in advancing hybrid learning approaches to tackle model complexity and data scarcity, accelerating materials and drug discovery timelines, and translating these innovations into industrial technologies.

Resumen del Currículum Vitae:

Senior Researcher at IMDEA Materials working with multiple groups. Technical Board Member and Responsible for Data Management in European AID4GREENEST Project. Independent External Expert for COST (European Cooperation in Science & Technology). R3 Certificate holder. Applied Mathematician (Trier University) and Ph.D. in Mathematics (Trier University).

7 years of post-Ph.D. professional experience in collaboration with academia and industry in mathematical modeling, simulation, optimization, and data science, applied across disciplines in sectors, such as chemical manufacturing, environmental science, food production, and healthcare, demonstrating adaptability to diverse challenges.

I have contributed to numerous mathematical models, methods, theoretical and numerical analysis, and algorithm and software development for a broad range of applications. These include 21+ publications (h-index: 6 (Google Scholar); citations: 92 (Google Scholar); cited in top journals like Nature Reviews; all at least in yellow open-access), and 1 software patent. My global engagement includes 47+ presentations (15 invited) at internat. events, where I promote cross-disciplinary collaboration and knowledge sharing. I have also authored 12 academic and 2 industrial reports.

My internat. mobility experience spans 6 countries (USA, Australia, Germany, Luxembourg, Spain, Rwanda), where I have fostered collaborative networks and contributed to interdisciplinary knowledge exchange at institutions like Carnegie Mellon University (USA), the Basque Center for Applied Mathematics (Spain), and Berkeley National Lab (USA) during significant research periods.

I have contributed to 14+ research projects (1 internat. funded by Berkeley Lab as PI), managing tasks, work packages, coordinating with industry partners, and leading teams, e.g. in software. My industry collaborations include consulting work with Festo SE & Co. KG (Germany), where I provided expertise in mathematical modeling and control. As the main developer of several freely accessible software tools, I have played a key role in transferring knowledge to industry. In addition, I coordinated 2 mini-symposia at international conferences (ICCOPT: 2x3, SIAM CT: 3x4).

From the early stages of my career, I have contributed to numerous research proposals, shaping project trajectories. I received the R3 Certificate in 2024 and have secured 9 collaborative research (1 individual) and 7 travel grants e.g. by SIAM. My network extends across institutions like Zhejiang University of Technology, Technical University of Madrid, and Pfizer Inc.

I am a member of professional communities such as EWM and SAMI, and I serve as a reviewer for journals like Computers and Electronics in Agriculture. I have actively contributed to shaping decisions and advocating for inclusive practices, e.g. by serving as a Gender Equality Commission at BCAM.

Beyond research, I have facilitated knowledge transfer to industry through comprehensive software training (e.g., KIPET, gpCAM). With 14+ years of commitment to gender equality and outreach initiatives, I have participated in mentoring initiatives and volunteered teaching in Rwanda.

My teaching experience spans both graduate and undergraduate levels across diverse institutions. I have mentored and supervised 5 Bachelor/Master students and 2 PhD candidates, fostering their academic growth.



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Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: KYNDIAH , ADRICA
Referencia: RYC2024-049843-I
Correo Electrónico: adrica.kyndiah@iit.it
Título: Organic Bioelectronics for High throughput Non-Invasive Intracellular Electrophysiological Monitoring for advanced Preclinical Drug Screening and Organ-on-a-chip Applications

Resumen de la Memoria:

My research career has been defined by a multidisciplinary approach to advancing organic electronics and bioelectronics, with a particular focus on electrolyte-gated field-effect transistors (EGFETs) and their integration with biological systems. I have made significant contributions to developing non-invasive platforms for electrophysiological recordings of cardiac and neural cells. During my PhD, I investigated charge transport mechanisms in organic semiconductors, focusing on organic field-effect transistors (OFETs). My postdoctoral work at CEA Grenoble and CNRS Bordeaux expanded this foundation through the development of organic light-emitting transistors and advanced interfacial engineering techniques for high-performance devices. This expertise enabled my transition into bioelectronics at IBEC Barcelona, where I established a new research line integrating EGFETs with electrogenic tissues for cellular activity monitoring and preclinical drug screening.

As a Senior Researcher at IIT Milano, I have expanded this work, building a strong track record in EGFETs, from fundamental characterization to scalable, solution-processed devices for biomedical applications. I have actively led experimental design, data analysis, and high-impact publications, bridging organic electronics and healthcare. My future research aims to revolutionize non-invasive bioelectronic platforms, enabling scalable, high-fidelity electrophysiological recordings with transformative potential for preclinical drug screening and disease modeling.

For the Ramón y Cajal program, I propose advancing my work from single-device proof-of-concept recordings to developing high-throughput platforms with optimized spatio-temporal resolution, enabling the study of action potential propagation in 2D and 3D models, including organoids. This platform will provide a robust, scalable tool for drug efficacy and toxicity evaluation, addressing critical challenges in biomedical research and preclinical screening. The program provides an ideal platform to propel this vision, fostering innovation at the intersection of organic electronics and healthcare.

Resumen del Currículum Vitae:

My academic and research career has been profoundly influenced by extensive international experiences across globally renowned institutions, fostering a strong commitment to interdisciplinary and collaborative research. I graduated in Physics from North Eastern Hill University, Shillong, India, before moving to Bologna, Italy, in 2011 to pursue a PhD through the prestigious TRIL program awarded by the International Centre for Theoretical Physics (ICTP). I was awarded my PhD in 2015 by the Department of Chemistry at the University of Bologna, with experimental work conducted at the National Council of Research (CNR-ISMN) under the supervision of Prof. Fabio Biscarini and Prof. Tobias Cramer. My research focused on charge transport in Organic Field-Effect Transistors (OFETs), laying the foundation for my expertise in organic electronics and device optimization.

Following my PhD, I further expanded my international exposure with a postdoctoral position at the French Alternative Energies and Atomic Energy Commission (CEA) in Grenoble, where I contributed to stabilizing organic photovoltaics. In 2016, I joined the French National Research Centre CNRS Bordeaux at the IMS lab, successfully fabricating the group's first hybrid organic light-emitting transistors (OLETs), which led to three peer-reviewed publications. My mobility continued with the award of a prestigious Marie-Curie-COFUND Fellowship in 2017, enabling me to join the Institute for Bioengineering of Catalonia (IBEC) in Barcelona. At IBEC, I initiated a new research line on bioelectronics, establishing a device characterization lab and interfacing electrolyte-gated transistors with cardiac cells for in vitro non-invasive recording. This work resulted in high-impact publications where I am the first and corresponding author.

As part of the EU-funded BORGES project, I co-led the IBEC team, coordinating activities, recruiting researchers, and supervising a PhD student. In 2020, I joined the Italian Institute of Technology (IIT) in Milan as a Senior Researcher, where I lead the bioelectronics and biosensing team within the Printed and Molecular Electronics lab of Dr. Mario Caironi. I established a cutting-edge bioelectronics lab for electrophysiological recordings using printed transistors and currently supervise three PhD students, with a fourth joining in February 2025, and mentor two postdocs. I am also a work package leader of an EU Pathfinder IV Lab project, advancing bioelectronic technologies. I have participated in technology transfer projects with industrial partners such as BRACCO which is a biomedical company for developing smart wearable injections.

In 2025, I became the Principal Investigator of the nationally funded RHYTHMIC project, supported by the Italian Ministry of Education with nearly €600,000. Beyond institutional roles, I actively contribute to the global research community through 26 conference presentations, including one keynote and four invited talks, and symposium organization. Additionally, I have been a member of PhD commissions and recruitment processes for international programs, further demonstrating my dedication to advancing science and fostering global collaboration.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad

Nombre: HOCKE, LIA MARIA

Referencia: RYC2024-048193-I

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Título: Clinical Applications of NIRS and fMRI in Vascular Health

Resumen de la Memoria:

My research has focused on understanding blood flow dynamics and systemic vascular health, using non-neuronal systemic low-frequency oscillations (LFOs) as biomarkers to track blood flow and perfusion in the brain with functional magnetic resonance imaging (fMRI). Moving forward, I aim to broaden my research to include both cerebral and systemic vascular physiology and incorporate additional cerebrovascular measures, in addition to setting a higher focus on near-infrared spectroscopy (NIRS) and functional NIRS (fNIRS).

The vascular system plays a vital role in regulating blood flow to meet the body's metabolic needs, and its dysfunction is associated with a range of conditions, including cerebrovascular diseases, neurodegenerative disorders, and psychiatric illnesses. Beyond the brain, systemic vascular health significantly influences circulation and the delivery of oxygen and nutrients throughout the body. Vascular dysfunction often precedes clinical symptoms, underscoring the importance of early detection and the potential of vascular imaging to guide therapeutic interventions and recovery strategies.

Building on my previous work, I aim to develop a comprehensive, non-invasive approach to assess vascular health across both the brain and body with fMRI/NIRS and fNIRS alone. This involves refining techniques for measuring cerebrovascular reactivity (CVR), pulsatility, and vascular lag—key factors in interpreting neuroimaging data and understanding how blood flow dynamics affect brain function and structure. By introducing and incorporating active interventions, and employing advanced signal processing and modeling approaches, I aim to capture the temporal variability of blood flow across regions, enabling more precise assessments of vascular changes.

Ultimately, this work seeks to enhance the understanding and monitoring of vascular health, advancing both cognitive neuroscience and clinical applications. By improving diagnostic accuracy and expanding the scope of vascular imaging, these efforts will contribute to the development of more integrated and effective approaches for studying and addressing cerebrovascular and systemic vascular conditions.

Resumen del Currículum Vitae:

From the beginning of my scientific career, I have focused on advancing non-invasive brain imaging techniques, particularly functional Magnetic Resonance Imaging (fMRI) and functional Near-Infrared Spectroscopy (fNIRS), for research and clinical neuroscience. Originally from Germany, my academic journey in Neuroscience and Biomedical Engineering has taken me to leading institutions worldwide, including the University of Maastricht in the Netherlands, Tufts University, Harvard Medical School, and McLean Hospital in the USA, the University of Calgary in Canada, and the Basque Center on Cognition, Brain and Language (BCBL) in Spain.

Over the course of my career, from a Master's student to an Assistant Professor at Harvard Medical School and most recently, Staff Scientist at the BCBL, I have demonstrated independence, creativity, and the ability to lead multidisciplinary projects. I published 22 peer-reviewed articles (six as first author), secured one patent, and contributed to a book chapter through collaborations spanning China, Turkey, Germany, and the USA. My work has been recognized through talks at both national and international levels, opportunities to lead publicly funded research projects, including an NIH R21 grant as PI (AG070383-01), showcasing my ability to drive impactful research.

My career spans foundational research, hardware development, innovative analysis techniques, and clinical applications of fMRI and fNIRS, both individually and in combination. My groundbreaking research in perfusion dynamics has transformed the field of functional imaging. A key contribution has been identifying low-frequency oscillations (LFOs) in functional neuroimaging as systemic, non-neuronal phenomena. These LFOs have become a critical signal for flow and perfusion tracking as well as denoising, enabling multimodal analysis techniques and versatile post-hoc approaches for fMRI and fNIRS data. Clinically, these methods have been able to uncover perfusion deficits and recovery in cerebrovascular conditions such as Moyamoya disease. Additionally, I have developed hardware and analytical techniques to mitigate physiological confounds in fMRI and fNIRS, advancing hemodynamic modeling and lag-based analyses. My current work focuses on leveraging these innovations for real-time feature extraction. The "Finding Hemo" symposia, which I co-organized in 2021 and 2022 attracted a global audience and highlighted the transformative impact of my research.

Furthermore, I have contributed to education through interdisciplinary teaching, including courses such as "Statistics for Graduate Students" at Tufts University and "Scientific Methods in Psychopharmacology" at Harvard University. As co-director of the Opto-Magnetic Group at McLean Hospital and a senior researcher at the University of Calgary, I have mentored four undergraduate students, two post-graduate students, and a postdoctoral researcher. At the BCBL, I continue my mentorship with two PhD students, inspired by the exemplary mentorship I have been fortunate to receive.



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Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: FERNÁNDEZ-CABALLERO FARIÑAS, M^a DOLORES
Referencia: RYC2024-048566-I
Correo Electrónico: lola.farinas@deusto.es
Título: Advanced Techniques and Technologies for Non-Destructive Material Characterization and Process Monitoring

Resumen de la Memoria:

After graduating as a Telecom. eng. and completing a MSc in biomedical eng. I started my research career at the Spanish National Research Council, where I carried out my PhD on physical technologies. The core of my research mission is the non-invasive estimation of physical parameters, which I have driven towards complex materials characterization and process monitoring. I consider myself a multidisciplinary scientist, with target application interests revolving around different communities and in constant evolution. To this end, I have specialized in the development of innovative ultrasonic techniques and technologies that generate new knowledge and enable the development of novel physical models that, through the solution of the inverse problem, allow us to establish meaningful relationships and have access to relevant information about the behavior or composition of materials or complex structures and/or the monitoring of processes. Since my first research contract in a publicly funded R&D project focused on the development of non-destructive testing techniques to facilitate the sustainability of composite materials manufacturing for aeronautical purposes (Tecnatom&Airbus) until today, I have had the opportunity to contribute to different laboratories around the world: non-destructive characterization of foams, membranes and hierarchically structured materials (ITEFI-CSIC), characterization of mechanical properties of balsa wood (MIT & BASF), application of spectroscopy to detect thickening in layers of the gastrointestinal tract to aid disease assessment (U.Glasgow), acoustic modeling of a plant leaf in relation to leaf traits and determination of plant water status (CSIC, CITA & Harvard) or estimation of food attributes such as texture, curing, salting or fat/water content (UPV). The main technological applications resulting from my research so far are: the development of a portable ultrasonic system for the rapid, non-destructive and non-invasive determination of plant water status in the field (CSIC, CITA and Grandes Vinos y Viñedos); and an inline and contactless ultrasonic system for the estimation of textural properties of extruded snacks whose patent is co-owned for exploitation with the manufacturer (UPV, CSIC & Siro Foods) among others. The multidisciplinary nature of my research, my collaboration abilities and my commitment to transfer are the outcome of my years of excellent training in the laboratory of Dr. Tomás Gómez at CSIC. Following my experiences in startups and industry, I transferred my Juan de la Cierva-Incorporación contract from CSIC to the University of Deusto after being certified as R3 and awarded an Ikerbasque Research Fellowship. This move allowed me to establish my own lab and brought me closer to leading a new line of research independently. Taking advantage of my experience in deep-tech entrepreneurship programs (The Collider, EBTON awards), I have identified a line of research for the coming years that aligns with my experience: the study of batteries using novel non-contact ultrasonic techniques for cell characterization and inspection. This line also aims to facilitate technology transfer by improving quality control in battery production lines, enhancing research on the next generation of batteries. As for today, I have recently secured national public funding to implement this line, including support for a PhD student.

Resumen del Currículum Vitae:

L. Fariñas, Telecom. Eng. and MSc of Biomedical Eng. (UPM), joined CSIC in 2012 as a research assistant and later was awarded with an FPI grant. Before defending her thesis titled "Non-contact Resonant Ultrasound Spectroscopy and its Applications to Study Multilayered Plant Tissues" (UPM, 2016) under the supervision of Dr. Gómez, she completed research stays (under competitive calls) at MIT (US, 2014) and U. Glasgow (UK, 2015). Right after her cum laude PhD graduation, she joined Harvard (US, 2016) as a visiting postdoctoral fellow. In 2017, she worked as a freelance researcher for CITA and as a data scientist at a Google-funded startup. In the course 2017/18, she joined UPV as a G. Valenciana postdoc fellow and later as a Juan de la Cierva-Formación fellow in the same group. Then, she was granted to carry out her first research project as PI by G. Valenciana. In 2020, she joined the U. California (US) as a visiting postdoctoral researcher funded by a José Castillejo grant. In 2021, she was hired by TECNATOM as a NDT R&D engineer. In 2022, she rejoined CSIC with the project: "Novel ultrasonic technologies application to complex materials characterization and process monitoring" awarded with a Juan de la Cierva-Incorporación postdoc contract. More recently, her project "Smart Non-Invasive Sensing For Product-Aware Production Environments" has been funded with an Ikerbasque Research Fellowship to start a new research line at University of Deusto. Her research interests are focused on new applications of ultrasound in complex materials. This results in a highly interdisciplinary background that has covered topics as aeronautic non-destructive testing, plant water status determination, leaves/tissues characterization, food texture estimation, monitoring of food industrial processes, monitoring of ex-vivo human food digestion, human gastrointestinal-tract characterization on medical imaging and research, testing and development of an in-field portable and non-destructive system for the optimization of irrigation in crops. To date, she has secured nearly €1M in public funding including 3 projects as PI, published 19 Q1s (10 as first author; 7 as first and corresponding; 494 citations; h12), contributed to >25 international conferences, and licensed one patent plus two filed. She took advantage of many awards received for interdisciplinary exchange: fellow at La Residencia de Estudiantes; Spain representative at 66th Nobel Laureate Meeting and granted 3 times to join an interdisciplinary conference at Google (US). She understands that transferring her know-how to society is her responsibility as a scientist too. This aim led her to look for forums to exchange ideas and networking between scientists and entrepreneurs. Consequently, she is part of Club de Científicos Rafael del Pino, Celera and Nova networks. Also, the European Institute of Innovation and Technology selected her to participate in its program to tackle Climate Change. Furthermore, she was twice included in the Chaiseul Institute's ranking of Economic Leaders for the Future. More recently, she was awarded by The Collider program for leading a startup project formed by CSIC scientists to create a deep-tech spinoff in 2023 and won the pitch competition EBTON-CSIC. Finally, she contributes to different forums for outreach such as Inter. Day of women in science at schools, round tables, videos, talks and outreach articles.



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Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: LIZANA MORAL, FRANCISCO JESUS
Referencia: RYC2024-048723-I
Correo Electrónico: lizanafj@gmail.com
Título: ALMACENAMIENTO Y GESTIÓN DE LA ENERGÍA TÉRMICA HACIA EDIFICIOS DE BAJA EMISIÓN DE CARBONO
Resumen de la Memoria:

La presente línea investigadora se focaliza en el desarrollo y validación de MATERIALES, SISTEMAS, EDIFICACIÓN Y PLANIFICACIÓN ESTRATÉGICA para la descarbonización de la calefacción y refrigeración, responsables de casi el 50% del consumo de energía final, siendo el 75% todavía basado en combustibles fósiles. Su línea de investigación abarca trabajos experimentales y numéricos, destacando:

En el área de investigación MATERIAL, la caracterización, desarrollo y validación de nuevos materiales para el almacenamiento térmico en laboratorio. En SISTEMAS, la evaluación de técnicas de integración de las soluciones de almacenamiento e intercambio de calor en edificios a través de modelos numéricos. En EDIFICACIÓN, la evaluación de tecnologías y edificios a través de estudios de campo y casos piloto (cuantitativos y cualitativos). Y en PLANIFICACIÓN ESTRATÉGICA, desarrollo y validación numérica de planes de acción y políticas a escala local y nacional.

Dicha línea de investigación ha derivado en la siguiente trayectoria:

APORTACIONES CIENTÍFICO-TÉCNICAS: Dr Lizana posee una posición permanente de Associate Professor en la Universidad de Oxford (equivalente a Profesor Titular) y lidera el programa Zero-Carbon Space Heating and Cooling en el Zero Institute. Su contribución científica abarca 36 artículos en revistas científicas JCR, 1 libro, 5 capítulos de libro, y 31 comunicaciones a congresos internacionales, obteniendo un índice h22 y 1960 citas. La carrera ha sido financiada a través de 10 ayudas y contratos de excelencia obtenidos en convocatorias públicas competitivas, destacando una Juan de la Cierva en el CSIC y una Marie Curie en la Universidad de Oxford. Ha contribuido a 16 proyectos de I+D (2 internacionales, 4 europeos y 10 nacionales), y ha sido IP de 3 proyectos, destacando el proyecto Europeo H2020 ResCool. Participa con regularidad en actividades de divulgación y gestión. Su trayectoria ha sido ampliamente reconocida, destacando el 1er Premio nacional a la mejor tesis doctoral GECAT, 1er Premio Joven a la Cultura Científica 2018; y 1er Premio Internacional YEAR AWARD 2018.

MOVILIDAD E INTERNACIONALIZACIÓN: Dr Lizana posee una carrera internacional e interdisciplinar, habiendo trabajado en España, Portugal, Alemania y el Reino Unido en tareas de enseñanza, investigación y tareas de gestión; y participado en 2 proyectos internacionales y 4 europeos. Ha desarrollado estancias predoctorales en The University of Edinburgh, Technical University of Munich, Universidade de Lisboa; y estancias postdoctorales en la Universidad de Sevilla, el CSIC, y la University of Oxford. Ha publicado 23 artículos JCR resultado de colaboraciones internacionales y 1 patente.

INDEPENDENCIA Y LIDERAZGO: Dr Lizana lidera el programa Zero-Carbon Space Heating and Cooling del ZERO Institute en Oxford. Dirige a 4 investigadores (pre y postdoctoral), es IP de 2 proyectos de investigación, y coordina el plan docente en "Building Services Engineering" en la Universidad de Oxford, el cual ha sido nominado para los CIBSE Awards. Ha publicado con más de 23 instituciones internacionales, es miembro editorial de revistas JCR, ponente invitado por diversas universidades y congresos internacionales, revisor de programas nacionales y europeos, y consultor internacional, destacando sus contribuciones a CIBSE, UNEP y al departamento de energía de Reino Unido.

Resumen del Currículum Vitae:

Dr. Lizana posee una posición permanente de Associate Professor (equivalente a Profesor Titular) en el departamento de Engineering Science en la Universidad de Oxford, y lidera el programa "Zero-Carbon Space Heating and Cooling" en el Zero Institute. Dirige a 4 investigadores (pre y postdoctoral), es IP de 2 proyectos de investigación, y co-supervisa a doctorados en la University of Edinburgh y la Universidad de Sevilla. Además, coordina el plan docente de "Building Services Engineering" en la Universidad de Oxford, donde imparte docencia y supervisión en los programas de grado y máster en ingeniería (MEng y MSc). Dr Lizana es también miembro del equipo de gobierno de Wolfson College en Oxford.

Dr. Lizana cuenta con una destacada trayectoria internacional e interdisciplinar, habiendo desarrollado actividades de docencia, investigación y gestión en España, Portugal, Alemania y el Reino Unido. Dr. Lizana es licenciado en Arquitectura por la Universidad de Sevilla (2013), Master Universitario en Peritación y Reparación de Edificios (2015), y Doctor por la misma universidad (2019) a través de un contrato de Formación del Personal Universitario (FPU). Consolidó su etapa postdoctoral con un contrato Juan de la Cierva Formación (JdC-F) en el CSIC, y una Marie Curie (MSCA) en la University of Oxford. Además, ha liderado investigaciones interdisciplinares a través de estancias internacionales en universidades de prestigio como la University of Edinburgh, la Technical University of Munich, y la Universidade de Lisboa.

Dr. Lizana ha contribuido a 16 proyectos de I+D (2 internacionales, 4 europeos y 10 nacionales), cuenta con 36 artículos en revistas científicas JCR, 1 libro, 5 capítulos de libro y 31 comunicaciones a congresos internacionales, obteniendo un índice h22 y 1960 citas. Además, 23 de sus publicaciones son el resultado de colaboraciones internacionales, 2 están en la categoría de artículo altamente citado, 1 está publicado en Nature Sustainability y 1 en Nature Scientific Data. La mayoría de sus trabajos están en acceso abierto (20 Open Access + preprints en repositorios), y todos sus desarrollos de software, código y datos están disponibles en GitHub (<https://github.com/lizanafj>) y repositorios públicos (CEDA, ORA).

Junto a su carrera investigadora, destaca su capacidad de transferencia de conocimiento a través de su participación en 5 proyectos de I+D financiados por empresas y su colaboración en proyectos de edificación en España, Marruecos, India y Arabia Saudí. Además, Dr. Lizana ha sido consultor de instituciones de relevancia internacional como el Departamento de Energía del Reino Unido (DESNZ), UNEP, y CIBSE.



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Dr. Lizana también desarrolla con frecuencia actividades de divulgación en medios (TheConversation, TheGuardian, Housing Matters,²), participa en redes internacionales (Build-up, H&C network, IMechE, CIBSE, IEA EBC,³), en actividades de difusión institucionales (10th OXFORD ENERGY DAY, Researchers⁴ Night); y colabora con programas de promoción de la investigación en escuelas como Science is Wonderful (2022) o Jóvenes con Investigadores (2016-19).

Su carrera ha sido reconocida internacionalmente, destacando el 1er Premio nacional a la mejor tesis doctoral GECAT (1000⁵); premio extraordinario de doctorado; 1er Premio Joven a la Cultura Científica 2018 (4000⁶); el 1er Premio Internacional YEAR AWARD 2018.



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Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: GÓMEZ GARCÍA, JORGE ANDRÉS
Referencia: RYC2024-049994-I
Correo Electrónico: jorge.gomez.garcia@csic.es
Título: Objective multimodal and longitudinal AI-driven methodologies for the early and prodromal detection of neurodegenerative motor disorders

Resumen de la Memoria:

I received my bachelor in Electronic Engineering in 2009 from Universidad Nacional de Colombia, and my Master in Engineering - Industrial Automation from the same University in 2010. I received my Ph.D. from Universidad Politécnica de Madrid, Spain in 2018. In 2015, I spent 6 months at the Toronto Rehabilitation Institute, associated with the University of Toronto, under the supervision of Professor Frank Rudzicz.

From 2022 to 2024, I served as a Postdoctoral Fellow at the Consejo Superior de Investigaciones Científicas. Prior to that, I worked as a Data Scientist at Satoshi Transformative SL - Tribaldata from 2021 to 2022. Between 2018 and 2021, I was a Postdoctoral Fellow at the Universidad Politécnica de Madrid, where I also held positions as a Predoctoral Fellow from 2016 to 2017 and a Predoctoral Researcher from 2012 to 2016. My early research experience includes working as a Research Assistant at the Universidad Nacional de Colombia from 2007 to 2010.

I have participated in 8 research projects using Artificial Intelligence to identify and quantifying the effects of pathologies, covering various aspects of disease and utilizing diverse data types such as IMU, EMG, speech or oculography. I have engaged in 4 private contracts with companies to transfer knowledge from university to industry. I have also been involved in the creation of 4 startups, being currently involved in one transferring my know-how on motor biometrics characterization for motor disorders analysis.

Along my career, I have been using Artificial Intelligence (AI) to study biomedical signals and improve the assessment and diagnosis of several pathologies. My research has included the characterization of speech and voice in Parkinson's disease for improved diagnosis and monitoring; Characterization of motor biometrics such as handwriting, muscle activity, oculometrics in Parkinson's disease for better diagnosis; development of methodologies to automatically detect voice pathologies using AI; Automatic systems to emulate perceptual evaluations made by humans or AI-Driven Solutions for COVID-19 analysis among others.

Building on my experience in this field, I plan to develop a research line titled "Objective multimodal and longitudinal AI-driven methodologies for the early and prodromal detection of neurodegenerative motor disorders".

Resumen del Currículum Vitae:

I received my Ph.D. from Universidad Politécnica de Madrid, Spain in 2018. Since 2021 I have been working at the National Spanish Research Council (CSIC) in the BioRobotics group, leading the line of research AI for Neuroengineering.

I have published 25 papers in scientific journals and 40 papers in scientific dissemination events. According to Google Scholar, my h-index is 14 with a total of 1015 citations. I have been a reviewer in various scientific journals including Journal of Selected Topics in Signal Processing; IEEE/ACM Transactions on Audio, Speech, and Language Processing; IEEE Access; Biomedical Signal Processing and Control; Applied Acoustic Journal; Computers in Biology and Medicine Journal. He has also being part of the technical committees at Interspeech 2019, 2020, 2021, 2024 and of the scientific committee of the 1st and 2nd "Automatic Assessment of Parkinsonian Speech Workshop" organized by Massachusetts Institute of Technology and Universidad Politécnica de Madrid.

I have developed my career in three countries: Colombia, Spain, and Canada, having worked with scientists from Johns Hopkins University in USA, Massachusetts Institute of Technology in USA, Charles University in Czech Republic, Friedrich-Alexander-Universität in Germany, Universidad Nacional de Colombia among others. I have participated in 8 research projects in Spain and Colombia and I have been linked to 4 startup initiatives transferring knowledge from research to industry, including one ongoing effort involving the betterment in the rehabilitation of stroke using AI and sensors.



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Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad

Nombre: LUCARINI SAN JOSÉ, SERGIO

Referencia: RYC2024-050475-I

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Título: Multiphysics multiscale materials modelling

Resumen de la Memoria:

Dr. Lucarini is a pioneer in the fields of materials fatigue, computational methods, multiphysics simulations of magnetoactive and electroactive materials, and damage models.

He has made numerous contributions to the micromechanical fatigue field, including the development of efficient homogenization methods for fatigue models that allow for micromechanics-based simulations to be accelerated by orders of magnitude. Besides, he created a framework to link micromechanical fatigue models with industrial components fatigue lives and developed a microstructural short crack growth model to capture corrosion-fatigue extended to large 3D cracks.

The applicant also made significant contributions to the multiphysics simulations of extremely soft magnetoactive materials, creating a homogenization framework that accounts for the coupling between mechanics, magnetism, and viscous deformation mechanisms., which was later used in electroactive materials context. The resulting work was further extended to be used for simulating a magneto-mechanical system applied to biological cells.

He programmed numerical software tools for multiphysics micromechanical modeling: a state-of-the-art fast Fourier transform (FFT) based code for micromechanics, a finite element code for magneto-mechanical modeling of magnetoactive and electroactive composite materials, a physical informed neural network tool for corrosion and a COMSOL wrapper for Abaqus umats to be used in multiphysics context.

He has interacted with several industrial end-users by applying his modeling frameworks to real world problems. He also keeps an open science strategy by granting open access to his publications and releasing as open source his codes.

Through his research career, Dr. Lucarini has a proven track record by:

(i) Conduct high-impact, pioneering research, having published 17 papers in the best journals of the field (Nat. Commun., IJES, JMPS, npj Comput. Mater., etc.) and h-index of 15 (WoS)

(ii) Develop an extensive network of collaborators, having worked with academics at prestigious universities such as ICL, Oxford, Texas A&M, École Polytechnique or UCLA.

(iii) Interact with industrial partners in collaborative R&D projects, such as the aircraft engine manufacturer ITP Aero, wind turbine bearings manufacturer Laulagun SL and e-Xstream Engineering.

(iv) Develop creative ideas and solutions that have been embraced by the scientific community, such as novel FFT algorithms and his own numerical software (FFTMAD) of fenics codes

(v) The success of large research project, being the PI of EU-Funded projects: SIMCOFAT, M4SH; having participated in several EU projects: MICROMECH, MOAMMM and 4DBIOMAP; and being the PI of one national project: MagHeal.

(vi) Attract founding to lead and conduct his own research: Marie Curie IF, HRHG Seed Project BCMaterials and Ikerbasque RF

(vii) Supervise students at different institutions: PhD research stay, bachelor and master thesis.

The proposed research line to develop concerns multiphysics-multiscale materials modelling and aims to bring together simulation tools to create multiscale modelling strategies for multiphysics simulation applied for the design of novel multifunctional materials.

Resumen del Currículum Vitae:

Dr. Lucarini received his industrial engineering degree from the University of the Basque Country (UPV/EHU) in 2015 and earned his PhD from the Technical University of Madrid (UPM) in 2020. From 2016 to 2020, he worked as a predoctoral researcher at the IMDEA Materials Institute, followed by postdoctoral positions at both the institute and the University Carlos III of Madrid. In 2021, he was awarded a Marie Curie Individual Fellowship and took on a research associate role at Imperial College London. In 2023, he secured an Ikerbasque Research Fellow position (current) at BCMaterials. During his doctoral studies, he also held a visiting position at UCLA.

With over 17 international publications in prestigious journals (including Nat. Commun., npj Comput. Mater., IJES, CMAME, JMPS, etc.) in the field of computational solid mechanics and a citation count of over 600 and an h-index of 15 (according to Web of Science), Dr. Lucarini is a recognized expert in his field. He has given more than 15 oral presentations in international conferences, including a keynote, invited seminar, and has been the principal investigator of two EU-funded projects and one national project, and has been involved in other four European projects. His ability to attract funding is assessed through the award of the Ikerbasque Research Fellowship, the Marie Curie Individual Fellowship, and the mobility grant of the UPM, as well as through the winning of a national project (BCMaterials High Risk-High Gain Seed project).

Dr. Lucarini's research focuses on simulating the mechanical behaviour of materials at various length scales and integrating these scales using multiscale approaches. He has studied composites, metals, lattice-based metamaterials, and porous materials to understand how microstructure affects behaviour in various regimes, including elastic, plastic, visco-elastic, visco-plastic, fracture, damage, and fatigue response. He has also made significant contributions to the multiphysics simulations of magnetoactive and electroactive composites.

Dr. Lucarini is proficient in developing models and simulation techniques for computational micromechanics and lower-length-scale approaches such as micromechanics-based and crystal plasticity models. He is an expert in Fast Fourier Transform (FFT) solvers for micromechanics and multiphysics problems. He has created several open-source research codes, including a generalist FFT solver for non-linear homogenization (FFTMAD), a finite element-based open-source code for magneto-viscoelastic materials (based on FEniCS) and CAPSUL, a physical informed neural network tool for corrosion and a crystal plasticity toolset that is now licensed to e-Xstream.

Through his international activities, Dr. Lucarini has established a research network of collaborations with teams around the world in Europe, the United States and China. He has hosted a PhD student research stay, co-supervised two master's theses and one bachelor's thesis at different



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universities. He has served as a peer reviewer for prestigious international journals (CMAME, Eur J Mech A Solids, Appl. Math. Comput., IJMS, J. Nucl. Mater.) and has teaching experience at the University Carlos III of Madrid and Imperial College London.



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Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: PÉREZ FARGALLO, ALEXIS
Referencia: RYC2024-048695-I
Correo Electrónico: alexisfargallo@gmail.com
Título: Generative AI to decarbonize the real estate stock and reduce energy poverty through energy literacy and personalized comfort systems

Resumen de la Memoria:

Durante mi carrera, he mantenido una preocupación constante por abordar problemáticas actuales y, generar y transferir conocimiento relevante para la sociedad a través de diversos mecanismos. He desarrollado indicadores de pobreza energética (EP) y los he transferido a políticas públicas. Además, he creado modelos de confort térmico, analizado brechas de desempeño y estudiado la influencia de las exigencias de confort en el consumo energético, generando hipótesis que hoy forman parte de herramientas utilizadas en Chile para evaluar medidas de Eficiencia Energética (EE). En el ámbito de la inteligencia artificial (IA), he diseñado modelos para predecir el consumo energético y la pobreza energética mediante redes neuronales, regresiones multivariantes y otros métodos. En cuanto a alfabetización energética, he evaluado programas nacionales y elaborado recomendaciones para organismos públicos. Entre mis logros destacan la creación de índices innovadores como el Índice de Riesgo Potencial de Pobreza Energética (FPPRI) y el Índice Adaptativo Horario para la Pobreza Energética (PADHI), adoptado por el Ministerio de Energía de Chile.

He transferido este conocimiento a través de la dirección de 4 contratos tipo 68/83 con organismos nacionales e internacionales (Banco Mundial, Ministerio de Energía, Ministerio de Obras Públicas e Instituto de la Construcción de Chile), la creación de 4 herramientas para la evaluación de EE, 25 conferencias internacionales, 46 publicaciones JCR (50% en acceso abierto, 63,5% en Q1, 84,9% con coautoría internacional y 9,4% en el top 10% de los artículos más citados), 3 libros y 8 capítulos.

Desde 2015, desarrollo mi carrera fuera de España y, desde 2022, dirijo la Red Internacional RIPEBA, que agrupa a 117 investigadores de 12 países. Esta red ha facilitado colaboraciones internacionales en publicaciones científicas y proyectos, trabajando con instituciones como la U. of Tokyo, U. Catholique de Louvain, Tampere University, U. Liège, CENSE, Rheinisch-Westfälische Technische Hochschule Aachen y diversas universidades en Chile y España.

En 2017, me incorporé como académico de tiempo completo en la U. del Bío-Bío (UBB). Desde entonces, he realizado cuatro estancias de investigación en centros andaluces: U. de Sevilla (2017, 2021), U. de Cádiz (2018) y U. de Granada (2024). Estas estancias se han centrado en aportar a las líneas de trabajo de los grupos, colaborar en proyectos, publicaciones y eventos, y formar doctorandos y estudiantes de maestría, lo que ha fortalecido mi vínculo con grupos de investigación españoles para propiciar mi posible retorno.

He liderado una Red CYTED y 4 proyectos de investigación nacionales con un presupuesto acumulado de € 1,044,831 (FONDECYT Regular 1230922; FONDECYT Regular 1200551; FONDEF ID17I10162; FONDECYT POSTDOCTORAL 3160806). He sido coinvestigador en 2 proyectos internacionales y 10 proyectos nacionales (7 en Chile y 3 en España).

En docencia, acumulo más de 3.000 horas (900 en postgrado). He impartido clases en Chile, Colombia y España. Además, he tutelado 38 TFG, 11 TFM, 1 tesis doctoral en cotutela con la Universidad de Sevilla y 1 postdoctoral, y actualmente dirijo 2 tesis doctorales.

Resumen del Currículum Vitae:

Doctor en Tecnologías de la Construcción (Universidad de Sevilla, 2013), fui investigador predoctoral y postdoctoral en el programa FPDU de la Junta de Andalucía (2008), investigador postdoctoral en la Universidad del Bío-Bío (Chile, 2015) y beneficiario del programa Fondecyt de Chile para investigación postdoctoral (2015-2017). Durante mi trayectoria en la Universidad del Bío-Bío, ocupé los cargos de Profesor Asistente (2017-2021) y Profesor Asociado (2021-2024), accediendo y ascendiendo por concurso de méritos. Actualmente, soy Profesor Titular en la Universidad San Sebastián (Chile) y Coordinador de la Red Iberoamericana sobre Pobreza Energética y Bienestar Ambiental (RIPEBA), integrada por 117 investigadores de 12 países.

Mi actividad investigadora se centra en el estudio del confort térmico y la pobreza energética para mejorar el bienestar ambiental, así como el desarrollo de modelos, metodologías y herramientas para evaluar medidas de Eficiencia Energética en Edificaciones. En estas áreas he liderado una red CYTED (€80,000) y 4 proyectos nacionales (FONDECYT Regular 1230922, €300,000; FONDECYT Regular 1200551, €229,472; FONDEF ID17I10162, €372,603; FONDECYT POSTDOCTORAL 3160806, €105,620), seis registros de autoría y dos patentes. Además, he participado como co-investigador en 2 proyectos internacionales y 10 nacionales.

Hasta la fecha, he publicado 46 artículos científicos, ocho capítulos de libro, editado tres libros, presentado más de 25 comunicaciones internacionales, organizado tres seminarios internacionales y cuatro talleres (workshops), además de formar parte de cinco comités científicos de congresos internacionales.

Mi trabajo de desarrollo y transferencia tecnológica ha producido metodologías y herramientas clave en EEE, como el banco de datos paramétrico con indicadores de ecoeficiencia y el software ECSE (Eficiencia Energética y Costos Sociales en Proyectos de Edificación), utilizado por el Ministerio de Desarrollo Social de Chile. Este software fue actualizado a ECSEV2, cuya relevancia fue reconocida internacionalmente, incluida su mención en la COP 25. Además, lideré la Etapa 1 para la calificación energética de edificios en Chile (2020). Como resultado de estos desarrollos, el Banco Mundial solicitó un estudio técnico para crear herramientas que evalúen alternativas energéticas en proyectos en Perú.



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Entre 2021 y 2024, fui director del Magíster en Hábitat Sustentable y Eficiencia Energética en la Universidad del Bío-Bío, donde fundé en 2019 el Grupo de Investigación en Confort Ambiental y Pobreza Energética, el cual dirigí hasta 2024. También fui editor de la revista Hábitat Sustentable (indexada en Scopus) y evaluador para agencias nacionales e internacionales como CONCYTEC (Perú), MEC (Uruguay) y ANID (Chile). Mi experiencia incluye la transferencia de resultados de investigación aplicada, como la entrega en 2024 de la base de datos climática SSP 2050 y 2080 al Instituto de la Construcción de Chile. Además, he realizado estancias predoctorales y postdoctorales en diversos centros de investigación de prestigio.



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Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad

Nombre: GURKAN , CEREN

Referencia: RYC2024-050115-I

Correo Electrónico: cgurkan@ing.uc3m.es

Título: Fluid Modeling with Advanced Discretization Methods

Resumen de la Memoria:

My research is focused on developing advanced cost-effective and high-fidelity discretization techniques for the numerical simulation of fluids. I worked with fundamental fluid equations (with increasing complexity, starting from second order elliptic equations to compressible Navier Stokes equations) on single or multiple domains over various benchmark cases proving the advantages (convergence, stability, accuracy, computational cost) of the advanced mathematical discretizations I propose. The advanced discretization techniques that I develop combine two smart ideas that separate them from the alternative conventional numerical techniques, leading to cost-effective and high-fidelity flow simulations. First pillar is so called the cut discretization, where the mesh fitting to domain boundary restriction is a prerequisite for any mesh-based numerical discretization technique is removed. Creating a high-quality mesh is the main challenge and the costliest aspect of any numerical simulation despite ever-growing research on advanced mesh generation. Moreover, if the domain boundary/interface is mobile or changing its shape (as in wind turbine models or topology optimization), re-meshing is a task that accounts for large portions of the time, human and computing resources in the overall simulation workflow. In cut discretization techniques, a cheap fixed background mesh is cut by the domain defined using a level set function arbitrarily, removing the mesh fitting or remeshing costs from the simulation. The second pillar is the hybrid natured discontinuous Galerkin (DG) discretization, where the number of degrees of freedom in the simulation is reduced significantly (hybridization), without sacrificing the high fidelity, local conservativity and stability of standard DG discretizations.

During my Ph.D. and post-doctoral studies, I have proposed two novel advanced discretization techniques, namely eXtended Hybridizable Discontinuous Galerkin (XHDG) and cut Discontinuous Galerkin (CutDG) methods; and proved that while removing the mesh fitting restriction, they keep the high fidelity of the simulation.

During the course of this funding, based on my solid background on developing high fidelity cost effective numerical techniques, I plan to take a step further in my career and work on implementation of this advanced techniques for an engineering application, namely, for the fully coupled simulation of floating offshore wind turbines. I plan to bring the high fidelity Discontinuous Galerkin discretization into our in house solver in Universidad Carlos III de Madrid, TUCAN-GPU, to enhance its simulation capacity to real size wind turbines, that will require a turbulence model (as real size wind turbines are subjected to turbulent flow, a flow that can not be handled with current version of TUCAN-GPU) and a fully resolved boundary layer at a reasonable cost, that could be accomplished by high fidelity DG discretization.

Resumen del Currículum Vitae:

Having been awarded the highly competitive Erasmus Mundus scholarships for both my master's and PhD studies, I successfully completed both programs with dual degrees, gaining extensive international experience throughout the process. Between 2013 and 2019, i.e., during my PhD (awarded with Cum Laude) and post doctoral studies I published 8 scientific papers, and a book chapter, all in prestigious Q1 journals (among them is the Computational Methods in Applied Mechanics and Engineering journal that is the most prestigious journal in the field of Computational Mechanics according to SJR ranking). Moreover, I have attended 9 international conferences with oral presentations, disseminating my work. As of January 2025, my work has been cited 141 times.

Between November 2021- November 2024, while I was working as an Assistant Professor in Istanbul, Türkiye, my research is funded by The Scientific and Technological Research Council of Türkiye (TÜBİTAK), with maximum budget and maximum possible duration where I served as solo PI, supervised and graduated two master students and funded a post doctoral researcher. Within this project two academic papers (both of them double authored, my students and myself) are published in Q1 journals.

Currently I work at Universidad Carlos III de Madrid (UC3M), Department of Aerospace Engineering as a Visiting Professor. Relying on my solid background on advanced numerical modelling and with the help of this funding I intend to establish my own research line within the Aerospace Engineering department, specifically focusing on the wind energy, a research area that has not yet been explored within the department. This funding will enable me to secure my position at UC3M, will lead a new research line in Aerospace Engineering department and will significantly enhance the simulation capacity of the in-house solver of department, TUCAN-GPU.



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Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: MONTES GONZALEZ, DAVID
Referencia: RYC2024-050825-I
Correo Electrónico: damongon@gmail.com
Título: Investigaciones aplicadas en ingeniería acústica y planificación urbanística y de infraestructuras de transporte rodado para la evaluación del ruido ambiental

Resumen de la Memoria:

Urban environmental noise has a significant impact on people's health, quality of life and well-being. Due to the fact that the flow of road transport is present on most streets in a city, road traffic through civil transport infrastructures is considered as the predominant source of noise in urban areas. In this context, the characteristics of the streets in terms of their architectural and urban design and of the surfaces of road transport infrastructures, together with some environmental variables, are also determinant in the generation and propagation of road traffic noise. In addition, the impact of road traffic in cities is also associated with air pollution. Consequently, this line of research aims to tackle a complex social problem such as noise pollution in cities from a multidisciplinary approach based on perspectives such as urban and architectural planning together with civil, acoustics and environmental engineering.

This line of work first aims to address new aspects of research such as the relations between road traffic, urban planning, noise and air pollution. To this end, it is planned to experimentally collect data on different types of objective variables (traffic, acoustic, urban and architectonic design, environmental) in urban areas, but also subjective variables related to the effects of noise and the quality of life of people living in cities, as well as their perception of the quality of sound environments. Knowledge of the dependency of urban environmental noise on these different types of variables will help to devise strategies for the design and development of more sustainable and user-friendly urban spaces in cities that contribute to reducing the impact of noise pollution and other potential pollutants associated with road traffic.

In this urban context, it is common the development of action plans based on strategic noise maps to try to mitigate the exposure of the population to environmental noise. However, given the complexity of dealing with this environmental problem due to the need for high mobility of people and goods in today's society, it is not always possible to reduce environmental noise levels to the values recommended by health organisations. In this sense, the design of urban spaces where people can have access to quiet green areas close to their homes to encourage their frequent use may represent a possible solution to help reduce the impact of noise pollution on people's health and wellbeing. This line of research also aims to study which environmental sounds, together with those objective variables associated with the characteristics of green areas and environmental parameters, and their possible interactions, are relevant for an optimal design of green spaces in order to reinforce their expected improvement effects on human well-being.

The achievement of the previous objectives would allow to reach a knowledge to devise novel strategies for the design and development of more sustainable and user-friendly urban spaces in cities that contribute to reducing the impact of noise pollution.

Resumen del Currículum Vitae:

David completed a PhD at the University of Extremadura in 2017, in which he did a 3-month predoctoral stay at the University of Coimbra (Portugal). This research, that received the mentions "cum laude" and "international doctor" and the extraordinary PhD award, contributed to the publication of ideas, hypotheses and results related to the accuracy in noise mapping to assess the exposure of the population to road traffic noise.

After the PhD, David led a 3-year project as principal investigator from a competitive call, which involved a period of 24 months at University of Coimbra (Portugal) and 12 months at University of Extremadura. New scientific contributions were made in this stage through the generation of ideas, hypotheses and results mainly related to the impact of urban features on noise pollution in cities, the management of environmental noise and the use of materials in acoustic engineering solutions for noise mitigation. In his most recent stage as a post-doctoral researcher, the candidate has been involved in research projects, partnerships with industry and international research collaborations on road and rail infrastructure design.

All this work resulted in 30 peer-reviewed scientific papers in JCR indexed journals: 16 in Q1 (6 in D1), 19 in T1 and 12 in Q2. But it also led to 2 peer-reviewed scientific articles in non-JCR indexed journals, 4 book chapters and 53 oral communications in international and national congresses. David led research activities which resulted in the published findings, especially in those in which he was the first or corresponding author. A progression in terms of the quality and quantity of publications can be noted throughout his scientific career.

He also participated as a member of the research groups in several projects that obtained funding in competitive calls both in Spain and Portugal, some of which were oriented towards collaboration with industry for the transfer of knowledge to the private sector. He developed a research project as principal investigator corresponding to the 3-year postdoctoral fellowship at the Universities of Coimbra and Extremadura.

Concerning mobility and international collaborations, David completed a 3 months predoctoral stay and a 24 months postdoctoral stay at University of Coimbra (Portugal). He collaborated in international research activities with the Institute of Acoustics of University Austral of Chile (Chile), the Institut Français des Sciences et Technologies des Transports (IFSTTAR) of University Gustave Eiffel (France) and the Institute for Sustainability and Innovation in Structural Engineering (Portugal), whose results were published in JCR indexed scientific journals and international congresses. He is currently involved in a European project from Interreg Sudoe Programme, led by CSIC-ITEFI (Spain) together with partners from Spain, France, Portugal and Andorra. He also participated in a COST international program and dissemination activities for students and general audience.

David collaborated in editorial activities as a reviewer JCR indexed scientific journals and international congresses, and as Guest Editor in a JCR indexed journal. He has also contributed to the training of young researchers and the development of their careers by leading BSc thesis.



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Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad

Nombre: BAILLY-GRANDVAUX , MATHIEU

Referencia: RYC2024-048860-I

Correo Electrónico: mbaillyg@ucsd.edu

Título: Energy transport in high-energy-density plasmas

Resumen de la Memoria:

My research focuses on the study of matter under extreme conditions of temperature, pressure, and magnetic fields, ranging from the characterization of Warm-Dense-Matter (WDM) to the study of magnetized hot dense plasmas, including the generation of secondary sources of particles and radiation. Recent years have seen a surge in demand for such research, driven by advancements in Inertial Confinement Fusion (ICF), material science, and laboratory astrophysics. My work aligns with this dynamic era in High-Energy-Density Physics (HEDP), highlighted by milestones such as the ignition breakthrough at the National Ignition Facility (NIF), renewing global interest in ICF as a viable path to fusion energy.

The ability to generate intense magnetic fields at laser facilities has profoundly advanced the study of magnetized high-energy-density plasmas, opening new avenues for laboratory astrophysics and enhancing energy transport and coupling in ICF. During my doctoral research, I characterized an all-optical method to generate hundreds of Tesla magnetic fields using lasers. This platform facilitated breakthrough experiments, such as guiding relativistic electron beams in dense matter, advancing fast ignition schemes in ICF.

Building on this foundation, my research on magnetized cylindrical implosions at OMEGA has demonstrated enhanced coupling of fast electron beams and diagnosed magnetization effects of a 10 kT axial field to the compressed core. These findings provide critical insights into the role of external magnetic fields in improving energy confinement and coupling efficiency, paving the way for innovative strategies in ICF. These advancements highlight the potential of a magnetized inertial fast ignition concept to achieve higher fuel temperatures and fusion gains. This concept first relies on understanding energy and magnetic flux transport in dense plasmas, areas where experimental data remain scarce. I will pursue this effort (with UCSD to carry on my DOE-funded project) while strengthening ties from Spain with my European collaborators (EuroFusion project) and seeking new funding. Magnetic fields generated using lasers carrying orbital angular momentum (OAM) could mitigate adverse magnetic mirror effects, which currently limit fast electron beam coupling to magnetized implosions. Initial experiments at petawatt-class facilities like CLPU and Apollon, supported by collaborations with international experts, will explore these approaches.

I will also continue to advance laser-driven ion heating for applications in fusion and astrophysics, continuing collaborations established during my previous work on these topics. I will build on my successful results on ion acceleration from structured targets and the characterization of ion-heated WDM. Future studies will focus on improving the ion source and coupling to magnetized WDM and plasmas, utilizing OMEGA and European facilities like CLPU, LULI-2000, and Apollon.

In the longer term, I aim to establish a dedicated laboratory in my future institution to investigate magnetized HED plasma dynamics. This effort will foster a robust training environment for Ph.D. students. By securing European funding and expanding collaborations, I will lead innovative research in magnetized HED physics, advancing fundamental plasma physics and practical applications in fusion energy and astrophysics.

Resumen del Currículum Vitae:

My research explores matter under extreme conditions of temperature, pressure, and magnetic fields, with applications in inertial confinement fusion (ICF) and laboratory astrophysics. During my Ph.D., I characterized compact laser-driven coils to generate strong magnetic fields. This innovative all-optical approach expanded the capabilities of laser facilities to perform magnetized experiments. A key breakthrough was the demonstration of relativistic electron beams guiding in solid targets using this technique. This work earned the 2018 Kondo Prize from Osaka University for its impact on the fast ignition concept in laser fusion.

I joined the University of California San Diego (UCSD) in 2017. My postdoctoral research expanded to include relativistic electron transport in shock-heated warm dense matter (WDM) and magnetized hot dense plasmas. I also initiated a project to improve ion acceleration using micro-structured targets. Leading experiments at premier laser facilities such as the OMEGA Laser Facility, I advanced experimental design, diagnostics, and data analysis, resulting in impactful findings and promotion to Scientist at UCSD in 2019. As principal investigator (PI) on DOE-funded projects, I led pioneering campaigns on magnetized cylindrical implosions and proton heating, opening new pathways for ICF and laboratory astrophysics. Notably, I directed a Discovery Science project at the National Ignition Facility (NIF) to study confinement properties of magnetized cylindrical implosions. I also conducted the first integrated experiment on proton fast ignition for laser fusion at the OMEGA facility.

My research has resulted in over 40 high-impact publications (h-index: 18) and numerous invited talks at international conferences, reflecting my active role in the plasma physics community. My collaborations span national laboratories, universities, and industry across Europe, the U.S., and Japan. Beyond academia, I partnered with General Atomics to develop 3D-printed targets using two-photon polymerization, achieving a fivefold increase in proton yield for ion acceleration, with applications in fusion energy and cancer therapy. Additionally, I pioneered time-resolved and high-resolution spectroscopic temperature diagnostics for ion-heated WDM, advancing research platforms for planetary science, astrophysics, and fusion research, by enabling precise characterization of extreme states of matter.

Mentorship is a cornerstone of my career. At UCSD, I supervised graduate students and postdoctoral researchers, guiding projects on laser-driven ion acceleration and WDM ion transport, among others, that produced high-impact publications. My mentees have secured prestigious roles, including



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positions at Los Alamos National Laboratory and Princeton University. As a PI, I have built collaborative research teams, secured funding, and provided training opportunities in experimental design, data analysis, and publication, fostering the professional growth of early-career scientists.

In addition to research and mentorship, I contribute to the plasma physics community by reviewing manuscripts for journals, evaluating funding proposals, and serving on user groups and conference committees. These roles ensure the advancement of plasma physics while promoting rigor and excellence in research.



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Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: PRIETO SIERRA, CRISTINA
Referencia: RYC2024-050770-I
Correo Electrónico: prietoc@unican.es
Título: Improving the reliability of probabilistic streamflow predictions at different time scales in gauged and ungauged catchments

Resumen de la Memoria:

I initiated and am leading the line “improving streamflow predictions in gauged and ungauged catchments” at IHCantabria. My main motivation is to overcome major societal challenges related to water resources. My research line focuses on catchment hydrology, which aligns with SDG 6. My research started with my international PhD on “Development of methodologies to quantify and reduce the uncertainty in predictions in ungauged basins via Bayesian approach” developed at IHCantabria, Imperial College London, Univ. of Bristol, & the National Center of Atmospheric Research, NCAR, US. In 2020, I got a postdoc grant from Eawag, Switzerland; in 2022, a follow-up grant from Univ. of Adelaide (UoA), Australia, & in 2025 I have been offered an honorarium to visit ETH as an academic guest to further pursue the research line, specifically, to improve reliability of probabilistic hourly predictions.

A key challenge in reliably predicting streamflow is handling uncertainties in data, model structures and parameters. This requires merging the latest advances in artificial intelligence with existing methods for uncertainty quantification.

Machine learning and physically based models can complement each other; the challenge is to figure out how to fuse them to get the best of both worlds.

My main contributions have focused on improving streamflow predictions by reducing model structure uncertainty using Bayesian approaches, ML models and information theory, as well as directing a PhD thesis on improving hourly predictions using Deep Learning (specifically LSTM) models.

I prioritize quality over quantity, which is reflected in my research trajectory: (i) Growing international scientific leadership. E.g., 21/22 Q1 papers, 8/21 D1, more than 1236 citations. More than 27 major international conferences; 2 Wiley book chapters and 3 editorial papers and invited seminars at major institutions. I am also a solicited speaker at EGU 2025. (ii) Constant transfer of knowledge to society and stakeholders. E.g., director of a 3-year project for URA (Basque Water Agency) to improve hourly predictions in the Basque Country. (iii) An international collaborative approach. E.g., I organized and chaired major international conferences (including 19 EGU and 1 AGU), am leading/co-leading 3WG on my research topic; I am Spanish World Meteorological Organization (WMO) expert collaborating in my research field; and a leader of the EU division of IAHR.

I will use the RyC to pursue the line on “improving hourly probabilistic streamflow predictions”. Specifically, to increase reliability & precision, & reduce bias in hourly streamflow predictions, which are critical to flood prediction in flashy catchments. However, hourly prediction entails additional challenges vs longer-term predictions. Processes and uncertainties become increasingly complex at finer time scales.

I am confident the research will strength collaborations with top international institutions (eg UoA, ETH Zürich, Eawag & Google). I expect the research will translate into submissions to major international journals & conferences, organizing summer schools, seminars & workshops; and the results will be used by water agencies (eg URA, Canal de Isabel II), consultancy projects (eg IHCantabria), companies (eg ARUP) & World Organizations (eg WMO) to satisfy societal needs. These entities have already expressed their interest.

Resumen del Currículum Vitae:

Since 2017 I am a researcher at IHCantabria and currently collaborating with Univ. of Adelaide (UoA), Eawag (Zurich), ETH (Zurich), Google (California). My research focuses on improving streamflow predictions at different time scales by generating scientific knowledge and engineering tools that will allow water agencies, policy makers and engineering companies to better manage water resources and flood hazards.

I am a MSCE and an MSc in Integrated Water Resources and Coastal Zone Management (Univ of Cantabria, UC), and hold an international PhD in Hydrology developed at IHCantabria, Imperial College London (ICL), Univ. of Bristol and National Centre of Atmospheric Research (NCAR), USA. In 2020 I was granted a postdoc at Eawag (Switzerland) where I also collaborated with UoA and ETH Zürich; and in 2021, received a follow-up grant for a research collaboration at UoA and in 2025 I have been offered an honorarium to visit ETH as an academic guest to further pursue my research line.

According to Scopus, my research has led to 22 publications, 21/22 Q1, including 8/22 D1 (6 publications in WRR and 2 in JoH; 2 in NHESS (Q1); 2 book chapters (Wiley); and 2 HSJ (Q1) community papers, the well-known, “Twenty-three unsolved problems in hydrology” and “The IAHS science for solutions decade, with hydrology engaging local people in a global world (HELPING)” that summarize contemporary challenges and set directions for the decade 2023/33 in my research field. I have 1235 citations, my h-index is 9 and I have recognition for 6 years (1 sexenio) of research. These publications in top scientific journals in my research field reflect my emphasis on quality over quantity.

I give regular presentations at major international scientific conferences, 27 as leading author (EGU, AGU, EWRA, JIA, STAHY, etc.); and invited seminars at major research institutions (ICL, NCAR, AA London, U. of Zurich, Eawag, Univ of Waterloo, Univ Politècnica de Barcelona, ICFM). I led and lectured in 5 international schools/workshops on hydrological model calibration, uncertainty estimation, and information theory.

I have been convener and/or chaired 19 EGU and 1 AGU sessions; I am the current scientific officer of the Hydrometeorological Hazards subdivision at EGU; chaired other international conferences (EWRA, STAHY, IAHR); was scientific committee at STAHY; was Editor of 2 SIs on flood risk in NHESS (Q1); am editor of 1 SI on History of Hydrology in HSJ (Q1); am leading/co-leading 3 Working Groups of the Int'l Association of Hydrological Sciences (IAHS); I am the PI of a pending COST action on hydrological design and communication (results expected in May); am reviewer for leading hydrological journals (e.g. WRR, JoH, HESS, NHESS, EMS); reviewed Chilean National Research Projects; reviewed 2 PhD Theses; and coordinate a MoU.

I also directed 2 MSc theses; currently direct 1 PhD Thesis that has produced 2 D1 papers, am Spanish World Meteorological Organization (WMO) expert collaborating with the hydrological division in 3 major initiatives, and led a 3-year project for the Basque Water Agency which implemented ideas from my research line. I am also 1 of the leaders of the EU division of IAHR, was in charge of, and carried out outreach for, the hydrological processes and modeling part of an Interreg EU project, and was lecturer at the Master of Water Resources Management at UC.



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Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: PEÑAS SILVA, FRANCISCO JESÚS
Referencia: RYC2024-049751-I
Correo Electrónico: penasfj@gmail.com
Título: Providing scientific evidence to enhance environmental flows science within the context of global change

Resumen de la Memoria:

My work focuses on environmental engineering and water resources, aiming to advance knowledge to support integrated catchment management in the context of global change. I have combined concepts from disciplines such as hydrology, ecosystem assessment and hydroecology, creating a research profile with a high degree of interdisciplinarity.

My main scientific contributions focus on three key research lines. Two lines explore river system dynamics under natural conditions and their response to global change drivers, with a key focus on large-scale modelling of different river components. The third develops decision-support tools and environmental flow methodologies for water managers. I have published 33 articles in high-impact SCI journals (20 in Q1, 11 as first author, 6 as last author), contributed to 2 book chapters, and over 50 conference presentations. My work includes participation in 20 competitive R&D projects and 23 non-competitive contracts with public and private entities. I have also supervised 3 PhD dissertations (2 ongoing), 7 MSc theses, 2 undergraduate theses and taught civil engineering courses at UCSC (Chile).

In 2017, I received a 24-month postdoctoral grant from the Government of Chile, which I conducted in the Civil Engineering Department of UCSC. There, I led my own project, HANSEL, leveraging Chile's unique socio-environmental context to advance my research. The project's findings have been presented at 3 international conferences, and submitted 2 papers. In 2024, I completed a 2-month postdoctoral fellowship at the University of Leeds (UK), where I led a review paper on advances in environmental flow science, co-authored by 40 researchers. Additionally, I have played leading roles in several major European and South American R&D projects (H2020-ITN, Horizon Europe, INTERREG Atlantic Area, ANII-Uruguay), totaling over €20M. I have demonstrated independent thinking and leadership capacities, competences that have increased exponentially since my postdoctoral period in UCSC, continuing to expand to this day. In this regard, I have been IP in 3 research projects, HANSEL (2017-2019; Government of Chile), GANGES (2020-2022; Regional Government of Cantabria) and RIFFLE (2021-2024; National Research Agency of the MCIN) securing a total budget > 400.000 €, and I have been the scientist in charge in IHCantabria of the Euro-FLOW ITN (2019-2022). I have also led 3 knowledge transfer projects, Virtual Watersheds (2020-2022), REFCON (2021-2023) and THICs (2024-2026), funded by the Uruguayan Research Agency and the MITERD/TRAGSATEC, respectively. I have also led working packages and task in different R&D and contracts with public and private entities, demonstrating my independency and a high ability to manage material and human resources.

The Ramón y Cajal Grant would enable me to further advance my independent career and solidify the leadership of my long-term research agenda. The proposed research line aims to advance the current knowledge on the response of freshwaters to upcoming ecological and water security threats associated with global change, enhancing the formulation of mitigation and adaption strategies in water management to achieve sustainability. This research line will rely on my highly interconnected network throughout Spain, Europe and Latin America to define joint strategies and access to competitive funds.

Resumen del Currículum Vitae:

I hold a PhD in Science and technology for environmental management of hydrological systems (Universidad de Cantabria; 2014) and MSc in Integrated Management of Aquatic Systems (Universidad de Cantabria; 2008). I had a postdoctoral position at the IHCantabria (2014-2017) and I was granted a two-year postdoctoral fellowship by the national fund for the scientific and technological development of the Chilean Government (2017-2019). Currently I am a researcher at the IHCantabria. In 2024 I have benefited from an international fellowship as a visiting academic at the University of Leeds (UK). I had a four months parental leave in 2022.

My research focuses on the fields of environmental engineering, water resources and ecosystem management aiming to improve our understanding the effects of global change on rivers systems to enhance water sustainable practices. In this context, water managers need immediate assistance and new knowledge and tools based on the most advance science to guide them towards the best solutions through a multipurpose socio-hydrological catchment approach.

My PhD focused on the analysis of large scale spatial and temporal hydrological patterns and the assessment of how anthropogenic pressures influence them. In my subsequent research, I have focused on how streamflow interacts with different structural and functional elements of rivers and the ecosystems services that they provide. In this regard, I have been IP of 3 research projects financed by the Chilean Government, the Government of Cantabria and National Research Agency of the MCIN focused on understanding the mechanisms by which hydrological changes associated with afforestation and forestry plantations, climate change and dam operations affects river processes, in order to draw science-based catchment management strategies. In addition, I have participated in 20 competitive R&D projects funded by public entities, including four research international projects totalling >20M€. Attending to the applied nature of the science and my interest in solving problems related to essential challenges for society, I have led 3 and participated in other 20 non-competitive contracts with public and private entities to promote transfer of knowledge, methodologies and tools to water managers and stakeholders.

In 2023 I obtained the R3 certificate. The result of my scientific activity can be summarized in the publication of 33 SCI papers [(20 Q1, 11 first author; 6 last author; 20 open access; 526 citations and H-Index = 14 (WoS)], 2 book chapters, 2 proceedings and over 50 presentations in national and international congress. In 2014 I was awarded the Outstanding Paper Award granted by the Water and Environmental Journal. I am a member of the Iberian Limnological Association and the FW BON.

During my professional development, I have also acquired experience lecturing and guiding new scientists. Teaching experience includes lecturing under- and postgraduates at the Faculty of Engineering of the UCSC (2017-2019) and collaboration in several courses within the postgraduate program of the University of Cantabria. I have supervised one international thesis (Pompeu CS) and I am currently supervising two international doctoral theses (Zarauza R and Hoang M), two of them framed within a European ITN. I have also supervised 2 final degree projects and 7 MSc theses.



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Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad

Nombre: ALMORA RODRÍGUEZ, OSBEL

Referencia: RYC2024-048912-I

Correo Electrónico: osbel.almora@gmail.com

Título: Advancing Semiconductor and Emerging Photovoltaic Devices

Resumen de la Memoria:

Dr. Osbel Almora is a trained Physicist with interdisciplinary expertise in Electronic and Material Science Engineering. His specialization lies in Emerging Photovoltaic and Semiconductor devices.

He earned a Bachelor's degree in Physics (2013) from the University of Havana, a Master's in Applied Physics (2016) from Universitat Jaume I (UJI), Spain, and a Ph.D. in Engineering (2020) from Friedrich Alexander Universität (FAU), Germany.

Dr. Almora's work encompasses the development of CdTe, heterojunction-silicon, perovskite, organic, and multijunction solar cells, as well as X-ray detectors, organic light-emitting diodes (OLEDs), pseudocapacitors, and photonic power converters. His research focuses on improving the efficiency, stability, and scalability of these technologies.

On the theoretical front, he has conducted analytical modeling and numerical simulations to study the optoelectronic response of solar cells and X-ray detectors. He possesses programming skills in Mathematica and Matlab, enabling detailed balance estimations and realistic modeling of steady-state and stationary solutions. His contributions to understanding mobile ion effects on transport regimes in metal halide perovskites are particularly significant.

In instrumentation and technical development, Dr. Almora has demonstrated proficiency in experimental setup assembly, modification, and automation, with expertise in LabView programming.

From an experimental perspective, Dr. Almora has extensive experience in optoelectronic characterization techniques, including potentiostatic impedance, thermal admittance, deep-level transient spectroscopy, and light intensity modulated photocurrent and photovoltage spectroscopies. He pioneered the analysis of hysteresis and ionic conductivity in perovskite solar cells and introduced light intensity modulated impedance spectroscopy (LIMIS). Beyond mastering established methods, he actively incorporates artificial intelligence (AI) tools to optimize data acquisition and processing.

His technical capabilities are complemented by his leadership in project management. He has coordinated several article-publication-oriented projects and he is the Manager at the steering committee of the "Emerging PV" consortium. As part of this initiative, he manages a platform for emerging photovoltaic technologies, overseeing a database, expert protocols, and annual reviews in Advanced Energy Materials. He also organizes the international "Next Generation Solar Energy" conferences, establishing the consortium as a vital resource in the field.

Dr. Almora has authored over 50 peer-reviewed articles and a book chapter, earning more than 3,500 citations and achieving an H-index of 26. His multidisciplinary expertise and dedication to advancing solar energy technologies position him as a young researcher leader in the transition to sustainable and scalable energy solutions.

Resumen del Currículum Vitae:

Dr. Osbel Almora earned a Bachelor's degree in Physics (2013) from the University of Havana, Cuba, and a Master's in Applied Physics (2016) from Universitat Jaume I (UJI), Spain. He completed his Ph.D. with the highest honors (2020) from Friedrich Alexander Universität (FAU) Erlangen-Nürnberg, Germany, through a binational program with UJI, which also awarded him the 2021 Extraordinary Doctoral Prize in Sciences. As a postdoctoral researcher, he has advanced the development of X-ray detectors and perovskite and organic solar cells at UJI, Pablo de Olavide University of Seville, and Rovira i Virgili University (URV), where he currently works.

Dr. Almora has published over 50 peer-reviewed articles and a book chapter, amassing more than 3,500 citations and an H-index of 26. He has served as the first author on 48% of his publications, corresponding author on 48%, and senior author on 5% (WOS). His pioneering contributions include capacitive analysis of hysteresis in perovskite solar cells under dark conditions, the study of solid-state ionic conductivity in lead halide perovskites, and the first solid-state application of light intensity modulated impedance spectroscopy. His recent work focuses on developing flexible and transparent solar cells, as well as multijunction devices such as tandem cells and photonic power converters.

Since 2013, Dr. Almora has worked at eight institutions across six countries, including seven years in Spain and three years in Germany, with research stays in Canada, Finland, and Switzerland. He has also conducted shorter research stays in France and Turkey and participated in international conferences in Mexico and Brazil. His collaborations span over 200 researchers from 120 institutions across 25+ countries (WOS). Notable projects include partnerships with Siemens Healthineers, ZAHNER-elektrik, OSRAM (Germany), and Fluxim (Switzerland).

Dr. Almora has secured competitive grants, including the predoctoral "GRISOLIA/2014/022" and postdoctoral "FJC2021-046887-I" Juan de la Cierva fellowships in Spain. He also completed the Erlangen Graduate School of Advanced Optical Technologies (SAOT) in Germany, receiving the 2019 SAOT Doctoral Student Award.



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Since 2020, he has been a founding member and administrator of the "Emerging PV" consortium, an international initiative advancing photovoltaic materials and devices. He coordinates its website (<https://emerging-pv.org/>), database, standardized protocols, and annual reviews (Advanced Energy Materials), while organizing the "Next Generation Solar Energy" conferences (<https://www.ngse.info/>).

As an educator, Dr. Almora has supervised two undergraduate theses (FAU and the University of Guadalajara, Mexico) and one Master's thesis (URV). In 2024, he earned the "Profesor Contratado Doctor" accreditation from ANECA and has mentored and taught in winter schools for SAOT and UJI.



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Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: ROLDÁN PÉREZ, JAVIER
Referencia: RYC2024-048739-I
Correo Electrónico: javier.rolدان@imdea.org
Título: Stability and Control of Power Systems Dominated by Power Electronic Converters

Resumen de la Memoria:

In the predoctoral period, in the IIT, the main focus was the design and development of power converters for different applications (DVR, STATCOM, etc.). The scientific developments were related to the digital implementation of controllers, harmonics and power flow control. He also performed academic activities at Comillas University. After finishing the PhD, he focused on the development of power converters for type IV wind turbines, in Norvento.

In the post-doctoral period, he focused on VSMs. He published research articles and addressed the lack of current controllers in VSMs, its operation during voltage sags, in parallel connection or in weak grids. He was involved in projects related to microgrids and renewable energies, as a researcher. Now, as a senior research assistant, he is involved in several research projects as PI. His main research interests have shifted to the stability and control of power converters in power systems. This broad line can be divided into several topics and applications. Among them:

1. Grid-forming technology: The candidate started with this research topic in 2016, and he currently leads many developments in this field, including two national projects (SOLARFLESS and REDESFUERTES), contracts with companies, MSc and PhD theses, etc. Currently, his focus is the adaptation of the VSM to specific technologies (PV, wind, redox-flow batteries, etc.)
2. Small-signal stability: He develops POD controllers for power plants and performs stability analyses of power systems. This specific problem has been mainly addressed with traditional techniques (eigenvalue analysis). Currently, he is focusing on frequency-response techniques (such as the impedance criterion) as these do not require analytical models (as in the patent [P1]). This feature is important for generators based on power electronic converters.
3. Voltage stability: As many renewable generators are being integrated in electrical distribution systems, voltage stability is becoming a problem. Currently, he is implementing secondary controllers to improve the voltage stability of distribution networks with renewables.
4. Control of Virtual Power Plants (VPPs): The concept of VPP is crucial to simplify the integration of renewable energies. However, the coordinated control of these devices is not straightforward. Currently, he is focused on the secondary control of VPPs.
5. Development of grid-codes for future power systems: The development of grid-codes for power converters in future power grids is relevant. The candidate is currently designing controllers that fulfil these grid codes. However, the requirements are still difficult to set. In future, these requirements will be evaluated in the context of a full power system.

It can be seen that, compared to the past, the candidate is moving towards grid-scale integration of power converters. In this research level, the detailed implementation of controllers becomes less relevant than in the past, and the focus is on understanding (and solving) the interactions between power generators. In particular, the development of advanced tools (impedance methods, black-box and grey-box techniques, etc.) is very important, and will be addressed in detail in the future.

Resumen del Currículum Vitae:

Javier Roldán received the BSc degree in Industrial Engineering, the MSc degree in Electronics and Control Systems, the MSc degree in Systems Modelling, and the PhD degree in Systems Modelling, all from Comillas University, Madrid, in 2009, 2010, 2011, and 2015, respectively.

From 2008 to 2009, he worked with a scholarship at EADS Astrium Crisa, where he did statistical analysis of electronic circuits. He developed a toolbox to perform advanced simulation studies.

From 2009 to 2014 he worked in the Institute for Research in Technology (IIT). He collaborated in 7 R+D projects while he developed his PhD under the supervision of Prof. García-Cerrada and Prof. Zamora-Macho. Some of these projects were funded by public institutions and some other where funded by companies (INDRA, INGETEAM, etc.). He built devices based on power converters (STATCOM, DVR, etc.) both for research and industrial purposes. He carried out academic activities like teaching, directing students' projects, and participated in the development of the control systems laboratory, at Comillas University. In 2014, he did a research stay at Aalborg University (4 months) with Prof. Guerrero. The results of this period led to 10 journal articles, 1 book chapter and several conference articles.

From 2015 to 2016 he worked at Norvento, where he held a Torres Quevedo Grant to conduct research in the integration of wind-power converters in weak grids. He was leading the power electronics section. He was in charge of building a power converter for a wind turbine, and he was involved in one research project related to the development of the control system for an isolated microgrid. He also wrote research proposals. The results of this period led to 1 journal article.

From 2016 to 2019 he was a post-doctoral researcher at IMDEA Energy, where he participated 2 Retos Colaboración projects, national research projects, and projects with companies (IMV, REE, etc.). He was under the supervision of Dr. Prodanovic. He held one Iberdrola's grant to research in the integration of renewable energies. In 2018, he did a research stay (3 months) in SINTEF (Norway), funded by a Jose Castillejo Grant, with Dr. D. Arco and Prof. Suul. He did another short stay at SINTEF funded by the Marinet2 program (EU funds). He opened a research line on grid-forming converters



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that he currently supervises. During this period, he supervised 1 PhD thesis, 8 MSc theses and published more than 10 journal articles. He participated in dissemination activities like ["La Noche de los Investigadores"](#).

In 2019 he became assistant senior researcher at IMDEA Energy. He won a Juan de la Cierva Incorporación Grant. He is in charge of contracts with companies and collaborations with international institutions. In 2023, he obtained the R3 certificate and became IEEE senior member. In 2023, he did a research stay (2 months) at INESC-TEC (Portugal), funded by the María de Maetzu program, with Prof. Moreira. In 2024, he did a research stay (3 months) at UPM (Spain), with Prof. Martínez. He is the principal investigator of 2 national research projects and scientific coordinator of 1 Colaboración Público-Privada project. Currently, he supervises PhD and MSc students. He has been involved in 2 EU projects. All his developments are related to the integration of power converters in electrical grids.



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Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad

Nombre: ÁLVAREZ NAVEIRA, ANTONIO JOSÉ

Referencia: RYC2024-050915-I

Correo Electrónico: antonio.jose.alvarez@udc.es

Título: Wind excited structures

Resumen de la Memoria:

I am a postdoctoral researcher at the University of a Coruña, whose main field of research is Computational Wind Engineering. Within this topic I have studied the aeroelastic response of twin-box bridge decks, mainly related with vortex induced vibrations (VIV). 3 main publications in Q1 journals have been produced, two of them in collaboration with professor Kenny Kwok (University of Sydney, Australia), in which it has been possible to reproduce and generalise the identification of different regions of vortex shedding, and identify a partial lock-in which is governed by the downwind box, feature not previously addressed in experimental campaigns. This research line was started in the frame of my FPI scholarship (BIA2013-41965).

I have also profusely studied the aeroelastic response of bluff bodies, with a publication about the VIV of a rectangular prism of ratio 4:1 in a Q1 journal, in collaboration with Dr. John Owen (University of Nottingham, UK), as result of a predoctoral stay (scholarship EEBB-I-17-11905). This investigation is extended in the frame of the project TED2021-132243B-I00, where the effect of turbulence in the aeroelastic response of rectangular prisms is studied. For the generation of turbulence an innovative procedure based on the rod induced method is used. The effectiveness of this method by means of numerical simulations has been proven in a Q1 publication, being the first of its kind. This work is result of the continuous collaboration with Prof. Kwok.

Continuing with the topic of bluff bodies I have joined an international consortium, the Bluff Body Benchmark Consortium, leading to a publication actually under review in a Q1 journal.

Within research projects BIA2016-76656-R and BIA2016-76656-R, with focus in the shape optimisation of bridge decks I co-authored 3 papers (2 in Q1 and 1 in Q2). These project allowed me to participate and design multiple experimental wind tunnel campaigns.

During 2022 and 2023 I did a postdoctoral stay at the Massachusetts Institute of Technology (Fulbright scholarship, ED481B-2021-133) under the supervision of professor Themistoklis Sapsis, world leader in the application of machine learning to engineering problems. This stay has led to 5 software registrations, a paper in an international conference and the co-authorship of a paper currently under review in a Q1 journal.

As PI of the project ERIES-ACCREFOL, done in collaboration with the CSTB wind tunnel (France), I would like to expand both the typology and complexity of the wind tunnel campaigns I have conducted so far. In that regard, I have done a research stay at WindDEE facility (Canada) in collaboration with researches from the University of Zagreb (Croatia) and the von Karman Institute (Belgium).

I have also done a research stay at Laboratório Nacional de Energia e Geologia (Portugal), in the frame of the European project MODENERLANDS, where I was trained in the assessment of the offshore wind resource using satellite images.

Moreover I have taught a total of 133 hours in subjects of undergraduate and master level, as well as receiving specific formation, obtaining the Kaufman Teaching Certificate Program, imparted at MIT. I have participated in dissemination activities such as webinars, the European Researchers Night. (G-Night, 2021) and the organisation of the 6th FOAM@Iberia international conference.

Resumen del Currículum Vitae:

I am currently a member of the Structural Mechanics group (GME) at the University of a Coruña, working as a postdoctoral researcher. My main field of research is in Computational Wind Engineering. Within this topic, I have studied the aeroelastic response of twin-box bridge decks, mainly related to vortex induced vibrations (VIV). 3 main publications in Q1 journals have been produced, two of them in collaboration with professor Kenny Kwok (University of Sydney, Australia), in which it has been possible to reproduce and generalise the identification of different regions of vortex shedding, and identify a partial lock-in which is governed by the downwind box, feature not previously addressed in experimental campaigns. This research line was started in the frame of my FPI scholarship (BIA2013-41965).

Among my research activities, I have also focused in the aeroelastic response of bluff bodies, specially rectangular prisms. As a result of a predoctoral stay (scholarship EEBB-I-17-11905) at the University of Nottingham (UK), and in collaboration with Dr. John Owen, I have published in a Q1 journal a research about the VIV of a rectangular prism of ratio 4:1. This investigation is extended in the frame of the project TED2021-132243B-I00, where the effect of turbulence in the aeroelastic response of rectangular prisms is studied. For the generation of turbulence, an innovative procedure based on the rod induced method is used. The effectiveness of this method by means of numerical simulations has been proven in a Q1 publication, which is the first of its kind. This paper is result of the continuous collaboration with Prof. Kwok. Moreover, I have recently joined the Bluff Body Benchmark Consortium, formed by 8 international groups, which led to a publication currently under review in a Q1 journal.

Within research projects BIA2016-76656-R and BIA2016-76656-R, with focus in the shape optimisation of bridge decks I have co-authored 3 papers (2 in Q1 and 1 in Q2). These projects allowed me to participate and design multiple experimental wind tunnel campaigns. Related with this type of campaigns, and as a member of GME, I have participated in technology transfer projects. These projects were with companies such as ACCIONA and PUENTES Y CALZADAS.

During 2022 and 2023 I did a postdoctoral stay at the Massachusetts Institute of Technology (Fulbright scholarship, ED481B-2021-133) under the supervision of professor Themistoklis Sapsis, world leader in the application of machine learning to engineering problems. This stay has led to 5 software registrations, a paper in an international conference and the co-authorship of a paper currently under review in a Q1 journal.

As PI of the project ERIES-ACCREFOL, and in collaboration with the CSTB wind tunnel (France), I would like to expand both the typology and complexity of the wind tunnel campaigns I have conducted so far. With that in mind, I have done a research stay at WindDEE facility (Western University, Canada) in collaboration with researches from the University of Zagreb (Croatia) and the von Karman Institute (Belgium).

In the frame of the European project MODENERLANDS, I have done a research stay at Laboratório Nacional de Energia e Geologia (Portugal), where I was trained in the assessment of the offshore wind resource using satellite images, which is a key technology in my future line of research.



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Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: ARANDA CALLEJA, MIGUEL
Referencia: RYC2024-051408-I
Correo Electrónico: migaracal@gmail.com
Título: Control automático en sistemas multi-robot y con sensores de visión

Resumen de la Memoria:

I am a researcher in robotics and automatic control, specializing in multi-robot systems, computer vision, and deformable object manipulation. I have published 23 journal articles (20 in Q1-Q2 JCR), 18 international conference papers, and a full book as the lead author. My work has received over 600 citations, with an h-index of 14. I have received recognitions such as the Best PhD Thesis in Robotics award (GTRob-CEA, 2016) and the IEEE RAL Distinguished Service Award as an Outstanding Reviewer (2024).

My recent research has been focused on two main topics: control of multirobot systems, and robotic manipulation of deformable objects. My long-term research vision is to contribute in creating robotic systems that exploit our best scientific and technological tools to aid humans to complete tasks in an autonomous, efficient and safe manner. My research project will make progress toward realizing that vision by building upon my recent line of research: controlling the interaction between multirobot systems and deformable or dynamic elements by exploiting geometric representations of deformation. This is useful in tasks such as enclosing a dynamic phenomenon (which could be, e.g., a group of animals, a wildfire, or an oil spill) or transporting a deformable object, or for robotic manipulation of an object to control its shape in, e.g., industrial assembly. My project will address key enhancements to my recently published approaches, in order to improve the robotic systems' adaptability, efficiency, and performance via both model-based techniques (observer-based control, multirobot motion planning, optimization-based control, etc.), and AI-based approaches.

Resumen del Currículum Vitae:

I have an extensive research track record, with 23 peer-reviewed journal articles (1 forthcoming; 20 in Q1-Q2 journals, 12 as first author) and 18 peer-reviewed conference papers (1 forthcoming; 11 as first author). I frequently publish in leading venues such as IEEE TRO, IEEE RAL, ICRA, IROS, and have authored a peer-reviewed book in the Springer series Advances in Industrial Control. My research focuses on multi-robot systems, computer vision for robotics, and manipulation of deformable objects.

I completed my PhD at the University of Zaragoza (2015) with an FPU doctoral scholarship, including over 9 months of research stays in the USA and France. I served as a postdoc at Institut Pascal, France, for 5 and a half years, with leading roles in two European projects, COMMANDIA (as Project Manager) and SOFTMANBOT (as Local Technical Manager), for SIGMA Clermont, Institut Pascal. Both projects, which coordinated multinational teams, developed robotic solutions for handling deformable objects in industrial contexts. I also contributed to French industrial projects like AEROSTRIP and MAROC, collaborating with major companies such as AIR France and Michelin.

In 2022, I joined the University of Zaragoza through the competitive María Zambrano Program to lead a 3-year project (2022-2024) as Principal Investigator, funded by the Spanish government and EU. The project, focusing on geometric models and multi-agent systems in deformable scenarios, has produced 11 journal articles and 5 conference papers. Currently, I am a Postdoctoral Researcher at Univ. Zaragoza under the DEFORMS national project.

I have co-supervised 3 PhD theses (France) and supervised 4 student projects at Univ. Zaragoza. I have also mentored international interns and participated as a jury member for 5 international PhD defenses. I organized the ROMADO Workshop (IROS 2020), Special Sessions at ROBOT2022 and ROBOT2023, and gave invited talks at renowned institutions (LAAS-CNRS, Nanyang University). I was guest editor of a special issue on deformable object handling (IEEE RAL, 2022) and have been active in conference program committees and session chairing. As a reviewer, I have contributed to 35+ journals, and to major conferences. My recognitions include the 2024 IEEE RAL Distinguished Service Award as an Outstanding reviewer (top 0.2% reviewers) and the 2016 GTRob-CEA Best Doctoral Thesis in Robotics award. The quality of my research has been validated by ACPUA with two six-year periods (sexenios).



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Turno General

Área Temática: Producción industrial, ingeniería civil e ingenierías para la sociedad
Nombre: RAHIMZADEH KIVI, IMAN
Referencia: RYC2024-048711-I
Correo Electrónico: iman.rahimzadeh@gmail.com
Título: Forecasting and managing induced seismicity for gigatonne-scale carbon storage

Resumen de la Memoria:

My research contributes to the urgent societal challenge of mitigating the climate change emergency (UN sustainable development goals 7 and 13). I generate knowledge and innovative workflows and tools required to safely and efficiently unlock the huge potential of the subsurface to cut carbon emissions and produce clean and sustainable energy. To this end, I conduct interdisciplinary research that brings together concepts and methodologies from geomechanics, geochemistry, seismology, data science and artificial intelligence.

A research line that I significantly contributed to is multiphysics and multiscale characterization of shales and mudrocks, (1) as a challenge for wellbore stability (my master's project at Tehran Polytechnic, Iran), (2) as unconventional gas reservoirs (my PhD project at Tehran Polytechnic, Iran) and (3) as sealing layers (caprocks) for fluid/energy storage underground (postdoctoral research at IDAEA-CSIC, Barcelona, Spain). I combined experimental and computational techniques in the context of coupled hydraulic-mechanical-chemical (HMC) processes to address these challenges. My contributions led to the development of a physically sound, environmentally friendly solution for wellbore stability in swelling shales, a novel theory for evaluating rock brittleness for more accurate identification of productive shale gas layers and unravelling the low risk of CO₂ leakage within geologic CO₂ storage over unprecedented spatiotemporal scales.

A major part of my postdoctoral research at the Spanish National Research Council (IDAEA-CSIC) involved developing coupled, multiphysics models to understand mechanisms of injection-induced earthquakes as a major challenge in front of the widespread deployment of geoenergy projects. I developed explanations for earthquakes unexpectedly induced after several years of exploiting hot sedimentary aquifers and counterintuitive observations of seismicity after stopping injection in enhanced geothermal systems in light of the involved coupled thermo-hydro-mechanical (THM) processes. I developed HM models of reservoir impoundment-triggered seismicity explaining Brazil's 1998 M4 Nova Ponte earthquake. I led a team developing a global physics-based database of injection-induced seismicity that has great potential to boost research on seismic hazard forecasting and mitigation.

My current research at Imperial College London, UK, focuses on evaluating coupled THMC processes of CO₂ injection into sedimentary rocks. I am combining laboratory experiments and numerical simulations for improved assessment of CO₂ flow and trapping behaviour underground. My research has proved notable stress impact on the kinetics of chemical reactions of CO₂ with rock and provided the first direct evidence of chaotic solute mixing in porous rocks. These findings have far-reaching implications for understanding and quantifying reactive transport processes in the subsurface. Additionally, I have developed an analytical, open-source tool, CO₂BLOCKSEISM, to evaluate subsurface CO₂ storage resources constrained by the risk of induced seismicity. The use of this tool enables a more realistic estimate of the possible rates of scale-up for CO₂ storage regionally and globally. I will expand my research to develop methodologies for forecasting and managing induced seismicity for gigatonne-scale geologic carbon storage.

Resumen del Currículum Vitae:

I am an engineer and a geoscientist with a demonstrated track record in teaching and conducting fundamental and applied research in the fields of subsurface energy and resource development. I earned my PhD in Petroleum Engineering in late 2018 from Tehran Polytechnic, Tehran, Iran. After a short period in the industry and as a lecturer at the Chamran University of Ahvaz, Ahvaz, Iran, I started my postdoc research career in 2020 at the Spanish National Research Council (IDAEA-CSIC), Barcelona, Spain. I initially enrolled as a contracted postdoc in the ERC-StG project GEOREST (23 months) and then as "Juan de la Cierva Incorporación" (4 months) and "PCI-MSCA IF-ST 2020" (project EASY GEOCARBON, 16 months) fellows, two prestigious grants that I secured through competitive calls. Awarded a "Horizon Europe Marie Curie fellowship" for the project THMC4CCS, in 2023, I joined the Subsurface CO₂ Research Group at Imperial College London, London, UK, where I am currently conducting my research. I have employed cutting-edge, real-time imaging techniques to develop an improved understanding of the coupled THMC processes of CO₂ storage in sedimentary rocks. Through conducting interdisciplinary research in a collaborative environment, I have established an extensive professional network comprising world-leading scientists in different fields of geoenergy. I have acquired knowledge and skillsets that enable me to tackle a wide range of complex geoenergy problems.

I have continuously contributed to advancing research in different fields of geoenergy for more than a decade. I have participated in 5 scientific projects (3 R&D contracts and 2 through competitive calls) as a leading scientist and in 3 fellowship grants as the PI. I have co-authored 25 peer-reviewed papers in high-impact, indexed journals, 1 book chapter, 20 scientific and technical reports and 31 conference contributions. I have enthusiastically served the geoenergy research community by giving 9 invited lectures in national and international institutes, reviewing nearly 100 papers for 30 different high-impact journals and 3 international grant applications in this field and co-convening a well-received session on coupled THMC processes in geological media in the European Geoscience Union (EGU) General Assembly since 2023. I have co-supervised 3 PhD students (1 ongoing) at CSIC and 9 final master projects (4 at Tehran Polytechnic and 1 at Sahand University of Technology, Iran, and 4 at Imperial College London, UK). One of the supervised PhD students is currently a postdoctoral fellow at the Ecole Polytechnique Fédérale de Lausanne (EPFL). I taught 2 undergraduate and 4 graduate courses (at the University of Tehran and Chamran University of Ahvaz, Iran). I have actively disseminated my research outcomes to the geoenergy industry through lectures in collaboration meetings and organizing 3 workshops. I have shown a strong commitment to effective public outreach through publishing papers in general-audience journals, interviewing media, managing webpages dedicated to my fellowships and developing web-based interfaces of my scientific tools and datasets in a way understandable to a broader range of audiences. In recognition of my research efforts, I have been awarded the EGU 2025 Division Outstanding Early Career Scientist Award in Energy, Resources and the Environment.



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Turno General

Área Temática: Psicología
Nombre: DE OLIVEIRA BANCA, PAULA MICAELA
Referencia: RYC2024-049097-I
Correo Electrónico: paula.banca@gmail.com
Título: Neurobehavioural basis of compulsivity: bringing neuroscience and therapy

Resumen de la Memoria:

The growing burden of mental illnesses, particularly compulsive disorders such as Obsessive-Compulsive-Disorder (OCD), substance misuse and behavioural addictions, remains a critical public health challenge. Despite scientific progress, current treatment options remain outdated, leaving many patients unresponsive. My research aims to bridge this gap by combining neuroscience and technology to develop more effective and personalised treatment solutions. It focuses on the behavioural and neural mechanisms of compulsivity, particularly the frontal-basal ganglia pathways, to identify precise targets for brain-based and digital interventions.

Throughout my career, I have made several groundbreaking contributions to advancing the understanding of compulsive disorders, particularly in OCD. One of my postdoctoral studies employed advanced Magnetic Resonance Spectroscopy with a 7 Tesla magnet to measure Glutamate and GABA levels in the OCD brain. This research revealed a excitatory-inhibitory imbalance in key brain regions (ACC and SMA), which was linked to symptom severity and habitual tendencies. This discovery, attracted global attention, opened new avenues for treatment targeting the glutamate system, and culminated in a high-impact publication (Nature Communications). Additionally, I developed an innovative gamified mobile app to evaluate the role of habits in compulsive behaviour, addressing a long-standing speculation in the field. The study revealed intact habit formation but impaired goal/habit arbitration in OCD patients with high compulsivity. Unexpectedly, 41% of the patients reported symptom relief after using the app, leading to an NHS clinical trial that confirmed its therapeutic potential. Ongoing studies are investigating its neural mechanisms, with plans to extend its benefits to autistic individuals through a European consortium.

My PhD research was equally impactful, employing a novel fMRI methodology to study brain responses during realistic, patient-specific symptom provocations. This approach overcame the constraints of traditional imaging paradigms and led to the first study identifying a fronto-striatal imbalance underlying habitual and goal-directed action control during OCD symptom provocation. This finding advanced the habit model of compulsivity and led to an invitation to join Cambridge University as a postdoctoral researcher. At Cambridge, my first publication employed computational modeling to demonstrate how impaired decision-making under uncertainty drives compulsive behaviours in OCD. This work highlighted the potential of reward-based strategies to improve patient outcomes and provided insights into the psychological mechanisms of compulsivity. Beyond OCD, my research has extended to other compulsive disorders, including binge drinking, binge eating, gambling, and sexual addiction, with additional high-impact publications in these areas.

In addition to empirical studies, I have authored influential review articles, including a widely cited piece in Neuron that introduced the "narrowing of goals" hypothesis for compulsion development. More recently, I proposed a multifaceted neural circuit theory of compulsivity in Nature Reviews Neuroscience. These works have consolidated existing research, inspired new directions in the field, and enhanced my international profile, leading to growing citation metrics.

Resumen del Currículum Vitae:

CARRER PATH: I completed my PhD with distinction at the University of Coimbra, Portugal, in 2015, resulting in 6 first-author peer-reviewed publications and two awards. In Portugal (mentor: Prof Castelo-Branco), I gained expertise in neuroscience, experimental design and imaging analysis. During a 2-year PhD research stay at Cambridge University (mentor: Dr Voon), I developed skills in cognitive and behavioural testing. A key PhD achievement was a pioneering study published in Brain (2015), the first to reveal an imbalance between goal-directed and habitual systems in the OCD brain during live symptom provocation and real-time remote stimulation from patient's homes to the MRI setting. In 2017, I was awarded a prestigious Wellcome Trust Postdoctoral Research Fellowship (2017-2024) to pursue my independent research on compulsivity at Cambridge University. I had the opportunity to work with world-leading neuroscientists. Key contributions: 1) discovery that inducing motor habits through my gamified mobile app reduces symptomatology in patients with OCD (Elife, 2024); 2) discovery that a Glutamate/GABA chemical imbalance in the forebrain underpins compulsive symptoms and habit control in OCD (Nature Communications, 2023).

The international recognition of my research is attested by 24 peer-reviewed papers (9 first author, 2 last author), in high-impact journals like Brain, Neuropsychopharmacology, Nature Communications, Neuron and Nature Reviews Neuroscience (2225 citations; H index 18 in Google Scholar), by cumulative grant income (over £700k) and by 13 established international collaborations.

CONTRIBUTIONS TO SOCIETY: mobile app as potential digital tool for treating compulsivity. Private sector: lead research advisor at Ideal Flatmate Ltd (2016); medico-legal psychological assessments for iDox (2024-present). Public sector: clinical psychologist at Institution for Social Solidarity, Portugal (2005-2008) and at Cambridge NHS (2023-2024). Dissemination: 16 invited talks, 15 posters and 7 published abstracts at international conferences; outreach team member at Hughes Hall College: organized and taught 2 neuroscience courses (2017-2019); outreach events (2016): Cambridge and Oxford Science Festivals (organiser and invited speaker, respectively); science communication broadcast (2017)

MENTORING: Master students (1), PhD-students (3), undergraduate students (5) **TEACHING:** 75h of supervision at Cambridge University (23 undergraduates): Atypical Psychology (24h), Brain Mechanisms of Psychopathology (6h), Neural Mechanisms of Motivation (4h), Psychological Enquiry and Methods (14h), Developmental Psychology and Individual Differences (19h), Neurobiology (4h) and Behavioural and Cognitive Neuroscience (4h). I lectured on "Imaging Mental Health" for the MPhil in Basic and Translational Neuroscience Course, Cambridge University. Evaluation tasks: Project



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reviewer for Poland National Science Centre, Israel Science Foundation, EUREKA Eurostars, Wellcome Trust; Manuscript Reviewer in high impact journals.

OTHER: Hughes Hall fellowship award (2018); Impact Leadership Course award, Hughes Hall Cambridge University (2021); Bursary to attend the Ignite Entrepreneurship Programme, Cambridge Judge Business school (2021); International Funders' Award in Management Skills course (2016). Member of the British Psychological Society and the Orchard OCD College, UK. Artistic work: Cover design for Neuron (Volume 102, Issue 1), 2019.



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Turno General

Área Temática: Psicología
Nombre: WLODARCZYK, ANNA
Referencia: RYC2024-048558-I
Correo Electrónico: Annamarwl@gmail.com
Título: Exploring Global Identification and Prosocial Engagement Through Cross-Cultural Lenses
Resumen de la Memoria:

Throughout my academic career, I have focused my research on the intersection of social identity, emotional processes, and societal challenges, particularly how psychological mechanisms can foster global cooperation and resilience. My work has evolved from foundational studies on collective emotions to a comprehensive examination of global identification and its relevance to issues like migration, climate resilience, and social cohesion. By employing interdisciplinary and cross-cultural methodologies, I have developed a distinctive research line that combines theoretical advancements with practical applications.

Initially, I investigated emotional synchrony within group gatherings, enhancing our understanding of how shared emotional experiences strengthen group identity and foster solidarity. This foundational work paved the way for exploring the relationship between self-transcendent emotions and superordinate identities in promoting prosocial behavior. These themes have informed my involvement in key international collaborations, such as the Towards Gender Harmony project, which produced global insights into gender dynamics, and the Global Social Identifications project, focusing on inclusive identities.

A significant aspect of my research is the application of advanced methodologies, including longitudinal, experimental, and comparative designs. This rigor ensures that my findings contribute to theoretical discourse and inform the creation of culturally sensitive interventions addressing critical societal challenges. For instance, my work on global solidarity highlights the potential of shared identities to mitigate polarized attitudes in multicultural settings.

My proposed research trajectory builds on this foundation, focusing on the emotional and cognitive mechanisms behind global identification and their relevance to societal challenges. Specifically, I aim to investigate how feelings of awe, gratitude, and elevation facilitate prosocial behavior and cooperative decision-making. These insights can inform interventions that enhance resilience to global crises, particularly in climate adaptation and the integration of migrant communities. Through interdisciplinary collaboration, my research aligns with Spain's strategic research priorities and the Sustainable Development Goals (SDGs), especially Goal 13 (Climate Action) and Goal 16 (Peace, Justice, and Strong Institutions).

This trajectory illustrates my transition from analyzing psychological processes to applying them in real-world contexts. Leading projects such as FONDECYT Iniciación and contributing to high-impact international studies ensure the validity and scalability of my research efforts. Additionally, my established networks with experts in social identity research foster innovative methodologies and enhance the impact of my work.

Aligned with the objectives of the Ramón y Cajal program, my research provides a comprehensive framework for understanding and addressing societal challenges through psychology. By integrating theoretical insights with practical applications, it aspires to cultivate inclusive societies and promote global cooperation, ensuring both regional relevance and global applicability.

Resumen del Currículum Vitae:

The trajectory of my research career exemplifies a steadfast commitment to excellence in social psychology, characterized by international collaboration, leadership, and substantial scientific contributions. My work addresses global challenges by exploring social identity, emotional synchrony, and collective resilience, fostering interdisciplinary networks and advancing psychological science worldwide.

Achieving a PhD with the highest honors (summa cum laude) and receiving the "International Doctorate" mention from the Basque Government's Deputy Minister for Universities and Research were pivotal milestones in my scholarly journey, underscoring my dedication to rigorous and innovative methodologies. This dedication is evidenced by my publication record of 68 ISI-indexed articles, an h-index of 24, and over 1,798 citations. My 2015 publication in the JPSP (Q1, JIF: 8.99) advanced the understanding of emotional synchrony in collective gatherings and earned the III Research Award for Young Doctors (2018) from SCEPS.

As Principal Investigator of the FONDECYT Iniciación project (2019-2022), I led investigations into superordinate identities and self-transcendent emotions, employing longitudinal and experimental methodologies to uncover mechanisms fostering global identity. Insights from this research have informed academic discourse and policy discussions on social cohesion and resilience in multicultural societies.

Impactful international collaborations distinguish my career. As the South America coordinator for the Towards Gender Harmony project, I examined masculinity threats and gender stereotypes across 62 countries. Publications from this initiative, including in Scientific Data (2024, Q1, JIF: 8.501), provide actionable insights into global gender dynamics. Additionally, my contributions to the Global Social Identifications project highlight my commitment to advancing cross-cultural methodologies and promoting prosocial behavior.

I have collaborated with NGOs and government agencies to address societal issues. My involvement in Chile's volcanic risk mitigation project (FIC-R 2017) applied psychological principles to enhance community resilience, while my contributions to initiatives like SOS Racismo reflect my commitment to fostering inclusivity and addressing social inequalities.

My scholarly efforts have garnered awards, including the ER Award (UCN, 2021), the OR Award (UCN, 2022-2023), the GCP Grant (UDEM, 2024), the ISPP Support Grant (2018), the STAR Award (2016), and the EPP Grant (ICP, 2016). These accolades underscore my ability to translate complex research into practical applications, bridging academic inquiry and societal needs.

Mentorship is central to my academic vision. I have supervised 12 undergraduate theses, one doctoral dissertation, and a postdoctoral fellowship, nurturing emerging researchers and contributing to high-impact publications. My guidance has empowered scholars to pursue meaningful contributions to psychological science.



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Aligned with the objectives of the Ramón y Cajal program, my future aspirations include expanding interdisciplinary research on social identity and global challenges. I aim to strengthen collaborations with European research networks, develop innovative cross-cultural methodologies, and address critical issues such as climate adaptation and migration through actionable solutions.



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Turno General

Área Temática: Psicología
Nombre: LOPEZ CANEDA, EDUARDO
Referencia: RYC2024-049840-I
Correo Electrónico: dudi.lopez@gmail.com
Título: From Neurocognitive Insights to Innovative Interventions in Alcohol Misuse

Resumen de la Memoria:

My research career has focused on three main lines of inquiry, contributing significantly to understanding the neurocognitive consequences of alcohol misuse in adolescents and young adults – a population highly sensitive to the neurotoxic effects of alcohol- and advancing novel intervention strategies:

1. The Effects of Binge Drinking (BD) on Inhibitory Control. My research has extensively explored the impact of BD on inhibitory control, a critical cognitive function underlying substance use behaviors. Through neuroimaging studies, I identified key functional and structural brain abnormalities, providing empirical support for major conceptual frameworks, such as the neurocompensation hypothesis, the neuromaturational delay hypothesis, and the continuum hypothesis linking BD to alcoholism.
2. Memory Suppression Mechanisms in Addictive Behaviors. I pioneered research on memory suppression mechanisms in the context of addictive behaviors. Under my first funded project as Principal Investigator (~€230,000), I developed the first paradigm for assessing memory inhibition in alcohol-related contexts. This work revealed that individuals with alcohol misuse exhibit abnormal functional connectivity between prefrontal and memory networks during suppression attempts, suggesting a potential link between alcohol use and intrusive alcohol-related memories. Building on this work, I secured additional funding (~€50,000) to conduct a randomized controlled trial in patients with alcohol dependence, in collaboration with leading substance abuse researchers, including Dr. Maurage (Catholic University of Louvain, Belgium).
3. The Interplay Between the Brain, the Bug, and the Binge. Expanding beyond these core areas, my current research investigates the complex interplay between the neurocognitive profile, the gut microbiome, and BD-induced damage. In collaboration with international experts, such as Dr. Cryan (APC Microbiome, Ireland), I'm exploring the therapeutic potential of microbiota-targeted interventions (e.g., psychobiotics), as a strategy to mitigate BD-related neurotoxic effects. This line of research, which I lead as Principal Investigator, received four years of funding (~€250,000).

My ability to secure funding has been demonstrated since the early stages of my career, through competitive scholarships awarded to top-performing students, such as the Research Collaborator and the Postgraduate Fellowships, and the FPU PhD Scholarship. My postdoctoral career, conducted entirely outside Spain, was also consistently supported by competitive calls, including the Portuguese Postdoctoral Fellowship and the highly competitive Individual Call to Scientific Employment Stimulus, where I achieved the second-highest score in the country in the psychology category. Recently, I secured an Assistant Researcher position, again with the second-highest score nationally.

My scientific leadership is demonstrated through managing four externally funded research projects, totaling over €530,000. These grants enabled the establishment of the Research Group on Neuroscience of Substance Abuse, which I lead, and where I've supervised/I'm supervising 3 postdoctoral researchers, 4 PhD students, 12 MSc theses, and 14 undergraduate students. My scientific excellence and independence were recently recognized by the Spanish Agency for Research, which awarded me the R3 certification.

Resumen del Currículum Vitae:

Eduardo López-Caneda is an Assistant Researcher at the Research Center in Psychology, School of Psychology, University of Minho (Portugal). His research primarily focuses on the effects of alcohol misuse on the brain and the development and implementation of innovative treatments to reduce alcohol use, craving, and relapse.

The impact of his research is reflected in 42 scientific articles published in high-impact journals, such as Addiction, Molecular Psychiatry, and Clinical Psychology Review. He has also authored 16 conference papers, 4 book chapters, and edited 2 books. His work has garnered over 1,840 citations, with an H-index of 23, according to Google Scholar (+1050 citations and H-index 19 in Scopus). Eduardo has participated in 81 conference presentations and 17 research projects, serving as Principal Investigator in 4 of them.

Eduardo's contributions have been recognized with 8 awards, notably the 2024 Prize for the Best Article by the Portuguese Association of Experimental Psychology (APPE) and the 2023 CANTAB Research Grant from Cambridge Cognition Ltd. He also serves as an Associate Editor for three JCR-indexed journals and a reviewer for 16 others, including Progress in Neuro-Psychopharmacology and Biological Psychiatry, Psychopharmacology, and Psychiatry Research: Neuroimaging.

He has achieved the second-highest national score in the Psychology category for two Individual Calls to Scientific Employment Stimulus (CEEC, Portugal), earning positions as Junior Researcher in 2018 and Assistant Researcher in 2022 (equivalent to a Ramón y Cajal position).

Throughout his career, Eduardo has secured approximately €534,000 in funding as Principal Investigator for research projects, along with €8,400 in awards. Additionally, funding for human resources, including his own and that of his PhD students, totals approximately €709,000, culminating in a combined funding achievement of €1.25 million.

Eduardo is actively involved in international collaborations, participating in several prominent consortia, such as the Memory Control Consortium, the EEGManyPipelines Initiative, and the tACS Challenge. Two studies resulting from these collaborations have been pre-registered in Nature Human Behavior. He is also a member of the Expert Committee for the EU Funding & Tenders and has served on evaluation committees for international research calls in Ireland, Mexico, and Spain.

Eduardo is accredited as a Profesor Contratado Doctor in Spain and serves as a Lecturer at the School of Psychology (EPsi) of the University of Minho, with over 1,000 accredited teaching hours. Since 2021, he has coordinated the Neuropsychology and Psychopharmacology courses. Additionally, he is an elected member of the School Council at EPsi and represents researchers on the school's Scientific Council.

His work has been widely recognized in the media, with features in outlets such as Daily Mail, The Herald, ABC, Jornal de Notícias, Cadena SER, and Radio Televisión Española.



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Turno General

Área Temática: Psicología
Nombre: CARBIA SINDE, CARINA
Referencia: RYC2024-050634-I
Correo Electrónico: carina.carbia.sinde@gmail.com
Título: Binge drinking: desde la neuropsicología al microbioma

Resumen de la Memoria:

Early in my career, my research focused on investigating the neuropsychological consequences of binge drinking during adolescence, a critical period of vulnerability due to ongoing neuromaturational changes. I demonstrated that even years after discontinuing binge drinking, young adults still exhibit cognitive difficulties, particularly in episodic memory consolidation, underscoring the long-term and pervasive impact of adolescent binge drinking. I also identified cognitive characteristics—such as alcohol-related biases and poor inhibitory control—that define individuals who continue to binge drink from adolescence into adulthood. By addressing the critical gap in longitudinal data, my research provides valuable insights into the characteristics of at-risk groups and informs the development of tailored prevention and intervention programs. This work followed participants from ages 18 to 29, offering a unique perspective on the factors influencing sustained binge drinking behavior over time. After completing my PhD, I expanded my research to explore the impact of binge drinking beyond the brain, focusing on the gut-brain axis. I was the first to demonstrate that young binge drinkers exhibit gut microbiota alterations, which are associated with emotional processing difficulties. I further identified specific microbial and functional changes that could serve as early biomarkers for craving, offering novel insights into the mechanisms underlying substance misuse. Building on this foundation, my current research explores early neurocognitive alterations in stress reactivity and craving through the lens of the gut-brain axis in young binge drinkers. This work provides a deeper understanding of the factors contributing to addiction risk and supports the development of targeted intervention strategies.

Resumen del Currículum Vitae:

With a PhD in Clinical Psychology from the University of Santiago de Compostela, I have established a dynamic international research career in Ireland and Belgium, focusing on advancing the understanding of alcohol misuse in young people. In 2018, I was awarded a prestigious Marie Curie Fellowship to conduct research at APC Microbiome Ireland, a pioneer institution in this field. This work revealed that gut microbiome alterations occur in young binge drinkers even before addiction develops, drawing widespread media coverage, including The New York Times. Building on these findings, I am currently a Senior Postdoctoral Researcher at UCLouvain, where I investigate stress reactivity and craving through the lens of the gut-brain axis. I have led and co-led research projects funded by major international programs (e.g., MSCA, FNRS) in Ireland, Belgium, and Portugal, developing multidisciplinary expertise in neuropsychology, gut microbiome, and dietary research. Collaborating with leading experts across Spain, Portugal, Ireland, the USA, and Belgium, I have authored 26 peer-reviewed publications (18 in Q1 journals), including 14 as first or last author. My work has garnered over 1,172 citations (H-index 18) and earned me the “Young Investigator Award” at the 2022 ISBRA/ESBRA Congress.



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Turno General

Área Temática: Psicología
Nombre: RODRÍGUEZ GARCÍA, MARÍA
Referencia: RYC2024-050291-I
Correo Electrónico: maria.rodriquezay@gmail.com
Título: Optimizing the effects of physical activity on youth mental health

Resumen de la Memoria:

My independent research line focuses on designing personalized digital interventions that use physical activity to promote mental health in youth. My long-term goal is to establish a research group focused on preventing mental disorders, such as depression and anxiety, in youth by implementing personalized physical activity and technology-based interventions—key strategies for fostering a healthier, more resilient society.

I completed my PhD at the University of Granada, where I received the Extraordinary PhD Award. During this time, I actively pursued international collaborations to broaden my expertise. As a postdoctoral researcher, I spent 36 months at Erasmus MC (the Netherlands), leading the physical activity and mental health line. I worked with flagship cohort datasets like Generation R, a population-based study tracking over 10,000 participants from fetal life to adulthood. Overall, I discovered that physical activity has a small but positive effect on youth mental health. This finding inspired me to explore the biological and neural mechanisms underlying these modest effects, aiming to design more effective physical activity interventions for youth mental health. To achieve this, I developed efficient, automated scripts to analyze Magnetic Resonance Imaging (MRI) data. However, I was surprised to find that the impact of physical activity on brain outcomes was minimal or nonexistent in youth. Despite this, the positive effects on mental health are undeniable: physical activity, when tailored to the needs of young people and designed to enhance their self-esteem, is associated with fewer symptoms of depression and anxiety years later. These findings, published in JAMA Psychiatry, marked a pivotal moment in my academic career and signaled a paradigm shift in my approach. In short, to optimize the positive effects of physical activity on youth mental health, interventions must be personalized and co-designed with the youth themselves. During my Ramón y Cajal fellowship, my mission is clear: to leverage technology to achieve this goal and strengthen the positive effects of physical activity on youth mental health.

In summary, I plan to shift from in-person physical activity interventions to co-designing digital tools with young people, aiming to optimize the impact of physical activity on their mental health. Building on my earlier research, which focused on observational studies, short-term training, and the effects of physical activity on brain outcomes, my current goal is to empower young people to sustain lifelong physical activity and enhance their psychological well-being. The award of this Ramón y Cajal proposal will provide me with the necessary resources and protected time to launch my ambitious and interdisciplinary research program in Spain. This award will be a crucial step toward securing my own research group and establishing myself as an influential leader in the field. My social commitment is to protect young people's mental health, addressing the real issues associated with physical inactivity, sedentarism, and poor use of technology.

Resumen del Currículum Vitae:

Scientific and Technical Contributions. I discovered that physical activity has a small but positive effect on youth mental health. This finding motivated me to investigate the neural mechanisms underlying this effect to optimize its impact in future interventions. To do so, I developed efficient, automated scripts to analyze MRI data. Surprisingly, my analyses revealed minimal or nonexistent effects of physical activity on the brain. However, the mental health benefits of physical activity were clear: when tailored to the needs of youth and designed to boost self-esteem, physical activity is linked to fewer symptoms of depression and anxiety years later. These findings, published in JAMA Psychiatry, marked a pivotal moment in my academic career and represented a paradigm shift in my approach. I concluded that designing effective physical activity interventions for youth mental health requires personalization and co-design with the youth themselves, which is my mission during my Ramón y Cajal fellowship.

Internationalization. I completed my PhD at the University of Granada, where I received the Extraordinary PhD Award while actively engaging in international collaborations to expand my expertise. This commitment is evident in the fact that 90% of my publications are collaborations with international researchers from Europe, the US, Chile, Australia, and the UK. I completed predoctoral research stays at renowned institutions, including the University of Utrecht, Erasmus MC, and the University of Pittsburgh, accumulating 9 months. As a postdoc, I spent 36 months at Erasmus MC (the Netherlands), where I led the physical activity and mental health line and tested my hypotheses using datasets from flagship cohorts, such as Generation R—a population-based study following over 10,000 participants from fetal life to adulthood. I also took on key international responsibilities, including joining EXACT, Europe's largest personalized health consortium funded by the EU's Horizon 2020 program. As a member of EXACT, I completed a two-month secondment at the Italian Ministry of Health, where I gained invaluable insights into the leadership barriers affecting the implementation of personalized health within global healthcare systems. These experiences inspired my current work at IBIMA, where I am developing personalized interventions aimed at promoting mental health in youth.

Leadership. I am the Principal Investigator of the TeenFit project, which lays the foundation for my research line. I also lead the MindMotion Lab within the SAMSERAP research group, a multidisciplinary team focused on designing digital solutions to promote mental health. Internationally, I contribute to the COST Action YouthDMH, a European research network dedicated to designing and implementing digital mental health tools for youth. Nationally, I am a member of RICAPPS, a leading network focused on promoting health through innovative interventions that are translated into clinical practice for societal benefit. My solid trajectory, network, and passion equip me to lead a cutting-edge research line.

My vision is clear: to establish a research group focused on preventing mental disorders, such as depression and anxiety, in youth by implementing personalized physical activity and technology-based interventions—key strategies for fostering a healthier, more resilient society.



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Turno General

Área Temática: Psicología
Nombre: COLOMBO, DESIREE
Referencia: RYC2024-050836-I
Correo Electrónico: dcolombo@uji.es
Título: Beyond Symptoms: Harnessing Positive Emotion Regulation through a Multidisciplinary Approach to Redefine Mental Health and Well-being

Resumen de la Memoria:

Globally, mental health needs are high, yet responses often fall short. Current approaches primarily focus on diagnosing and treating mental disorders through categorical, symptom-based frameworks. This perspective neglects the WHO's holistic definition of mental health, which emphasizes positive well-being as essential. My research addresses this critical gap by focusing on positive emotion regulation (PER), a transdiagnostic factor central to mental health and overall well-being. Specifically, I investigate how individuals regulate positive emotions, employing ecological, technology-driven methods to capture and enhance these processes in daily life. This approach bridges laboratory findings and real-world experiences, promising groundbreaking theoretical insights and impactful clinical applications. So far, I have conducted several studies leveraging tools such as virtual reality and mobile applications to understand and enhance PER across temporal frames—savoring the moment, anticipating pleasant experiences, and recalling positive memories. These three dimensions of PER are increasingly recognized as vital for emotional well-being and are often impaired in individuals with depressive symptoms, which has led to the development and demonstrated effectiveness of clinical interventions targeting all three dimensions. However, most existing work has treated these dimensions as separate mechanisms, but there is compelling reason to believe that these dimensions may influence one another in complex ways. My research line aims to explore the interplay between past, present, and future PER through an integrative, multidisciplinary approach that incorporates ecological methodologies (e.g., mobile applications, virtual reality) alongside self-report and objective measures (e.g., physiological and ocular indexes). This research also seeks to examine the connection between PER and emotional well-being, with a particular focus on depression—a highly prevalent psychological disorder characterized by impairments in PER. This research is innovative and groundbreaking on several fronts. (a) From a theoretical point of view, no prior research has conceptualized PER as an integrative phenomenon that simultaneously includes savoring in the past, present, and future, nor explored the potential impairments in this dynamic and their impact on depression. (b) From a clinical perspective, current interventions address these temporal dimensions separately, lacking an integrated framework that effectively combines all components. With the global rise in mental health challenges, especially depression, such a framework could optimize therapeutic strategies to enhance well-being beyond merely alleviating symptoms. (c) From a methodological point of view, this research seeks to overcome methodological limitations in prior studies by employing a comprehensive approach that integrates diverse tools and methodologies, providing a multi-layered understanding of positive emotional dynamics. Overall, this line of research holds significant potential to advance theoretical understanding of PER, improve mental health interventions, and address global mental health challenges, aligning with key global initiatives, such as WHO's social determinants of health, WHO mental health guidelines, the Sustainable Development Goals for Good Health and Well-being.

Resumen del Currículum Vitae:

After earning a psychology bachelor's degree in Bergamo and a master's in cognitive neuroscience in Milan, I spent a year at the Istituto Auxologico Italiano under the guidance of Prof. Riva, conducting research on the use of virtual reality to treat neurodegenerative disorders. In 2017, I received a Marie Skłodowska-Curie ITN fellowship within the European project AffecTech at Jaume I University (Spain), which focused on enhancing emotional well-being through technologies. Between 2018 and 2019, I collaborated with Philips Research (Netherlands) through two research stays, where I contributed to the development of the mobile application EmotionAlly, holding 30% of its intellectual property rights. My doctoral thesis was recognized with important awards, including the Extraordinary Doctorate Award and the Best Doctoral Thesis Award from the Spanish Society of Positive Psychology. As a young postdoctoral researcher, in 2021 I received a Juan de la Cierva postdoctoral fellowship at Valencia University, where I led a project on mobile technologies and emotional regulation. My commitment to research excellence and international collaboration subsequently earned me a Margarita Salas postdoctoral position (2023-2024), focusing on positive emotion regulation deficits in depression. This position included a year-long research stay at Vrije Universiteit (The Netherlands), followed by a year at Jaume I University (Spain). Starting in February 2025, I will join Valencia University as a senior postdoctoral researcher, focusing on designing technology-based interventions to enhance well-being. Over my research career, I have gained extensive expertise in applying technologies to psychological research, mastering rigorous multidisciplinary methodologies, and applying this knowledge across both academic and private sectors. My contributions include over 40 publications indexed in Scopus (H-index: 15; citations: 1000) and WoS (H-index: 13; citations: 843). I have demonstrated strong leadership and independent thinking as evidenced by my first-authored publications, which account for 50% of my total publications. According to Scopus metrics, 45.7% of my publications rank in the top 25% most-cited documents globally, 50% are published in Q1 journals, and 88.6% are co-authored with researchers from other countries/regions. This strong international collaboration is further supported by my multilingual proficiency, which includes C1-level fluency in English and Spanish, B1-level proficiency in German and French, and native fluency in Italian. Combined with my proactive pursuit of international opportunities, these skills have facilitated long-term collaborations with institutions such as Aix Marseille University (France), Catholic University (Italy) and Vrije Universiteit (The Netherlands). I have presented my research findings in almost 30 national and international congresses, as well as actively engaged in dissemination activities to promote knowledge in mental health. Beyond my research, I am deeply committed to training and mentoring. I have taught 34 academic credits and have supervised almost 20 master's theses in clinical psychology. Currently, I am supervising six master's students and co-supervising two doctoral dissertations at Valencia University.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Psicología
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Título: Urban determinants of mental health

Resumen de la Memoria:

During my research career I have focused on, and made meaningful contributions to, understanding how cities shape mental health, and which urban factors contribute to healthier and better lives. With the start of my PhD in 2015, I built a decade of research experience on the potential of urban spaces, such as green spaces or squares, to foster recovery from stress and cognitive fatigue. The key aspects of this work are 1) the analysis of the restorative properties of built and natural settings and 2) the role of individual factors such as place attachment and identification in psychological restoration, which have both resulted in meaningful inputs to the literature on environmental psychology. After my doctoral studies, I leapt into the field of environmental epidemiology, searching for answers to the same questions but using the tools, models and resources of said discipline. Therefore, my postdoctoral contribution focuses on the analysis of how environmental exposures like residential greenness or air pollution impact population mental health and neurodevelopment (among other health outcomes), using data from observational cohort studies and health records. During this stage, I have developed extensive R programming skills, became competent in complex statistical modelling, implemented the principles of robust causal inference into my research and explored other research topics such as environmental risk perceptions and knowledge about environmental health matters. Consequently, I have relevant experience with manifold research designs, including experimental, survey, observational-cohort and longitudinal, and I am proficient at working with questionnaire, diagnosis and health records data.

Resumen del Currículum Vitae:

I am currently working at the University of the Basque Country UPV/EHU and have just finished a 2-year research stay at the Bradford Institute for Health Research (UK), where I hold an honorary research position. I (have) participate(d) in 11 research projects funded in competitive national and international calls that sum up to 13,434,568€. I have also been able to self-fund 9 years of my research career via the obtention of competitive individual pre- and post-doctoral grants. I have published 41 papers (20 as first and/or corresponding author) in journals indexed in the Journal of citation reports, of which 35 were published in the first quartile. These works accumulate 466 cites in the Web of Science and my h index in the Web of Science is 12.

I am a member of three independently funded research groups: Basque Environmental Health Research Group in the University of the Basque Country UPV/EHU (PIs: Aitana Lertxundi and Nerea Lertxundi), Group 28 in Consorcio de Investigación Biomédica en Red de Epidemiología y Salud Pública (CIBERESP; PI: Jesús Ibarluzea) and Environmental Epidemiology and Child Development in Biogipuzkoa Health Research Institute (PI: Jesús Ibarluzea).

Thanks to a pre-doctoral research stay in the University of Tampere I have established a stable international research collaboration with international researchers in Finland and the United Kingdom. During the post-doctoral stage, I am actively involved in research projects within the LifeCycle and ATHLETE research consortiums supported by H2020 funds. With my colleagues at the Bradford Institute for Health Research, I am currently taking part in ambitious urban health research through intensive UK-based funding.

I participate regularly in international conferences such as the International Society of Environmental Epidemiology Conference, the International Association of People-Environment Studies or the International Conference on Environmental Psychology. I am a member of the Spanish Environmental Psychology Association (PSICAMB), the Spanish Epidemiology Association (SEE). I also integrate urban health section of the European Public Health Association (EUPHA). Finally, I usually review for the Journal of Environmental Psychology, Landscape and Urban Planning and Urban Forestry and Urban Greening.

Finally, I have mentored young researchers in different stages of their research careers. I have supervised university students doing research internships in different research institutions and directed master and degree dissertations. I recently hosted a PhD international research stay from Cambridge University (6-months) and I am co-directing a PhD research project on the effects of air pollution on mental health. I have lectured undergraduate students about environmental psychology, and I am currently involved in the lecturing of psychometry and other methodological contents. My research has received media coverage in newspapers, dedicated webpages and radio programs and I recently participated, alongside my colleague PhD Anna Bornioli, in the North American "Dense city" podcast.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Psicología
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Título: Neuropsicología clínica aplicada a enfermedades neurodegenerativas

Resumen de la Memoria:

Dr. Rocio Del Pino's research trajectory spans a broad international scope, focusing on neurodegenerative and chronic diseases. Since starting and completing her Ph.D., she has gained substantial international research experience, undertaking international stays (Harvard Medical School, University of Cambridge and NTNU) and collaborating with renowned institutions such as Johns Hopkins Hospital, Fraunhofer, TU Dresden, or Ayesa. In 2024, she completed a 5-month research stay at NTNU (Norway) on social robotics and immersive healthcare technology, creating an international consortium and submitting several project proposals.

Leadership: She coordinates clinical trials and projects on neurodegenerative diseases and has taken a leadership role in several high-profile projects, including serving as the PI for 2 multicenter projects [AISym4MED (Horizon Europe) and Personalized telerehabilitation in chronic diseases (Health Basque Government)]. She has managed a research budget exceeding €3 million, working on research projects in collaboration with institutions across Europe and the US, excluding funding from clinical trials supported by international pharmaceutical companies. She mentors 5 PhD students, supervises internships, and has overseen over 65 undergraduate and master's theses, shaping future neuropsychologists and researchers.

Teaching. She has taught and supervised at several institutions (UPV-EHU, University of Cambridge, UOC, UNIR, and University of Deusto). She is an accredited associate professor and Ph.D. supervisor in the UPV-EHU Neuroscience doctoral program.

Collaborations: Dr. Del Pino has fostered collaborations with technology companies (e.g. MYSPHERA, Franhoufer, i-maginary) and clinical institutions (e.g. Johns Hopkins Hospital, Casa di Cura di Milano, UMFCO). She has worked on projects involving virtual coaching, e-health solutions, and assistive technology. She actively collaborates with patient organizations like ASHUBI and Parkinson Association ACAPK.

Other Merits: She serves as a guest editor and reviewer for scientific journals (e.g. Frontiers in Psychology, PLOS ONE), and her research metrics include 55 publications in high-impact journals. She received the Eskertze 2023 Award by Osakidetza for her contributions to the field of value-based medicine as result of H2020 vCare project. She holds an accreditation as an expert in clinical neuropsychology.

Research: Her research focuses on early detection and personalized treatment of chronic and neurodegenerative diseases, especially Parkinson's, Huntington's diseases and chronic fatigue syndrome, using biomarkers, neuropsychological symptoms, and non-pharmacological treatments such as telerehabilitation, e-health, and social robots. By integrating artificial intelligence solutions developed by multidisciplinary team of clinicians and technicians, she aims to improve disease classification, diagnosis, and treatment, while addressing unmet needs in rural and underserved populations.

Dr. Del Pino's work aligns with national strategic research plans, focusing on precision medicine, digital health, and personalized treatments for chronic diseases. Her research aims to promote international collaborations, integrate technology into healthcare, and enhance patient outcomes by their involvement on the co-creation of innovative cost-effective neuropsychological solutions.

Resumen del Currículum Vitae:

Rocio Del Pino is a clinical neuropsychologist who earned her Ph.D. in Clinical Psychology and Health (2014) at the University of Deusto, supervised by Dr. Natalia Ojeda and Dr. Javier Peña, in collaboration with Dr. David Schretlen at Johns Hopkins Hospital. She completed a predoctoral fellowship at Harvard Medical School, mentored by Dr. Larry Seidman and Dr. Raquelle Meshulam-Gately. Her background includes a Master in Clinical Neuropsychology (2012-2013), a Master in Mental Health and Psychological Therapies (2010-2012, University of Deusto), and a Psychology degree (2010, University of Valencia). She was a Research Supervisor for the Junior Researcher Programme (2015-2016, University of Cambridge) and a postdoctoral researcher and associate professor at the University of Deusto (2015-2017), where she coordinated the Psychology and Neuropsychology internships, and developed 2 new neuropsychological tools for Spanish population, registered as intellectual property (BI-895-13, BI-79-15).

Since September 2017, she works at the Neurodegenerative Diseases group at Biobizkaia Health Research Institute, coordinating over 10 clinical trials and 16 research projects. In this period, she has been the site and pilot coordinator on 3 European projects (H2020: vCare and Gatekeeper, and Horizon Europe: AISym4MED), focused on implementing health technology for Parkinson's disease (PD). In the AISym4MED project, she is the Principal Investigator (PI) of Biobizkaia. In 2022, she also obtained funding, as PI, for a multicentric project on personalized telerehabilitation for post-COVID-19 and chronic fatigue syndrome patients funded by Basque Government's Health Department, securing, as PI, over half a million euros for the next 4 years. She leads a multidisciplinary team of clinicians and technicians, collaborating with national and international tech companies (e.g., Ayesa, Austrian Institute of Technology, Fraunhofer) and clinical centers (e.g., Casa di Cura di Milano, Johns Hopkins Hospital).

In 2024, she completed a 5-month research stay at the NTNU's Department of Neuromedicine and Movement Sciences (Norway), supported by a mobility grant from the Basque Government's Education Department.

She currently supervises 5 predoctoral students: 2 related to post-COVID-19 condition and ME/CFS, 1 on impact of nutritional status in PD, 1 studying the relationship of pain and cognition in PD, and 1 predicting cognitive impairment in Alzheimer's disease through new digital tools. She has supervised over 65 undergraduate and master's theses in neuropsychology and psychology degrees at UNIR (2018-2020) and University of Deusto (2015-2017). She has been professor in psychology and neuropsychology programs at the UOC (2023-2024), UPV-EHU (2019-present), UNIR (2019-2020), and University of Deusto (2015-2017). She is accredited as an Associate Professor by UNIBASQ.

She has published 55 articles in high-impact scientific journals, accumulating a total of 716 citations (250 citations in 2024), and a RI Score=4971. She has contributed to 2 book chapters and holds an H-index of 15 (Web of Science). She is a grant evaluator for the AVAP (Agencia Valenciana de Evaluación y Prospectiva) and an Accredited Psychologist Expert in Clinical Neuropsychology. She received the Eskertze 2023 Award, from Osakidetza, for her contribution to value-based medicine in the economic field.



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Turno General

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Título: Psicoterapia de precisión para poblaciones desfavorecidas

Resumen de la Memoria:

My academic and professional journey focuses on bridging the gap between research and practice in psychotherapy through the development of precision, culturally sensitive interventions, particularly for underserved populations. My work integrates advanced digital technologies and transdiagnostic approaches to design scalable, adaptive, and personalized treatments. The ultimate goal is to promote equitable mental health care by combining scientific innovation with real-world application.

Research Line to Develop: Precision Psychological Interventions for Disadvantaged Populations

This research line seeks to transform access to and effectiveness of psychological interventions by addressing persistent challenges in mental health, including the lack of personalized treatments and the structural barriers faced by vulnerable populations. A key focus is on Latin American migrants in Spain, who often experience social isolation, discrimination, and trauma compounded by linguistic and systemic healthcare inequalities.

The research builds on two main pillars:

Data-Driven Personalization: Leveraging technologies like machine learning to predict therapy outcomes based on initial and real-time data. Ecological momentary assessments (EMA) and biosensors are integrated to capture dynamic emotional and physiological information, enabling treatments to adaptively address individual needs.

Dissemination and Accessibility: Developing scalable interventions that combine self-guided formats with hybrid models, maximizing the reach of psychological care in resource-limited settings.

Key projects include:

Predicting Therapy Outcomes: Developing machine learning algorithms to analyze initial and longitudinal data, identifying patterns that link therapeutic processes (e.g., emotion regulation) to clinical improvements in depression and anxiety.

EMA and Biomarker Studies: Longitudinal studies using wearable devices and mobile apps to monitor physical and emotional data, predicting dropout risks and improving therapeutic outcomes.

Adaptive Transdiagnostic Interventions: Conducting a randomized trial comparing self-guided and hybrid transdiagnostic treatments, adjusting interventions based on early responses. This project focuses on economically disadvantaged populations across Ibero-America.

This research addresses the longstanding stagnation in psychotherapy effectiveness over the past 50 years and the disproportionate benefits of psychological care for those with higher economic resources. By integrating personalization, technology, and equity, this line of research provides a transformative approach to improving mental health care delivery.

Strategic Collaborations and Partnerships

The research is conducted in collaboration with the University of Valencia and Aiglé Valencia, a non-profit organization I co-founded in 2019. Aiglé Valencia is dedicated to advancing mental health knowledge, professional training, and evidence-based psychological treatments, with a specific focus on underserved populations. This partnership allows the integration of research, training, and clinical supervision, aligning with the objectives of this research line.

Resumen del Currículum Vitae:

My scientific career began in 2014 at Aiglé Foundation, a psychotherapy training and clinical center in Argentina, where I published my first paper as the lead author. In 2015, I received a Santiago Grisolia scholarship to join the Labsitec group in Spain, contributing to national and international projects. My work focused on testing the efficacy of a transdiagnostic treatment protocol for emotional disorders, leading to a master's thesis on dropout reasons in such treatments. I also co-authored the protocol and main outcome paper for a randomized controlled trial in this line of research. In 2017, I was awarded a prestigious Marie Curie ITN predoctoral fellowship at the Catholic University of the Sacred Heart in Italy, where I joined the European AffectTech project. Collaborating with engineers and human-computer interaction designers, I contributed to developing technological solutions for emotion regulation in affective disorders. Under the supervision of Professors Giuseppe Riva and Cristina Botella, I pursued a PhD through a co-tutorship between the University Jaume I and Cattolica University. During my PhD, I conducted a research stay at the University of Buenos Aires, which strengthened my expertise in advanced data analysis. My dissertation, centered on emotion regulation and digital technologies, included studies such as an IPD meta-analysis on virtual reality and a meta-analysis on biofeedback, both published in Q1 journals.

In 2021, I served as a Lecturer in Statistics at the University of Buenos Aires and secured two research grants as Principal Investigator. I subsequently received a Margarita Salas postdoctoral fellowship, spending a year at the University of Bern, Switzerland, where I worked on psychotherapy mechanisms of change. Currently, I hold a Juan de la Cierva postdoctoral contract at the University of Valencia.

My primary research focuses on the personalization, dissemination, and exploration of psychotherapy mechanisms of change, emphasizing how and for whom psychological interventions work. I integrate traditional face-to-face approaches with digitally mediated treatments, aiming to address the gap between research and practice. My work prioritizes underserved populations, exemplified by my involvement as a clinician and researcher in the PATER program, which provides mental health care to individuals in material marginalization. I have published extensively on these topics, including 52 JCR-referenced articles (h-index: 19, WOS citations: 1261), 58 Scopus-indexed works (h-index: 20, citations: 1495), and a total of 78 publications, including 10 book chapters.

Beyond research, I actively contribute to scientific dissemination and community building. As President of the Argentinian section of the Society for Psychotherapy Research (SPR), I have organized international events and served on the scientific committees of the SPR's 52nd, 54th, and 55th meetings. I am a member of the International Committee of Division 29 (Psychotherapy) of the American Psychological Association and have co-edited two special issues in Revista de Psicoterapia. Additionally, I serve on the editorial boards of four journals, including International Journal of Clinical and Health Psychology (Q1), and have conducted over 50 peer reviews.



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Turno General

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Título: Mental Health and Magnetic Resonance Imaging

Resumen de la Memoria:

During my research career, I have become an independent clinical neuroscientist with high-level leadership capacities and an outstanding international network of collaborators. My research has relied on the use of Magnetic Resonance Imaging (MRI) as a window toward understanding the nature and treatments of mental disorders. My Ph.D. thesis was focused on evaluating the neurobiological correlates of electroconvulsive therapy (ECT) in patients with treatment-resistant depression (TRD). This research work opened up the possibility of collaborating in international consortia and establishing an international collaboration with Massachusetts General Hospital-Harvard Medical School (i.e., through two predoctoral research stays). During my first years as a postdoctoral researcher, my interest in studying the mechanisms of action of other rapid-acting antidepressants increased, and I started mentoring junior scientists as well as organizing international scientific symposia. In addition, I led an MRI and mental health work package in one international research project. Currently, I am the co-Principal Investigator of one national project and the leader of four national and one international MRI research subprojects about depression biomarkers. In addition, I coordinate three international structural MRI and mental health consortia projects. As the founding Leader of the Neuroimaging & Affective Disorders Lab at the Institut de Recerca Sant Pau, I supervise three Junior Postdoctoral Researchers and international post-graduate students. Recently, after a postdoctoral research stay at Massachusetts General Hospital-Harvard Medical School, my primary research interest evolved, and I am attempting to consolidate a research line about dimensional response biomarkers of rapid-acting antidepressants. My innovative dimensional analytical approach has already been disseminated at different international conferences, and getting a Ramón y Cajal will allow me to start my research project. Rapid-acting antidepressants (i.e., (S)-ketamine and psilocybin) have shown high response rates above 60%. Understanding the mechanism of action of rapid-acting antidepressants is a significant milestone in the journey toward precision psychiatry. Why? Not only may it lead to the identification of reliable brain-based biomarkers for rapid antidepressant response, but it may ultimately enable more personalized antidepressant treatment approaches. However, no previous structural MRI research has explored the volumetric effects of (S)-ketamine or psilocybin in patients with depression. In addition, using overall clinical severity reduction as a clinical outcome has proven inadequate in capturing the full complexity of the pathophysiology in previous studies evaluating other rapid-acting antidepressant treatment strategies, such as ECT. In the era of the National Institute of Mental Health Research Domain Criteria, it is imperative to shift our analytical approach towards dissecting mental disorders into core dimensions.

Resumen del Currículum Vitae:

I initiated my research training in neuroimaging and mental health in the Neuroimaging Laboratory at the Psychiatry Department of the Bellvitge Biomedical Research Institute during my MSc internship in 2013. One year later, I received a predoctoral scholarship from the Spanish Ministry of Education, Culture, and Sport (FPU13/02141) to perform my Ph.D. in Electroconvulsive Therapy (ECT) for Treatment-Resistant Depression (TRD) and Magnetic Resonance Imaging. During my Ph.D., I obtained an International Travel Fellowship from the Universitat de Barcelona having the chance to start a scientific collaboration with Dr. Camprodon in the Laboratory for Neuropsychiatry & Neuromodulation at Massachusetts General Hospital-Harvard Medical School. After an initial stay of three months, I received a Mobility Prize from Partners Healthcare-Massachusetts General Hospital allowing me to conduct a second research stay of five months. In November 2018, I obtained my International Ph.D. degree with the highest grade of Excellent cum laude, and I started a new professional stage as a postdoctoral researcher at the Institute for Research and Innovation Parc Taulí. In January 2021, I received a Sara Borrell postdoctoral contract from the Carlos III Health Institute (CD/00189). From June 2021 through December 2021, I conducted a third research stay at Massachusetts General Hospital-Harvard Medical School, sponsored again by Partners Healthcare-Massachusetts General Hospital. After this postdoctoral research stay, my primary research interest evolved, and my research line is currently focused on understanding the dimensional impact of rapid-acting antidepressants on patients with TRD with the final aim of developing a personalized prediction model of antidepressant treatment response. Guided by these research objectives, in July 2022, I started working as a senior postdoctoral researcher at the Institut de Recerca Sant Pau, where I am the founding Leader of the Neuroimaging & Affective Disorders Lab. I am currently supervising three junior postdoctoral researchers, and I started an internship agreement with two international universities to mentor post-graduate students. During my research career, I have been listed in thirty-one relevant publications (twenty-six of them from the first quartile), I have collaborated in eleven competitive research projects (six of them acting as a neuroimaging leader, one as a co-Principal Investigator, and two of them international), I have participated in five national and seventeen international congresses (selected in twelve of them for oral communication and acting in two of them as a chair), I have given more than 400 hours of official teaching at the Universitat Autònoma de Barcelona and Universitat Oberta de Catalunya, and I supervised one Ph.D. student. My cumulative impact factor is 211, and my citation index is 589, with an H-Index of 13. Currently, I am a member and project leader of the Global ECT-MRI Research Collaboration and the Enhancing Neuro Imaging Genetics Through Meta-Analysis Network. In addition, I am a member of the Mental Health Networking Biomedical Research Center, the International Consortium on the Genetics of Electroconvulsive Therapy and Severe Depressive Disorders, the Global Bipolar Cohort as well as I was a member of the organizing committee of the European Forum of Electroconvulsive Therapy.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

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Título: Pharmacological, Behavioral, and Genetic Characterization of Pessimism as a Predictive Factor for Vulnerability to Depression

Resumen de la Memoria:

As a psychologist, I have always been interested in the neurobiological underpinnings of mental disorders and this interest has guided my decisions through all my career stages.

During my PhD (2010/16), I joined Prof. Correa's laboratory. I learned about animal models for studying lack of motivation or apathy. My thesis was about the role of adenosine on modulating the lack of motivation induced by dopamine depletion using caffeine and physical exercise as therapeutic tools. I also worked on a project funded by the 'Plan Nacional sobre Drogas' about the effects of caffeine and ethanol interaction in the context of drug addiction. During this stage I learned about a broad range of rodent paradigms using conventional methods like mazes and operant chambers (with levers). I also gained experience in behavioural drug screening and brain immunocytochemistry which all together gave me the skillset of a behavioral neuroscientist.

In my first postdoc at University of Cambridge, I worked as Research Associate on a project about 'The development of touchscreen-based tasks for the assessment of motivation and affective state in mice' within the context of the study of animal welfare (2016-18). Touchscreen devices allow rodents to interact with visual stimuli shown in a touchscreen associated with programmed contingencies. This postdoc allowed me to become an expert on rodent touchscreen assessment and behavioral task development.

After this postdoc, I was hired as a Research Associate in Prof. Jeff Dalley's lab (2018-19) at the same university in a novel project about inflammatory and functional markers of early stress and vulnerability to depression in rats. In this project, I used protocols of early life stress and assessed its effects on behaviour, inflammatory blood markers, and structural/functional brain changes using MRI. These two postdoctoral positions required me to lead projects independently, providing intensive training in becoming a versatile and self-reliant researcher.

In Sep 2019 I got a position as a Lecturer in Biological Psychology at The OU (UK). In this position, I've worked on the optimisation of a Cognitive Judgement Bias (CJB) in rodents and an adaptation to humans which confers my research with a high translational potential. CJB determines how our decisions or judgements are influenced by our mood (e.g., 'is the glass half full or half empty?'). According to the literature, pessimistic CJB contributes to an increased vulnerability to depression. For the Ramon y Cajal project, I aim to use this task and psychological construct to behaviourally, pharmacologically and genetically characterise negative CJB or 'pessimism' (judging ambiguous stimuli as negative) as a factor that contributes to an increased vulnerability to pro-depressant manipulations. This project will provide insights into the neurobiological and genetic underpinnings of CJB, a clinically relevant symptom not only present in depression but shared across mood disorders.

I have progressed through the three stages of my career (PhD-Postdoc-PI) in a logical and timely manner. I have broadened my skills, knowledge, research interests, and international network, keeping a clear and consistent research pathway without compromising novelty as shown by my current line of research and the project proposed in this application.

Resumen del Currículum Vitae:

During my PhD at University Jaume I (Castellon, Spain), I contributed to the generation of knowledge about the dopamine-adenosine involvement in motivated behaviour, and about caffeine-alcohol interaction in the context of drug addiction funded by a FPU grant (2012-2016). During the PhD period, I did two short international stays at UCONN (US) (6 months total).

After my PhD, I've been years 8 and 9 months working at international institutions. I worked as a Research Associate at the University of Cambridge (UK) on a project funded by the NC3Rs (2016-2018). One of the most relevant contributions from this postdoc was the development of novel touchscreen-based tasks for assessing motivation (Neuropsychopharmacology 2023, IF:8.29) and affective state (submitted to Psychopharmacology). Once I finished my project, I was hired as Research Associate at the same university funded by GSK (2018-2019) in Prof. Jeff Dalley's team to lead a novel project about inflammatory of early stress and vulnerability to depression in rats. This work was published in well-known journals like Translational Psychiatry (IF:7.98) and Neurobiology of Stress (IF:7.14). I was hired to lead these two projects which required me to meet the highest scientific standards, thus showing the leadership and independence required to be promoted to an academic position.

In September 2019 I got a position as Lecturer in Biological Psychology at The Open University (OU). I was granted a prestigious grant from the Royal Society (UK) in 2021-2022 an Individual Synergy grant (2021), and funding to cover a PhD studentship (2021-2024) to support a PhD student as PI who passed his viva in 2024. My main contribution at this institution has been the optimisation of a translational test for assessing Cognitive Judgement Bias in rodents and humans which I believe will be published in a well-ranked journal. I am Co-I in a CIAICO grant from Generalitat Valenciana (2024-2026) and collaborator (team member) on several grants as stated in my CV. I have collaborated on projects involving different labs and research fields leading to high-impact publications like the most recent one (Sarah Foester et al, in Nature Neuroscience (IF: 28.77)). I am the Neuroscience Research Cluster lead and as such, I organize meetings, and conferences to spark collaborations and attract funding to support invited speakers like the 'BNA small grant'(2022). I am an associate editor of Frontiers in Integrative Neuroscience and member of the organising committee of a satellite event for the next EBPS (2025), and a member of the Animal and Welfare Ethical Review Body. I have participated in project evaluations and PhD thesis assessments. I combine all the above with my academic teaching duties.

I have been productive in all stages of my career. I have published 41 articles (10 as first author, of which 4 as first/corresponding author, and 29 as co-author) and, 5 book chapters (h-index of 20). I have disseminated results at more than 20 international conferences, the most relevant being the Plenary Lecture at the International Touchscreen Symposium (2023) and invited speaker at the EBPS (2019). The most relevant publications and achievements will be shown in the attached CVA and highlighted in the memory report.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática:

Psicología

Nombre:

FUENTES CLARAMONTE, PAOLA

Referencia:

RYC2024-048804-I

Correo Electrónico:

paolafuentesclaramonte@gmail.com

Título:

Correlatos neurocognitivos de los síntomas psicóticos y el consumo de cannabis

Resumen de la Memoria:

My research focuses on understanding brain function through neuroimaging methods, specializing in areas like cognition, language, learning, decision-making, mental disorders, and addiction. My expertise also extends to computational modeling and connectivity. Over the past decade, my research has concentrated on the neurocognitive correlates of psychotic symptoms and the neural effects of cannabis use. With 63 peer-reviewed publications and multiple international collaborations, my work has significantly advanced our understanding of psychotic symptoms (including negative symptoms, auditory hallucinations, formal thought disorder, and delusions) and cannabis-related cognitive alterations.

My scientific contributions have been marked by the development and validation of neuroimaging protocols tailored to investigate complex cognitive processes. This work has resulted in significant contributions in (i) the development of novel experimental paradigms suitable for fMRI to study the psychological processes that are assumed to be linked to psychopathological manifestations, including executive function, reward processing and reinforcement learning, symptom capture for auditory hallucinations (3 variations of the classical paradigm), speech perception, free speech production, phonological encoding, semantic processing, and autobiographical memory; and (ii) the application of these paradigms to healthy individuals and to clinical samples of interest, especially patients with schizophrenia and other psychotic disorders. This has generated relevant findings, among others, in (1) the role of executive (dys)function in schizophrenia, where my work has underlined the involvement of executive impairment in negative symptoms and disorganized language, with prefrontal hypoactivation as a potential neural mechanism for this link; (2) auditory hallucinations, where our findings have questioned one of the main theoretical accounts of the symptom (the perceptual theory of hallucinations) in favor of theories that consider the involvement of more complex cognitive processes such as language and memory; and (3) a potential link between impaired social cognition processes and persecutory delusions, which has promoted the development of a recently funded project to comprehensively explore the cognitive and brain correlates of delusions in schizophrenia.

I have also opened an independently funded research line on the cognitive, psychiatric and neuroimaging findings linked to cannabis use. This line involves several research projects that are collectively aimed at finding cognitive (with especial focus on executive function), motivational (focusing on reward processing and amotivation) and psychopathological (development of psychiatric symptoms with a focus on those in the psychotic spectrum) effects on young cannabis users (aged 18-25). These are studied with functional neuroimaging to identify both behavioral and brain changes that may accompany cannabis use, and explore their potential for predicting cognitive or psychopathological complications in the long term.

This research trajectory contributes not only to enriching our understanding of the brain, but also potentially to the generation of better prevention and intervention strategies in mental health, including public policies on substance use.

Resumen del Currículum Vitae:

I am an experimental psychologist and neuroscientist interested in the neurobiological bases of behavior, with a strong background in functional neuroimaging, neuropsychology and mental disorders. My research work has primarily focused on the interplay between cognitive processes (including executive function, reward processing, language or memory) and its neurobiological correlates through neuroimaging methods.

I developed my PhD in Universitat Jaume I between 2011 and 2015 within the Neuropsychology and Functional Neuroimaging group, with a project that tested the links between reward sensitivity and cognitive control processes. After obtaining my PhD, I joined the Multimodal Neuroimaging research line in FIDMAG Research Foundation (Barcelona), where, during the last 9 years, I have developed a research line focused on the neurocognitive correlates of psychotic symptoms and, more recently, cannabis use. My expertise includes advanced neuroimaging analysis methods, computational modelling and connectivity. I have authored 63 scientific papers (19 as first and/or corresponding author) that have generated more than 1300 citations and an h-index of 19 (Scopus).

My scientific trajectory also includes collaborative work with other national and international groups, including those from CIBERSAM, international collaborations (University of Cambridge, Open University UK), and international consortiums (ENIGMA, DISCOURSE in Psychosis).

I have been able to independently acquire funding through competitive calls for human resources (FPU-ME, and post-doctoral contracts Juan de la Cierva, Sara Borrell and I+D+I Caixa Junior Leader), international collaboration (José Castillejo mobility funds) and research projects (Plan Nacional sobre Drogas, AEI-Proyectos de Generación de Conocimiento). This trajectory has warranted the acquisition and refinement of strong analytical skills and technical proficiency, problem-solving abilities (hypothesis formulation, experimental design) and project management.

I have exercised teaching both at the undergraduate and graduate levels (Universitat Jaume I, Universitat Internacional de Catalunya, Universitat Pompeu Fabra and Universitat Autònoma de Barcelona), and have received specialized training for higher education teaching while participating in educational innovation projects. I have co-supervised 3 doctoral thesis (one through international collaboration) and 4 master dissertations, and I currently supervise other 3 PhD candidates.



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I am deeply committed with scientific dissemination, not only through scientific papers and conferences, but also through outreach activities and general media. To this end, during 2023 and 2024 I coordinated the scientific dissemination project “Neuroconnecta’t amb el teu futur”, funded by the FCRI (Fundació Catalana per la Recerca i la Innovació), aimed at connecting teenagers with new scientific interests and mental health awareness.

The quality of my research has been recognized by the Santiago Reig award for 2021’s best scientific publication by an early career researcher (CIBERSAM), and by the Vila Saborit (Societat Catalana de Psiquiatria) awards for the best annual scientific publication (years 2019, 2020 and 2021). I have also been recognized by the ANECA for the position of Profesora Ayudante Doctora.



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Turno General

Área Temática: Psicología
Nombre: ESCRICHS MARTÍNEZ, ANIRA
Referencia: RYC2024-048803-I
Correo Electrónico: anira.escrichs@upf.edu
Título: Decoding the Effects of Hormones and Reproductive Stages on Whole-Brain Dynamics

Resumen de la Memoria:

I am leading a pioneering research line that explores the relationship between women's brain health and hormonal changes throughout their lives. My work addresses a critical gap in neuroscience, which has historically underrepresented women and overlooked the impact of female-specific hormonal changes on brain function. This approach combines neuroendocrinology, neuroimaging, theoretical neuroscience, and artificial intelligence to provide unprecedented insights into how female sex hormones influence brain function.

My investigations have revealed that whole-brain dynamics fluctuate significantly across different menstrual cycle phases, responding to cyclical changes in ovarian hormones. Importantly, these dynamics remain stable during hormonal contraceptive use. I have also uncovered a critical shift in brain dynamics during the transition from perimenopause to menopause, characterised by a significant decrease in both whole-brain dynamics and hormone levels. These findings establish a fundamental link between sex hormones and brain function, opening new avenues for understanding women's brain health.

Looking ahead, I aim to conduct longitudinal studies to track individual women's brain changes over time, including those who have undergone surgical interventions. This approach will provide a complete picture of how hormones and reproductive transitions affect brain dynamics throughout women's lifespans. I aim to create new personalised approaches to women's health by integrating advanced computational and artificial intelligence methods with longitudinal neuroimaging data. This research has the potential to enhance our understanding of various neurological conditions that disproportionately affect women, ultimately leading to more targeted and effective treatments.

Resumen del Currículum Vitae:

I hold a degree in Computer Engineering and completed a PhD in Computational Neuroscience supervised by Prof. Dr. Gustavo Deco in December 2022, graduating with the highest distinction, Cum Laude. I have made significant academic contributions with 32 peer-reviewed publications, including 13 as the lead author (10 as the first author and 3 as the last author) and 19 collaborative articles. These reflect my dedication to independent research and collaboration in disseminating knowledge. I prioritise transparency and accessibility by making preprints publicly available before formal publication on BioRxiv or ResearchSquare (currently 9 under review). Over 90% of my publications are co-authored internationally, aligning with the EU's commitment to open research ecosystems. As lead investigator, my research has been published in high-impact journals such as Nature Communication Biology, Nature Molecular Psychiatry, Nature Women's Health, and Cerebral Cortex, collaborating with world-renowned researchers. In addition, I am committed to Open Science principles. All methodologies and software developed during my research adhere to the FAIR principles. These resources are freely available through my GitHub profile and the eBRAINS platform. Currently, I am working on international research projects, including NEURO-FEM as the Principal Investigator Coordinator (€296,250.00), a synergic project with Prof. Dr. Belinda Pletzer from the Center for Cognitive Neuroscience at the University of Salzburg, and the eBRAIN-Health project, coordinated by Prof. Dr. Petra Ritter at the Charité University Medicine Berlin, where I serve as the Deputy Research Director at UPF.

I share my research findings on social media platforms to improve outreach and maximise social impact. Several national and international media outlets, such as La Razón, El Periódico, Neuroscience News, and EurekAlert, have featured my investigations, bridging the gap between science and society.

I supervise a postdoctoral researcher, co-supervise three doctoral candidates, and have co-supervised two master's theses (finished). These mentoring efforts have directly led to notable achievements, including high-impact publications.

I am actively involved in international consortia and contribute to the scientific community as a reviewer for international journals.



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Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: TEIXEIRA BARBOSA COSTA, JOSÉ DIOGO
Referencia: RYC2024-050025-I
Correo Electrónico: zediogo.costa@gmail.com
Título: Pushing the frontiers of complex oxides for low power and ultrafast nanoelectronic devices

Resumen de la Memoria:

The semiconductor industry is experiencing a worldwide surge in interest and investment, driven both by geopolitical concerns and the growing demand for faster and low power chip components for disruptive large language models applications, such as ChatGPT. There are several initiatives towards this goal, including the European Chips Act and the PERTE Chip. Spain is also positioning itself, with strategic investments such as imec (Málaga) and the Spark Foundry (Vigo). To fully capitalize on these investments, Spanish Universities and Research Centres must intensify their efforts to produce high-quality research and foster a skilled talent pool ready to meet the demands of emerging high-tech facilities.

The goal of this RyC grant is to contribute to this effort by leveraging the candidate's extensive experience in cleanroom fabrication, including in a foundry environment. Particularly, Pulsed Laser Deposition (PLD) depicts critical advantages compared to other deposition techniques, such as great control over film stoichiometry and epitaxy without using electric charges, making it exceptionally well-suited for the deposition of complex oxide materials. This technique will be explored to develop new materials and devices for two main topics:

Resistive Switching for In-memory Computing: Current computing architectures explore separate memory and processing units, to perform computational tasks. Consequently, the processor speed far outpaces the speed at which data can be fetched from memory, limiting overall system performance (Memory Wall). To address this challenge, the development of devices which permit information storage and computation in the same space (in-memory computing) is one of the most promising strategies. Resistive switching (RS) devices, depict controllable resistance states that can be used both for storing data and performing computation. These devices are based on a simple metal/oxide/metal two-terminal architecture. PLD is the ideal tool to fabricate epitaxial high performance RS devices. One of the goals of this RyC application is to screen different complex oxides for optimized performance and fabricate crossbar arrays to demonstrate faster and lower power operation as matrix-vector multipliers.

Complex magnetic ferrites for RF electronics: RF filters and oscillators are key enablers of 5/6G applications. YIG spheres are a well-established technology employed as RF filters and oscillators. DC has demonstrated that YIG filters can be miniaturized, and are thus compatible with integrated circuit solutions. Nevertheless, as the quest for higher frequencies intensifies, the focus inevitably turns to accelerating magnetic dynamics. Antiferromagnets exhibit the fastest magnetic speeds and are likely to play a pivotal role in the next generation of spintronic devices. Recent breakthroughs include the demonstration of all-antiferromagnetic tunnel junctions and the discovery of a new class of magnetic materials, altermagnets, that depict alternating magnetization (like antiferromagnets) but can support spin-polarized currents, making them highly relevant for spintronic devices. PLD, as the ideal tool to deposit complex oxides, is one of the key systems to explore novel epitaxial altermagnets. It is the goal of this application to perform the fundamental exploration of anti and altermagnetic oxides for ultrafast RF devices.

Resumen del Currículum Vitae:

Diogo Costa's (DC) career combines international experience, high-impact publications, applied research with granted patents, and profound involvement in research projects and start-up growth. Overall, DC co-authored 31 peer-reviewed publications, 7 as first and 5 as corresponding author, some of which published during PhD. He also holds 3 patents (1 granted, 2 filed), presented 11 oral and 7 poster presentations at international conferences and workshops. His work has been cited 933 times with an h-index of 15.

DC received his PhD from Porto University (2017) for research conducted at the International Iberian Nanotechnology Laboratory (INL; Portugal), on the fabrication and characterization of novel spintronic devices. At INL, he gained extensive applied research experience, including process setup, cleanroom nanofabrication and device measurements. He also collaborated with another group working on electrocatalysis, resulting in further published works, completed independently of his supervisors.

During the PhD, DC also performed an international research stay at Radboud University (The Netherlands), exploring ultrafast lasers to study magnetic dynamics. He capitalized on this opportunity, contributing to 3 publications, including one in Nature Nanotechnology.

In 2017, DC started a postdoctoral position in a collaboration between KU Leuven and imec (Belgium). He was appointed tool responsible for one of the first full-wafer Pulsed Laser Deposition systems, a role he held for over 4 years. This position required close collaboration with the tool manufacturer, providing hands-on experience with industrial partners and deep technical knowledge of a complex system.

DC later secured the prestigious MSCA-IF grant, evaluated as 100%. His exceptional performance earned him a permanent research position at imec in 2020, to develop spin-orbit torque magnetic random-access memories. He also represented imec as a spokesperson with industry leaders (Huawei, TSMC, Sony...). In addition to scientific publications, including as the first corresponding author, he contributed to 3 patent applications (1 granted, 2 filed). Additionally, he was designated the daily supervisor of 2 PhD students and 4 internship projects.

To apply his acquired knowledge on tech transfer, DC joined iPronics, a start-up developing programmable photonic chips from Universitat Politècnica de València. There, he participated in the successful EIC-transition proposal (€2.5M) in a rapidly growing company (from <10 to >40 people), gaining valuable insights into moving technologies from academia to industry. He later moved to Gradient Technologies as a Senior Photonics Engineer, to work on a CDTI Red de Excelencia Cervera project. Alongside his research, DC assumed roles as a Work Package and Task Leader, gaining valuable experience in managing collaborative projects with external partners.

Recently, DC identified an opportunity to join Cátedra Chip (PERTE Chip), a collaboration between the Universidade de Santiago de Compostela (USC) and Televés. DC envisioned this role as the perfect transition to further his research career. Thus, in January 2025, he started a research position at USC, in a collaboration between CiQUS and CiTIUS. The project aims to fabricate novel resistive switching devices that will integrate memory and logic functions into a single unit (in-memory computing).



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Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: KUSHIBAR , KAISAR
Referencia: RYC2024-048256-I
Correo Electrónico: k.kushibar@gmail.com
Título: Artificial Intelligence in Healthcare

Resumen de la Memoria:

My research interests lie at the intersection of artificial intelligence and medical imaging, with a focus on developing robust, efficient, and trustworthy deep learning methodologies for healthcare applications. Specifically, I am passionate about advancing segmentation, classification, image synthesis, addressing domain adaptation challenges, and uncertainty estimation methods. I am also deeply engaged in federated learning, promoting fairness and privacy-preserving collaboration. Furthermore, my work emphasizes the importance of harmonized, large-scale datasets and guidelines for ethical and deployable AI in healthcare, reflecting my commitment to open science and interdisciplinary collaboration. My career journey that led to this is as follows:

In 2015, I obtained a prestigious Erasmus Mundus scholarship, to pursue a career in Computer Vision from three different universities and research labs. While working at the Le2I Lab in France, I contributed to seeded image segmentation and worked on SLAM algorithms for Pepper robots at the National Robotarium lab in the UK. My first exposure to Medical Imaging and a milestone moment was during my internship at the ViCOROB institute in Spain, where I worked on deep learning for brain imaging.

In 2017, I was awarded with a competitive FI-AGAUR fellowship to continue pursuing my researcher career as a PhD candidate at ViCOROB, University of Girona, and dedicate my efforts in AI for healthcare. At this time, I have worked on different national projects focusing on AI applications in neuroradiology such as: 1) EVOLUTION on building predictive models for multiple sclerosis; 2) BiomarkEM on obtaining new biomarkers from brain MRI with atrophies and lesions; and 3) WASSABI on brain structure quantification for new biomarker discovery. Working on these projects allowed me to collaborate with multiple hospitals in Spain and leading experts in the field of neurodegenerative disorders.

In 2020, after finishing my PhD, I obtained a position as a Horizon2020 postdoctoral researcher, at the Barcelona Artificial Intelligence in Medicine lab, University of Barcelona, where I became the AI lead for the EU-funded EuCanImage project (20 partners, 11 countries). This period also highlights another milestone of my career as I successfully secured a new EU-funded RadioVal project (16 partners, 13 countries) as a co-PI. These roles involved collaborations with 84 researchers across Europe, North and South America, Asia, and Africa, including academic institutions, hospitals, and industries.

In 2022, I won a competitive Juan de la Cierva fellowship that allowed me to further my career as an independent researcher. In collaboration with the international and multidisciplinary consortiums of experts from EuCanImage and RadioVal, I continued to work on the applications of AI in cancer imaging in organs such as breast, liver, and pelvis, focusing on the trustworthiness of AI models.

A successful career as a researcher allowed me to become an academic by winning a Lecturer position at the University of Barcelona through a public call, which I have started now, at the beginning of 2025. As I strive continuing to contribute to the field of AI in healthcare, my goal is to create my own research group and I strongly believe that the Ramon y Cajal fellowship will pave the way to accomplishing this ambition.

Resumen del Currículum Vitae:

Since the beginning of my research career, I have focused on Medical Image Analysis, starting with neuroimaging and expanding to modalities like Breast MG and MRI, Liver MRI and CT, Colorectal MRI, and Cardiac MRI. Over the past 7 years (3-year PhD, 4-year postdoc), I have published 24 papers, including 17 in high-impact international journals (Avg. IF 9.5), 6 at MICCAI, 1 at the International Workshop in Breast Imaging, and a book chapter titled "Deep Learning for Medical Imaging." Two additional papers from MICCAI and CVPR challenges are under review. One of my publications received the Galileo Galilei best paper award, and I won an international MICCAI challenge on Federated Learning.

In the 4 years since completing my PhD, my work has had a significant impact, as evidenced by 3622 citations (h-index 17) on Google Scholar and 816 citations (h-index 13, FWCI 3.48) on Scopus. Furthermore, 75% of my papers rank among the top 25% most cited worldwide. I have collaborated with 84 researchers from 20 countries across academia, hospitals, and industry (e.g., Siemens Healthineers, Radiomics.bio, IBM, Icometrix). I also lead the AI Working Group of the EuCanImage project, which involves 37 researchers from universities, companies, and hospitals across Europe and the USA.

I have obtained €164,800 in personal grants, from BSc to the Juan de la Cierva postdoctoral fellowship, which helped shape my independent research career and enabled collaborations on multidisciplinary projects. Since 2020, I have led the AI Working Group of the €9.9M EU-funded EuCanImage project. Alongside Prof. Dr. Karim Lekadir, I co-lead the €5.8M RadioVal project from conceptualization to execution. I also contribute to the AI4HI network through the AI Validation and Data Annotation WGs, collaborating with four other EU-funded projects: ChAlmelion, INCISIVE, ProCancer-I, and PRIMAGE.

I have co-supervised 4 PhD students (Akis Linardos on Federated Learning, Lidia Garrucho on breast cancer treatment, Richard Osuala on medical image synthesis, Smriti Joshi on domain adaptation), 2 visiting PhD students (Isabella Cama on uncertainty estimation, Chiara Baldini on domain generalization), 3 MSc students (including Mladen Rakić, whose work was published in Neuroimage Clinical), and 2 BSc students. Our PhD students have published 12 papers in high-impact journals and at MICCAI. As a co-supervisor, I contributed to the conceptualization, methodology development, and supervision of these publications, where I am listed as second author or acknowledged.



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I have been an active member of the medical imaging community and have given invited talks at events such as the 4th Big Data Africa School (South Africa), AI4Imaging School (Netherlands), Congress of Oncologists and Radiologists (Kazakhstan), and ERION meeting (Spain). I have reviewed for high-impact journals (Artificial Intelligence in Medicine, IEEE Transactions on Medical Imaging, etc.), the MICCAI conference, Marie Skłodowska Curie Actions proposals, and PhD defences (Kazakh National University). These recognitions demonstrate how my prior fellowships have enabled me to become an independent scholar.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: FABELO GÓMEZ, HIMAR A.
Referencia: RYC2024-049620-I
Correo Electrónico: himarfg@gmail.com
Título: Multimodal Technologies for Improving Early Detection, Prevention, and In-situ Diagnosis of Diseases
Resumen de la Memoria:

My previous works have been focused on the demonstration, as a proof-of-concept, that Hyperspectral Imaging (HSI) combined with Artificial Intelligence (AI) algorithms is able to diagnose cancer in in-vivo brain tissue in real-time, targeting its future use as an intraoperative diagnostic tool for brain surgery. From this, I gained experience in developing medical instrumentation, generating medical databases, designing AI-based algorithms and implementing them onto hardware accelerators to achieve real-time performance. I have also collaborated in the application of HSI to other medical areas such as skin or cervix cancer detection during clinical routine practice or enhanced histopathology. Moreover, I have worked in the application of AI algorithms to process tabular clinical data with the goal of developing tools for preventing chronic diseases.

My proposed multidisciplinary research line will take advantage of the know-how acquired in the past years using HSI in different medical applications and will provide a step forward in the use and validation of this technology within the medical field. The main difference with respect to my previous research works will be the integration of different data sources (imaging techniques, tabular clinical data and/or biosignals) with AI-based algorithms to create novel multimodal diagnostic technologies (targeting point-of-care testing systems) for improving early detection, prevention and in-situ diagnosis of non-communicable and/or communicable diseases through different types of biological samples. These new tools will facilitate clinicians the in-situ diagnostics during their routine clinical practice by using advanced computing platforms that will allow real-time processing of the multimodal data. The proposed research will be based on four main pillars: 1) medical instrumentation development and data acquisition, 2) algorithm development, 3) algorithm acceleration and 4) clinical validation of the results.

The outcomes of this research will be in line with the area of intervention "tools, technologies and digital solutions for health and care including personalised medicine" included in the Horizon Europe "Cluster 1: Health" strategy. Moreover, this research is in line with the EU Mission on Cancer, which has the goal of saving and improving the quality of life of more than 3 million lives by 2030, preventing what is preventable, while providing a better understanding of cancer and ensuring equitable access. This research will mainly contribute to: 1) Recommendation 4 (Optimise existing screening programmes and develop novel approaches for screening and early detection) by developing new tools based on multimodal data processing which are low-cost and non/minimally-invasive and that could be easily adopted by health systems (even for screening in primary care in some cases); 2) Recommendation 5 (Advance and implement personalised medicine approaches for all cancer patients in Europe) by generating large open multimodal-based cancer datasets and developing robust AI-based approaches to provide personalized diagnostics.

Resumen del Currículum Vitae:

I received the Telecommunication Engineering and the master's and PhD degrees in Telecommunication Technologies from the University of Las Palmas de Gran Canaria (ULPGC), Spain, in 2013, 2014 and 2019. I achieved the Cum Laude qualification, the International Mention, and the Extraordinary Prize of PhD of 2018/2019. In 2015, I started to work as Project Manager and Researcher in the HELICoiD EU Project. In 2017, I obtained the Predoctoral Research Grant of the ULPGC and, in 2019, I achieved the Postdoctoral Orientation Period (POP) contract. Then, in 2021, I started to work as Project Manager and Researcher in the WARIFA EU Project and, in 2022, I obtained the Juan de La Cierva-Formación postdoctoral grant at the Fundación Canaria Instituto de Investigación Sanitaria de Canarias (FIISC). In 2024, I started to work as Principal Investigator in the STRATUM EU project at FIISC and as member of the coordination team.

Until now, I have published 58 journal papers (34 Q1-JCR, 13 Q2-JCR, 6 Q3-JCR, 3 Q4-JCR and 2 non-JCR) most of them in open access journals, 68 conference papers, 4 book chapters and 1 international patent. I was invited as a Keynote Speaker at the Photonex 2016 HSI Conference and I am member of the Reviewer Board of 15 different journals. Moreover, I acted as a Scientific Expert for research organizations in the evaluation of grant applications. I have actively participated in 10 research projects and grants. I received several conference and other scientific awards and prizes, highlighting the "Robert F. Wagner All-Conference Best Student Paper Award" at the SPIE Medical Imaging 2019 conference. In 2022 and 2024 I was included in the Stanford/Elsevier World's Top 2% Scientists List.

I have lectured 120 hours in official teaching at the ULPGC and obtained the accreditation of "Profesor Contratado Doctor" and "Profesor Ayudante Doctor" by ANECA. I have co-supervised 17 Final Degree Projects and Master Thesis and 3 PhD theses (2 on-going). I am the project director of a predoctoral grant given by the AECC (Asociación Española Contra el Cancer) at FIISC.

In 2018, I performed a research stay in the Department of Bioengineering at The University of Texas at Dallas (USA), under the supervision of Prof. Baowei Fei, publishing 6 journal papers, 1 book chapter and 4 conference papers in collaboration. In 2019, I performed 3 short stays at the Universidad Politécnica de Madrid (Spain), Universidad de Castilla-La Mancha (Spain) and the University of Pavia (Italy). In collaboration with these groups, I published 14 journal and 14 conference papers. I have performed several international collaborations, co-authoring more than 30 publications with many relevant research institutions. I led the creation and publication of the first worldwide publicly available In-vivo Hyperspectral Human Brain Cancer Image Database. Since 2017, I participated in the organization and writing of 10 European project proposals, achieving two granted projects, of which STRATUM is currently principal investigator at FIISC. Currently, I am pursuing a second PhD in Research in Biomedicine at the ULPGC, with the goal of applying artificial intelligence and HSI for a non-contact, in-situ, and early diagnosis of different diseases through the analysis of different biological sample types.



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Turno General

WoS h-index: 23 / Scopus h-index: 26 / Scholar h-index: 30 - i10-index: 62



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: LENZINI , FRANCESCO
Referencia: RYC2024-050135-I
Correo Electrónico: lenzinifrancesco@gmail.com
Título: Toward a universal, room-temperature continuous-variable quantum processor based on thin-film lithium niobate waveguides

Resumen de la Memoria:

During my master studies and my international academic career, I have acquired skills at the intersection between nanophotonic engineering and quantum information science.

I have completed my PhD degree in 2017 at the Centre for Quantum Dynamics of Griffith University, Australia. At Griffith University, I have been the first PhD student of the Integrated Quantum Photonics group of Prof. Mirko Lobino. Here I have developed from scratch a fabrication process for the realization of lithium niobate waveguides by ion diffusion. As a main result of my PhD work, I have made a milestone achievement in the field of continuous-variable (CV) quantum optics, by demonstrating the first realization of a reconfigurable integrated photonic device able to generate squeezed states of light and CV entanglement.

Funded with a fellowship from the Alexander von-Humboldt Foundation, during my Postdoc in the group of Prof. Wolfram Pernice at the University of Muenster, Germany, I have independently developed my own research programme aiming at the realization of quantum photonic circuits on the novel thin-film lithium niobate (TFLN) platform. Here I have led one of the first efforts for the fabrication of TFLN waveguides in Europe, and I have contributed with pioneering works (where I appear as a last and corresponding author) to the establishment of quantum photonics with TFLN as a new research field. These include the first realization of an electro-optically tunable TFLN waveguide network integrated on-chip with superconducting nanowire single-photon detectors, and the first demonstration of a programmable quantum processor on the TFLN platform.

Building on my expertise on thin-film lithium niobate and CV optical quantum computing, my research line will aim at accessing a new regime of nonlinearity in quantum optics, and exploring an entirely new and uncharted territory.

In CV quantum optics, single photons are replaced with squeezed states of light, which can be generated on-demand by parametric down-conversion. Deterministic entangling operations are performed with simple beam splitters. Additionally, the information encoded in the states is read-out by homodyne detection with conventional photodiodes. Importantly, all these operations can be performed in a deterministic way and in a room-temperature environment. However, to realize a universal quantum computer, they must be complemented with a strong optical nonlinearity (e.g., a self-Kerr interaction) at least cubic in the electric field. So far, the achievement of sufficiently strong optical nonlinearities with available material platforms has been out of reach.

Based on original ideas that I am currently developing, my project will aim at challenging this status quo and demonstrate that a universal set of gates for CV quantum computing can be feasible with a single photonic integrated platform based on thin-film lithium niobate waveguides. Such an achievement could open entirely new perspectives in the field of photonic quantum computing, not only enabling to realize a CV quantum processor that can be fully operated in a room-temperature environment but also allowing to implement novel classes of quantum circuits (e.g., CV quantum neural networks) beyond the limitations of non-universal, special purpose current quantum photonic processors.

Resumen del Currículum Vitae:

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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: MARTORELL MARUGÁN, JORDI
Referencia: RYC2024-049532-I
Correo Electrónico: jmartorellm@gmail.com
Título: Computational Biology for Biomedical research and Precision Medicine
Resumen de la Memoria:

My scientific trajectory unfolds along three primary interconnected research lines, that have been advancing in parallel: 1) User-friendly bioinformatics tools, 2) Machine learning for omics data analysis, and 3) Methodological support for biomedical studies.

I have leaded the development of several computational software tools that are now employed by thousands of users globally. Their articles have received more than 400 citations from works that used these tools for their research. These tools accomplish different analytical goals such as meta-analysis of genetic association studies, integration of omics data, use of public gene expression data or discovery of differentially methylated regions, among others. Altogether, these software are supporting very relevant studies, advancing the knowledge in diverse biomedical fields. They received more than 400 citations.

Furthermore, I research about the uses of artificial intelligence for biomedical data analyses and precision medicine. In this context, I developed machine learning models able to perform differential diagnosis of very similar autoimmune diseases based on multi-omics molecular data. I also developed a deep learning framework to predict sample phenotypes with cutting-edge single-cell gene expression data.

I also collaborated with other research groups, leading the bioinformatics and statistical analyses of their data, resulting in very relevant outcomes published in top scientific journals.

My current research goal as the Principal Investigator of the PARKPRECISE project is the use of computational methods for the stratification of Parkinson's disease patients, with applications to precision medicine and gaining new knowledge about the molecular mechanisms of this neurodegenerative disease. Following this research line, I aim to specialize in Computational Neuroscience, studying the different neurodegenerative diseases through the application of new computational methods to multi-omics single-cell data.

Resumen del Currículum Vitae:

I obtained my PhD in Biomedicine in 2021 at the University of Granada. I performed predoctoral and postdoctoral research stays in Fondazione Bruno Kessler (Italy), establishing a long-term collaboration that resulted in the joint publication of three articles with my host group in Briefings in Bioinformatics, Computers in Biology and Medicine and Current Bioinformatics.

In 2023, I started a new role in Granada as the Principal Investigator of the PARKPRECISE project, funded with over €200,000. I lead an international team of researchers in advancing precision medicine for Parkinson's disease. Furthermore, three predoctoral researchers are involved in this project, developing their theses in this context.

Other funding obtained include a predoctoral grant (€64,802), international stays grants from EMBO (€8,270) and EFIS-IL (€5,750), a Margarita Salas postdoctoral grant (€79,100), and a regional postdoctoral grant (€68,670). In total, I obtained over €600,000 during my career, demonstrating success in obtaining funding for research.

My publication record includes 36 articles in JCR-indexed journals, with 29 of them in Q1 journals and 18 in D1. These articles achieved over 1,400 citations, resulting in an h-index of 20 according to Google Scholar. Additionally, my contributions to national and international conferences include 37 presentations through both oral and poster formats, some of them as last/corresponding author.

I directed five Final Master Theses and I am doing direction tasks in three ongoing doctoral theses. I've been invited to tribunals in master's thesis evaluations. I served as an expert reviewer for research grants at both national and international levels (e.g., AEI, European Commission). I also participated in the committee of congresses like the European congress ECCB2022.

Furthermore, I reviewed over 40 articles for JCR journals, and I have been associated editor for Mathematics (D1) and Biomedicines (Q1). I also belong to the editorial boards of Gene & Protein in Disease and Innovative Medicines & Omics journals.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: OLMOS TRIGO, JORGE
Referencia: RYC2024-050342-I
Correo Electrónico: jolmostrigo@gmail.com
Título: Light-Scattering Symmetries in High Refractive Index Nanostructures

Resumen de la Memoria:

My research lies at the interface of nanotechnology, nanophotonics, and nano-optics. Specifically, I study the interaction between electromagnetic radiation and nanomaterial systems through light-scattering symmetries and conservation laws. This approach provides valuable insights and design guidelines across various areas of nanoscience, including zero backscattering, optical localization, optical activity, and nanophotonic phenomena involving the angular momentum and helicity of light.

I am particularly known for my scientific publications on Kerker conditions, non-radiating sources such as bound states in the continuum and optical anapoles, and enhanced chiral sensing mediated by non-chiral antennas.

I focus on three main research fronts to drive progress. These fronts are based on the research lines I recently developed as the sole author in Contributions 9 and 10 of my CVA. The first front centers on the development of a novel chiroptical spectroscopy technique for detecting molecular chirality at the nanoscale. This technique aims to overcome the efficiency and reliability limitations of current chiroptical methods, such as Circular Dichroism (CD) and Optical Rotation (OR). The second front explores magneto-photonics, particularly how photonic nanostructures respond to external magnetic fields. Through this research, I aim to uncover new magneto-optical signatures beyond the conventional Kerr effect, Faraday rotation, and Magnetic CD. Finally, the third front focuses on decoding the optical properties of all-dielectric metafluids using polarimetry alone.

Resumen del Currículum Vitae:

I completed a Master's in nanoscience at UAM and earned a Ph.D. in Physics of nanostructures with CumLaude distinction and International mention from UPV-EHU, under the guidance of Prof. Juan José Sáenz. My Ph.D. was supported by the competitive Basque Government Fellowship (Grant No. PRE_2017_1_0352, Total Amount: 72,740.64€). Following this, I served as a postdoc on a hybrid project between the Donostia International Physics Center (DIPC) and CSIC, supported by a National Project (No. PID2019-109905GA-C22, Total Amount: 65,340€), where I was part of the working team. In July 2022, I co-organized the MoLeConference2022 (see webpage), which gathered over 200 scientists. Later that year, I secured two prestigious grants: a Margarita Salas fellowship (Grant No. MARS422-06, Total Amount: 100,800€) and a Juan de La Cierva fellowship (Grant No. FJC2021-047090-I, Total Amount: 60,000€ plus 4,800€ for expenses).

I chose the Juan de la Cierva fellowship to join the QnanoLab group, led by Prof. Molina-Terriza at the Material Physics Center (MPC) in San Sebastián. As the sole theorist in the QnanoLab throughout 2023, I gained valuable insights into the challenges experimentalists typically face in the laboratory, marking an important milestone in my scientific career and in the research lines I develop. In San Sebastián, I actively engaged in knowledge transfer through outreach initiatives, such as Zientzia Astea (Semana de la Ciencia) and Pint of Science. In January 2024, I joined Universidad de La Laguna (ULL) as a Juan de La Cierva Fellow with three goals in mind: (a) to become a physics professor, (b) to supervise Bachelor's Thesis projects, and (c) to establish independent research lines. I am pleased to have successfully achieved all of these goals. In teaching, I accumulated 160 hours of experience in Electromagnetism and Engineering. Moreover, I am supervising 2 Bachelor's Thesis projects in my established research lines. One of the strongest points of my CV is that during the Juan de La Cierva fellowship (Dec 2022–Dec 2024), I co-authored 14 scientific contributions in high-impact journals of nanotechnology (7 as the first author, 8 as the corresponding author). Recently, I published 2 high-impact works as the sole author in a novel research line addressing the resolution of Maxwell's equations using polarimetry alone (see Contributions 9 and 10 in my scientific memory).

Overall, I have co-authored 28 scientific contributions in high-impact peer-reviewed journals: 16 as the first author and 14 as the corresponding author (see Google Scholar). Notably, I am either the corresponding or first author on approximately 70% of the scientific papers I have co-authored, reflecting my leadership and independence. Additionally, I have published 19 scientific contributions without my Thesis advisor. My overall research has garnered around 459 citations, resulting in an h-factor of 12. Notably, I have publications in some of the highest-impact journals of nanotechnology and photonics, including Advanced Optical Materials (2), Laser&Photonics Reviews (3), Physical Review Letters (1), NanoLetters (1), Nature Photonics (1), ACS Photonics (4), and ACSNano (1), among others. In addition to this, I have co-authored more than 50 contributions at national and international conferences, with 6 Invited Talks.



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Turno General

Área Temática: Tecnologías de la información y de las comunicaciones

Nombre: BALLARDINI , AUGUSTO LUIS

Referencia: RYC2024-051457-I

Correo Electrónico: augusto.ballardini@uah.es

Título: Scene Understanding for Self Driving Cars

Resumen de la Memoria:

The proposed research line focuses on advancing the field of autonomous driving by transitioning from traditional metric-based navigation to a semantic navigation system. This approach leverages Large Language Models (LLM) and Knowledge Graph representation to enhance the reasoning capabilities of driving algorithms. The HUMANAV project, led by the researcher, serves as the initial testbed for these innovative ideas. The goal is to develop explainable systems that can provide linguistic descriptions of decisions made by automated systems, addressing one of the key barriers to the adoption of AI-based technology in the automotive industry. This research trajectory holds the potential to transcend into diverse research fields and real-world applications, building on successful collaborations with both industry and research institutions¹.

Resumen del Currículum Vitae:

In 2013, Augusto (H-index 12) entered the PhD program at the University of Milano Bicocca (UNIMIB) after winning a competitive scholarship from the Italian Ministry of Education. He earned his PhD in Computer Science in 2017, publishing six articles and one research report. In 2015, he was awarded Erasmus+ mobility grants, enabling him to work for nine months with IEEE Fellow Miguel Ángel Sotelo at the University of Alcalá (UAH), where he built a strong international network. That year, he introduced his Road Layout Estimation framework at the International Conference on Intelligent Transportation Systems (ITSC), forming the foundation for his future research. At UNIMIB, he led the self-driving team, publishing advancements in ITSC 2016 and contributing to a Transactions on Systems, Man, and Cybernetics paper (30+ citations).

After his PhD, he became a postdoctoral researcher at UNIMIB, leading the Urban Shuttles Autonomously Driven (USAD) project. Between 2017 and 2019, he published two papers at ICRA (CORE-A, GII-GRIN-SCIE A) and one in ITSC (50+ citations). He also conceptualized and oversaw a key dataset used in his research. His collaborations extended to public institutions, such as the Italian National Institute for Nuclear Physics and private R&D projects. From '10 to '19, he engaged in over ten public research dissemination events, including the European Researcher's Night.

In 2019, Augusto was awarded a Marie Skłodowska-Curie Fellowship at UAH. His research resulted in publications in ICRA (CORE/GRIN A), the Intelligent Vehicle Symposium (CORE/GRIN B), Elsevier Robotics and Autonomous Systems (JIF 3.7), and MDPI Sensors (JIF 3.874). He co-supervised a PhD student and collaborated with UAH faculty, publishing two additional journal papers (JIF 3.576, JIF 8.665). In 2022, he secured a María Zambrano Fellowship and continues collaborating with Prof. Sotelo on the European Project IA-IQ-READY and the preparation of PROSPECT.

In 2024, he secured funding from UAH for his project, "Human-like Semantic Navigation for Autonomous Driving" (HUMANIT), demonstrating leadership in competitive calls and expanding his research expertise. His impact is reflected in 17 peer-reviewed publications, 486 citations, and one book. He has served as a Guest Editor for MDPI Sensors and Machines (2021-23) and as a reviewer for ITSC, IV, ICRA, IROS, Elsevier, MDPI, and Frontiers, where he also led a research topic.

He has actively supported early-stage researchers, mentoring 18 graduate theses, 4 master's students, 1 PhD student, and 2 Erasmus+ traineeship PhD students, while participating in all their evaluation committees. Additionally, he contributed to the Fond National de la Recherche (Luxembourg) evaluation process and the University of Genova's PhD selection committee.

At UNIMIB, his efforts in research, teaching, and dissemination helped grow the USAD self-driving research team from 3 to over 10 members. He has accumulated 260 hours of teaching experience across core and advanced courses. In Spain, he supervised 1 Italian PhD student's research stay, 1 UAH PhD student, and 1 master's student. In 2022/23, he lectured in two bachelor's programs at Camilo José Cela University. His academic career is officially recognized by ANECA with the titles Profesor Ayudante Doctor, de Universidad Privada y Contratado Doctor, and Profesor Titular de Universidad.



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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: YANG , LI
Referencia: RYC2024-049521-I
Correo Electrónico: li.yang@uah.es
Título: Multifunctional RF/Microwave Circuits for Wireless Communication/Sensing Networks

Resumen de la Memoria:

RF/microwave front-end components with highly-versalite functionalities are always essential for the emerging Beyond-5G/6G wireless communication and sensing networks. Throughout his scientific research activities, Dr. Li Yang's efforts have focused on the development of cutting-edge multifunctional microwave/mm-wave bandpass filtering devices with state-of-the-art performance in planar/multilayer technologies for their novel RF systems.

He obtained the M.Sc. degree in Electrical and Electronics Engineering and Ph.D. degree in Electrical and Computer Engineering from University of Macau (UM), Macau, China, in 2013 and 2018, respectively. From October 2012 to March 2013, he worked as research assistant at Nanyang Technology University, Singapore. From March to September of 2018, he worked as postdoctoral fellow at UM. Regarding his scientific studies at UM, he was involved in 7 competitive projects granted by the Macau Science and Technology Development Fund. His research works as the first author resulted in 10 international journal and 6 international conference papers, which brought him the Best Student Paper Award in ISAP2010 and the extraordinary Second Prize of the Macau Natural Science Award in 2020.

Since November 2018, he has been with the Adaptive Microwave Systems Group (AMSG) of University of Alcalá (UAH) as postdoctoral researcher to design innovative types of absorptive/reflectionless multilayer wideband circuits. His works were granted with a prestigious MSCA COFUND project from March 2020 to March 2022. As the principal investigator of this project, he led the development of cutting-edge absorptive multilayer filtering devices for power-efficient RF front-end chains. Now he works as a senior research scientist at UAH, leading research works with a group of PhD students on multifunctional reflectionless circuits. During his stay at UAH, he has successfully attracted 2 industrial contracts from Huawei Sweden Research Center and SYDNICON PTY LTD, Australia, and was involved in 2 national projects. Meanwhile, he has designed more than 70 RF circuits, and (co-)authored 49 international journal and 38 international conference papers (21 as first author without his M.Sc./Ph.D. supervisors and 16 as B.Sc./M.Sc./Ph.D. thesis co-supervisor). He co-supervised 1 B.Sc. thesis in November 2022, 1 M.Sc. thesis in February 2023 and 1 Ph.D thesis in November 2024. He is now (co)supervising 4 Ph.D. theses and 1 M.Sc. thesis. Moreover, he has cooperated with renowned professors at universities worldwide (including 5 IEEE Fellows) and industrial experts (e.g., Qorvo Inc.). Now he has published 62 international journal (10 JCR Q1/41 JCR Q2) and 45 international conference papers (42 orals/3 posters), given 4 seminars, co-authored 4 Chinese Patents and 1 EuMC2021 workshop, co-chaired 1 IMOC2023 and 1 IMS2024 sessions, and co-instructed 1 NEWCAS2023 tutorial. He is an Associate Editor of the IEEE Transactions on Circuits and Systems II: Express Briefs and the IEEE Access (both JCR Q2), a reviewer for several IEEE JCR Q1/Q2 journals, and a TPC member of several IEEE and EuMA conferences. He has been elevated as IEEE Senior Member and IEEE MTT-S Young Ambassador, and elected as Young-Professional IEEE MTT-4 and MTT-5 Affiliate Member. Since 2015, he has been the originator of the SCI-journal lunch/dinner gatherings.

Resumen del Currículum Vitae:

Li Yang received the M.Sc. degree in Electrical and Electronics Engineering and Ph.D. degree in Electrical and Computer Engineering from University of Macau (UM), Macau, China, in 2013 and 2018, respectively. From October 2012 to March 2013, he was a research assistant with Nanyang Technological University, Singapore. From March to September of 2018, he was a postdoctoral fellow at UM. In November 2018, he joined the University of Alcalá (UAH), Madrid, Spain, as a postdoctoral researcher. He was awarded two prestigious research grants (Juan de la Cierva Formación 2018 and GOT ENERGY TALENT (GET)-COFUND MSCA fellowships) to develop his leadership capability as an independent researcher in 2020. Due to the law conflict, the latter was chosen. Now he is a senior research scientist, leading several PhD students at UAH.

Until now, he has authored 62 papers in international journals (10 JCR Q1/41 JCR Q2) and 45 papers in international conferences (42 orals with 4 invited with 1 First Best Paper Award), co-authored 1 workshop, co-chaired 1 special session, and given 4 seminars. For his publications, he has been the first author in 40 (21 without his M.Sc./Ph.D. supervisors), including several prestigious IEEE journals (6 TMTT, 4 MWCL/MWTL, 2 TCAS-II and 1 TCAS-I), and he has also co-authored 8 journal papers and 7 conference papers as co-supervisor. His publications have accumulated 1430 citations with h-index of 22 (source: Google Scholar). He was a recipient of the Second Prize of Macau Natural Science Award (2020). He is an IEEE Senior Member, and a member of IEEE MTT-S/CAS-S and EuMA. He is an IEEE MTT-S Young Ambassador and Young-Professional Affiliate Member of the IEEE Technical Committees MTT-4 and MTT-5. He is an Associate Editor of the IEEE Transactions on Circuits and Systems II: Express Briefs and the IEEE Access (both JCR Q2). He serves as a reviewer for several JCR Q1/Q2 IEEE journals and Technical Program Committee Member for several IEEE and EuMA conferences. He has been principal investigator of the GET-CFOUND MSCA programme (>127k€) and participated in 9 research projects (7 Macau FDCT (>1.5 M€) and 2 national). He has attracted 2 industrial contracts from Huawei Research Center (Sweden) and SYDNICON PTY LTD (Australia), in which he acts as key personnel. He has cooperated with many renowned professors at universities worldwide, including 5 IEEE Fellows and industrial experts. He has co-authored 4 Chinese Patents. He is also active in the teaching, supervision and dissemination activities. He has lectured the tutorials and lab lessons of three undergraduate courses and one postgraduate course at UM (2011-2015) and one undergraduate lab course in English at UAH. He is now (co-)supervising 5 Ph.D. theses, 1 M.Sc. thesis and 1 exchanged Ph.D. student. He co-supervised 1 B.Sc. thesis (TFG), 1 M.Sc. thesis (TFM) recognized as HISPASAT Award for the Best Master's Thesis in New Technologies for Communications Satellites, and 1 Ph.D. thesis (TD). He was invited to give a 2-hour talk to high school students at his hometown in 2023 and provide a 1-hour tutorial as co-instructor at NEWCAS2023. He served in the RFID Automatic FDCT library, participated as team leader in Macau Summer Camps, and was reviewer of the BOC STEM High-School Talent Challenge. He has been the originator of the SCI-journal gatherings since 2015.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: BARRAL RAÑA, DAVID
Referencia: RYC2024-048797-I
Correo Electrónico: rabarrabal@gmail.com
Título: Multimode photonics for classical and quantum technologies

Resumen de la Memoria:

I have matured as researcher since I completed my PhD thesis in 2015, expanding my collaborations, expertise and know-how. I pursued a very timely and broad interest in the blooming and strategic field of quantum technologies -Nobel prize in Physics 2022- and ultrafast optical techniques -Nobel prize in Physics 2023- that resulted in a unique expertise in theoretical and experimental integrated, multimode, quantum, and ultrafast optics. I have initiated collaborations with world leaders in photonic quantum technologies and other fields and I have a rich and thriving network of international collaborations. I have a competitive, interdisciplinary and unique curriculum in the field: merging integrated, fiber and free space optics, optoelectronics, instrumentation, continuous and pulsed lasers, spatial and frequency encoding, coherent and single-photon detection, and fundamental quantum optics. I hold a broadband expertise ranging from the most applied and linked to the industry to the very fundamental yet crucial topics for the field. I demonstrated innovation transfer to industry at all stage of my scientific education and career. I have seven years of international mobility in world-class groups in France and UK. I demonstrated pugnacity and a solid research track with international recognition. I have also demonstrated that I can work autonomously or in team, in different projects in parallel, always contributing efficiently to their completion and to the generation of new ideas and their implementation. I have been supervising a growing number of PhD students and assumed all the roles of a well-rounded P.I. in a world renowned group being responsible for the everyday organization of the experimental work, with agreed schedules, milestones, deliverables and research outputs and efficient pooling of tools and skills. I keep very much updated and cross fertilize domains. Over the last years, I have obtained >200K€ from funding agencies and I am now in charge of two large projects: one funded with 1M€ on quantum communications and other funded with 3M€ on quantum computing. I have recently received the R3 certificate as established researcher.

Resumen del Currículum Vitae:

- I obtained a PhD (summa cum laude) from the University of Santiago de Compostela (USC) in November 2015. I currently hold a position as local project coordinator of the Plan Complementario de Comunicaciones cuánticas (PC3) at CESGA.
- I have ~eight years of postdoctoral experience: USC, C2N (France) and LKB (France).
- I have authored 35 peer-reviewed works (+3 in review, +4 in preparation), 19 of them as first author, 24 as corresponding/last author, 20 without my thesis supervisor. I have published in high impact and reputed journals esteemed within the physics and optics community as Optica (1), Physical Review Letters (2), Quantum Science and Technology (1), Physical Review Applied (1), Physical Review Research (1), Physical Review A (7), Optics Express (3), New Journal of Physics (2), etc. 366/400/587 cites (WOS/Scopus/Scholar), 109 cites in 2024. Two papers from 2024 with >20 cites each.
- I have participated in over 15 international and national projects. I collaborate with international companies in the development of new type of detectors and QKD use cases, and have worked in transfer of technology.
- I have participated in more than 30 national and international conferences with >20 orals. My work has been presented in more than 50 conferences. I have been invited >10 times to give seminars at international institutions. I have been 8 times conference moderator. I am project evaluator for the National Committee for the Evaluation of Research, Italy.
- I supervised a growing number of PhD, master and graduate students.
- I taught at the international summer school Quantum Future Academy, masters degree of Neurosciences, Laser, Photonics and Vision of the USC. I gave a course at Collège de France for senior computer scientists. I taught Quantum Physics for Computer Scientists of the Quantum Information master degree of Sorbonne Université. I coordinated the second-year masters project and supervised student projects on quantum computing. I am teaching integrated quantum photonics at Univ. of Vigo.
- I have been accredited by the Spanish agency ANECA to be hired as Profesor Ayudante Doctor and Profesor Contratado Doctor.
- I got the R3 certificate as established researcher in the 2023 call by the Ministry of Science.
- I organized and chaired a number of meetings and seminars, and participated in the organization of international conferences on quantum technologies.
- I have been awarded with an Île de France postdoctoral fellowship and equipment project, and with a DIM-Quantip research valorization prize.
- I got funding to build and run at CESGA first a QKD lab and now a photonic quantum computing lab.
- I have been invited to participate with few outreach science papers in France and Spain.
- I have participated in dissemination activities organized by QICS, in various scientific vulgarization actions and in local programs.
- I review ~10 papers/year since 2019 for journals like Physical Review Letters, Physical Review A, Physical Review X, Physical Review Applied, PRX Quantum, Optics Express, Optics Letters, etc.



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Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: MORO VELÁZQUEZ, LAUREANO
Referencia: RYC2024-050476-I
Correo Electrónico: lauremoro@gmail.com
Título: Digital biomarkers and assistive technologies for people with neurological disorders and older adults
Resumen de la Memoria:

The world will face a dementia wave due to quickly aging societies and fewer young people to act as caretakers. We are not ready for it, as we do not have reliable and cost-effective early detection tools, and assistive technologies that can relieve caregivers and the healthcare system. My commitment is to provide new digital biomarkers for neurological diseases and assistive technologies for people suffering from them. My ultimate goal is to improve the quality of life of patients by giving them more independence. In the past, I have proposed new non-invasive digital metrics for Alzheimer's Disease (AD), Parkinson's Disease (PD), and other neurodegenerative diseases using speech, eye movement, and handwriting.

In my publications, I have collaborated with research groups at Johns Hopkins University (JHU), Massachusetts Institute of Technology, University of Illinois, Universidad Politécnica de Madrid, Technical University of Delft, and Czech Technical University in Prague, among others. During my predoctoral research, I proposed new acoustic metrics for assessing voice quality in individuals with vocal pathologies to the scientific community. I collaborate with neurologists and geriatricians on several projects to develop new diagnostic tools using physiological measures and artificial intelligence. As a result, I have proposed novel methods to evaluate neurological diseases employing advanced speech technologies, eye-tracking, handwriting, and limb movement. For instance, speech and breath rate, intonation variability, word repetition, syntactic construction, and vocabulary complexity can inform diagnosis and assess motor and cognitive-related diseases. Most of my recent work aims to provide interpretable features rather than creating black boxes, while I acknowledge that deep neural networks and interpretable features can be complementary. My studies include the first analysis of the evolution of speech patterns in a cohort of people with PD before diagnosis, in which I propose a neural classifier able to detect people who will develop PD 10 years before diagnosis with accuracy above 70%.

Additionally, I am currently working on a pioneer study led by neurologists at the Johns Hopkins Hospital where people with schizophrenia not responding to traditional treatments have received a deep brain stimulation implant to improve their quality of life. My goal is to objectively quantify and evaluate the changes in the behavior of these patients before and after receiving the implant so the larger research team can determine the efficacy of the new treatment and evaluate if it affects cognitive and motoric activity.

More recently, I started to lead research in brain-computer interaction (BCI) for people who can no longer speak, as people with severe neurological disorders. This research sets the path to generate real-time speech generation from cortical activity.

I have also contributed to creating several datasets such as Neuro-Logical signals, WearGait-PD, Neurovoz, HeyJay!, CUCO, and Parkceleb. I have researched the problems of current speech recognition models in people with dysarthria and proposed new methods of data augmentation to improve speech recognition and spoken language understanding for people with atypical speech, in collaboration with scientists at Amazon.

Resumen del Currículum Vitae:

I am a telecommunications engineer with a PhD from Universidad Politécnica de Madrid. According to Google Scholar, I am the author of more than 100 scientific publications, and my h-index is 24. My research is pioneering in providing interpretable classifiers that leverage and identify the key speech segments needed to detect neurological disorders. This research comprised my doctoral thesis defended in June 2018 with the distinction of "summa cum laude." Then, I joined Johns Hopkins University (JHU) to expand my knowledge of artificial intelligence and establish new links between my previous research group in Spain and JHU. During my postdoctoral research, I proposed the first approaches that leverage neural acoustic representations and large language models to detect Alzheimer's Disease from speech (ranked #1 in the ADreSSo 2021 international challenge).

Currently, I am an assistant research professor at JHU's Electrical and Computer Engineering Department and the Center for Language and Speech Processing (CLSP), one of the leading research centers in speech signal processing, data science, and artificial intelligence. I have been the principal investigator of two projects funded by the Consolidated Anti-Aging Foundation to analyze new digital biomarkers of neurological diseases. I was awarded a grant from NIH to develop and analyze a multimodal platform to evaluate neurological diseases, integrating hardware and software to provide portable and synchronous recording and analysis of eye movement, speech, and handwriting.

I have received the Best Ph. D. Thesis Award at ISCA-Iberspeech 2021 conference, the Best paper in an international journal award, granted by the Spanish Excellence Network on Speech Technology (RTTH), the Best academic record award in Computer Science Technologies and Engineering at Universidad Politécnica de Madrid (2014), and the National award Liberalización de las Telecomunicaciones in the field of Sound and Image Engineering granted by the Association of Telecommunications Engineers of Spain (2013).

I was the General Chair of the IEEE 57th Annual Conference on Information Sciences and Systems (CISS), and have organized multiple international conferences and symposiums.

Regarding the transference of technology, I have led a project funded by Amazon that provided state-of-the-art spoken language understanding for people with atypical speech, who are usually misunderstood by speech assistants like Alexa.

Also, I have collaborated to create the company Meaning.Team, in which I am the data lead. This company researches, develops, and commercializes new speech technologies to improve spoken communication and anonymize speech and has a yearly revenue over \$2M. In a collaboration between Meaning.Team, JHU and the University of Southern California, we have obtained a \$7.6 M grant from the US government to develop and publish new technologies to anonymize speech that can be useful for defense and domestic applications (for instance, remain anonymous around speech assistants).

I have been the principal advisor of two PhD students, co-advised five PhD students, and mentored more than ten. I have also mentored one postdoctoral fellow, ten master's students, and five undergraduate students. All of them have published scientific articles under my supervision.



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Turno General

Área Temática: Tecnologías de la información y de las comunicaciones

Nombre: RUIZ CARIDAD, ALICIA

Referencia: RYC2024-050500-I

Correo Electrónico: alicia.ruiz.card@gmail.com

Título: Photoionics

Resumen de la Memoria:

In my upcoming research career, I plan to focus on challenging topics that will allow me to create innovative ideas based on my knowledge of oxygen ion dynamics in oxides and photonics/optoelectronics. Specifically, I will focus on two key areas: 1) next generation optoionic devices and 2) their integration into silicon platforms. Advancing our understanding and engineering of these areas is crucial for developing optoionic devices, including iontronic devices for information technologies.

I am well-positioned to deepen my expertise and contribute meaningfully to the following topics in the coming years:

- ▣ Enabling large-scale and cost-effective methods deposition of advanced functional materials (such as ionic conductors via large-area PLD and PVD deposition methods) for the reliable manufacturing of robust solid-state photoionic devices.
- ▣ Underpinning an emerging discipline such as Iontronics through the exploration of conventional and alternative mobile ions, including Li, O, Ca, Na, and H, along with the incorporation of rare-earth elements, to enhance the performance of optoionic devices.
- ▣ Open big data generation by advanced operando characterization of solid-state electro-optic devices and their interfaces using structural and optical techniques, such as operando STEM, XRD, Spectroscopic Ellipsometry and Raman spectroscopy.
- ▣ Development of disruptive and emerging technologies facilitated by optoionic devices, including sensors, electrochromic devices, and ionic transistors.
- ▣ Miniaturization and batch-mode manufacturing of photonic devices through advanced litho-graphic processes, coupled with the development of encapsulation methods and the implementation of quality control protocols for final devices.

My background has equipped me with a solid foundation in iontronic technology and a comprehensive understanding of the key challenges and opportunities within this field. With expertise in materials processing, device integration, and technology transfer, I am qualified to make significant contributions through a lab-to-market approach. My track record of publications and collaborations with industry leaders underscores my ability to conduct impactful research and drive the commercialization of innovative technologies.

Resumen del Currículum Vitae:

Currently I hold a Marie Skłodowska Curie Action fellowship in Prof. Tarancon's group at the Catalonia Institute for Energy Research (IREC), focusing on advanced electrochromic devices using ion-based materials. My background includes 20 publications (4 in top-tier journals), 8 conference proceedings, and 1 book chapter. I've participated in 28 international conferences (4 invited talks and 17 oral presentations), and I have over 310 citations and an h-index of 9 (Google Scholar). I also review journals like Materials Science in Semiconductor Processing. I count among my collaborations with industry partners such as STMicroelectronics and IBM Zurich. I hold French habilitation to teach, and I have supervised students in Spain, France, and Switzerland, enriching my mentoring and communication skills.

I joined IREC after being awarded a MSCA-PF fellowship. My program included a secondment at InSpek, an industrial partner focused on the encapsulation, and commercialization of on-chip photonic devices. The expertise I acquired at IREC in micro-fabricated solid-state ionic (SSI) devices, combined with access to IREC's advanced research facilities and my background in photonics, positions the Nanoionic's group in IREC as pioneers in the development of solid-state electrochromic devices utilizing oxygen ions.

In 2022, I worked as a postdoctoral researcher at the University of Basel, contributing to the NCCR SPIN project, funded by the Swiss National Science Foundation with a budget exceeding 17 million CHF. This project, led by the University of Basel in collaboration with ETH Zurich, EPFL Lausanne, and IBM Zurich, focuses on quantum computing research. My role involved leading the growth and integration of core-shell nanowires and heterostructures on silicon platforms. My work resulted in one peer-reviewed publication and an invited talk. Additionally, I participated in a European project, which led to two peer-reviewed articles and two presentations at international conferences. In 2021, I held a postdoctoral research position at the Electron Microscopy Center of Empa-ETH Zurich (CH). During this time, I conducted key studies on oxygen dynamics which gave me the required expertise to later successfully apply for the MSCA fellowship on development of electrochromic devices. I reflected my findings in the publication of a high-impact ACS Applied Material Interfaces, where I held first co-authorship. Moreover, I established with CEOS and DECTRIS an industry partner. In May 2021, I earned my PhD from the Centre de Nanoscience et Nanotechnologies (C2N) and University of Paris-Saclay (FR). During my PhD, I successfully demonstrated the proposals of the POPSTAR- starting ERC project awarded by my supervisor. My results were highlighted with the authorship of four first-author articles and corresponding authorship. My contributions to international conferences have been recognized with two awards. I have also presented my research at several prestigious conferences, including an invited talk. In 2016, I obtained a master's degree in Nanoscience and Nanotechnology from the University of Barcelona and University Paris-Saclay (FR). During this period, I demonstrated my research expertise through the publication of a high-impact review in Advanced Materials, and in NanoLetters. Furthermore, I had the privilege of presenting 2 invited talks.



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Turno General

Área Temática: Tecnologías de la información y de las comunicaciones

Nombre: MALLIK, KAUSHIK

Referencia: RYC2024-049116-I

Correo Electrónico: kaushik.mallik@imdea.org

Título: Verified software design for cyber-physical systems

Resumen de la Memoria:

~Primary line of research~

Most modern automated machines are nowadays cyber-physical systems (CPS), i.e., they contain "physical" dynamical systems which are controlled and monitored by "cyber" components or computer software. Examples of CPS systems are abundant, and include self-driving cars, airplanes, medical wearable devices, and power networks. As a majority of CPS systems are safety-critical, it is important that the software components designed for CPS are safe and trustworthy. The problem is challenging due to the combination of continuous and discrete nature of CPS systems, for which traditional software programming approaches alone do not suffice. On the other hand, the modern AI approaches do not provide any formal correctness guarantees.

I develop mathematical frameworks for the design and verification of safe CPS software. The center of gravity of my research lies in formal methods, a branch of theoretical computer science offering mathematically rigorous techniques for the automated design and verification of correct software programs. Over the past years, my research has redefined the state-of-the-art in formal methods for CPS, with the development of new design principles and associated software tools that were faster, more modular, and could solve larger classes of problems than the existing approaches.

~Secondary line of research~

A majority of human-centric decision-making tasks, like screening job applicants, are now delegated to AI agents, and it has been reported that these AI agents often show biases based on protected attributes of humans, like gender or race. Such biases usually originate from historical biases in training data, and their prevention or mitigation is now an active area of research.

I develop algorithms for monitoring biases of deployed AI systems. The monitors are lightweight online statistical estimators, specialized towards estimating biases in the monitored decision-maker based on the observed decisions. While monitoring is a well-known context in CPS, we were among the first few to study it in the context of AI fairness.

~Research track record~

I have published 26 peer-reviewed research articles, among which 5 are in top-tier journals, and 4 are in CORE A* and 8 are in CORE A ranked international conferences. I have developed four open-source software tools/libraries, some of which are in active use by researchers across Europe. My PhD thesis won the ETAPS Doctoral Dissertation Award, and 3 of my papers got nominated for best paper awards. Outside Spain, I actively collaborate with researchers from 5 different countries, namely Austria (ISTA and Univ. of Graz), Czech Republic (Masaryk Univ.), Israel (Univ. of Haifa), India (IIT Bombay), and Singapore (SMU).

~Line of research to be developed~

Most existing formal methods approaches in CPS depend on models of the dynamical parts given as inputs. In reality, models are often inaccurate and are susceptible to deviations at runtime, which compromises the safety and trustworthiness of the software components during deployment. This remains a neglected topic in formal methods and CPS research. I will develop new frameworks that are resilient towards modeling errors. Emphasis will be given both on the mathematical rigor and the practical usefulness, as well as putting the theoretical results to the test on real robots.

Resumen del Currículum Vitae:

~Education and employments~

I am an assistant research professor at IMDEA Software Institute, Madrid. In 2012, I finished B.Tech (bachelor's) in electrical engineering from West Bengal University of Technology in India, in 2015, I finished M.Tech (master's) in Systems and Control from the Indian Institute of Technology Roorkee in India, and in 2022, I finished PhD in computer science from the Max Planck Institute for Software Systems in Germany (PhD was granted by RPTU Kaiserslautern). After my PhD, during 2022-24, I was employed as a postdoctoral researcher at the Institute of Science and Technology Austria (ISTA) in Austria.

~Honors~

I have received the 2023 ETAPS Doctoral Dissertation Award for my PhD thesis, 3 nominations for best paper awards on different international conferences, among which 2 are CORE A-ranked.

~Research output~

I have published 26 peer-reviewed research articles, among which 5 are in top-tier journals, and 4 are in CORE A* and 8 are in CORE A ranked international conferences. My articles have more than 500 citations and my h-index is 12. I have developed four open-source software tools/libraries, some of which are in active use by researchers across different countries in Europe.

~Societal contributions, dissemination activities~



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The primary end-users of my research have been the scientific community. All my conference papers were orally presented in conferences from these areas. Besides, I have delivered invited talks in renowned international venues, including UC Berkeley (USA) and the Simons Institute for the Theory of Computing (USA). Additionally, I am collaborating with researchers from IIT Bombay (India) on a project funded by a major Indian banking corporation (SBI Foundation), whose aim is to design fair and trustworthy software for banking software applications in India.

~International collaborations~

Outside Spain, I actively collaborate with researchers from 5 different countries, namely Austria (ISTA and Univ. of Graz), Czech Republic (Masaryk Univ.), Israel (Univ. of Haifa), India (IIT Bombay), and Singapore (SMU).

~Mentorship activities~

I have supervised 7 bachelor's and master's students on internship projects, 3 of whom went on to pursue PhD in top-tier academic institutes (Stanford Univ., Univ. of Leeds, and ISTA). I have mentored 4 PhD students on short projects, and 1 PhD student on his thesis project.

~Leadership and professional activities~

I have been invited to serve in program committees of leading international conferences in CS, namely RP, SETTA, and VMCAI. I have served in the core organizing team of the Young Scientist Symposium 2024 at ISTA, which is an annual international symposium that attracted about 190 participants from different countries in Europe. I am a member of ACM.

~Past projects~

I have worked as a researcher within 2 large projects, one funded by ERC (Advanced grant called VAMOS), and another one funded by the German Research Foundation (DFG) within a collaborative center (called TRR-248 CPEC) involving 3 German universities. I have also received personal fellowship funding from the German Academic Exchange Service (DAAD) for seven months' stay at TU Berlin, Germany, to conduct research on my master's thesis, and, during PhD, I have received the DAAD-RISE grant for hiring research interns from the north America.



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Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: VINOGRADOV, EVGENII
Referencia: RYC2024-051003-I
Correo Electrónico: vinogradovea@gmail.com
Título: Advanced Channel Modeling-Enabled Non-Terrestrial Networks

Resumen de la Memoria:

SCIENTIFIC AND TECHNICAL CONTRIBUTIONS

My research bridges wireless communications, 6G networks, and Advanced Air Mobility (AAM). My approach combines theoretical innovation, simulation-based validation, and experimental testing to ensure practical relevance and impactful outcomes. Beginning in 2013 with wireless channel modeling, I initially explored non-stationary behavior in sub-6 GHz indoor channels, later expanding to millimeter-wave (mmWave) bands and UAV communication systems. My contributions include developing non-stationary channel models, which are crucial for understanding dynamic propagation environments. I also pioneered UAV-based massive MIMO platforms for measuring multidimensional non-stationary channels.

My work in 6G networks includes advancing edge-computing frameworks for UAVs, enabling real-time trajectory planning. Additionally, I explored cell-free massive MIMO within O-RAN architectures, proposing and validating innovative resource allocation and scheduling strategies using testbed measurements.

In AAM, I developed communication protocols that enable collision-free navigation, integrating Remote ID with stochastic modeling to enhance operational safety. My work has influenced policy through collaborations with regulatory bodies like EASA and GCAA.

INTERNATIONALIZATION AND MOBILITY

I have a global research presence through collaborations with prestigious institutions. After earning my Ph.D. at UCLouvain, I worked as a postdoc at KU Leuven and currently lead research at the Technology Innovation Institute in the UAE. My international collaborations span European, American, and Asian institutions, resulting in high-impact publications and successful project outcomes. I have held leadership roles in H2020 consortia such as MARSAL, MINTS, and PercEvite and made significant contributions to European and national projects.

INDEPENDENCE AND LEADERSHIP

As a principal investigator and work-package leader, I have successfully managed multidisciplinary projects in AAM and 6G networks. At KU Leuven, I secured €1.5 million of national and international funding. My leadership involves defining research directions, managing resources, and mentoring 9 Ph.D. candidates and industrial teams

LINE OF RESEARCH TO BE DEVELOPED

During 5 years of the RyC fellowship duration, I aim to expand my research into underexplored frequency bands (THz, optical), integrate NTN for AAM, and address unique challenges in the space segment of NTN.

- Develop robust THz and optical channel models, including underwater optical channels (enabling full NTN including air, space, and water) in collaboration with UPC and ICM, to tackle non-stationary behaviors and environmental challenges.
- Design hybrid architectures combining satellites, high-altitude platforms, and UAVs for reliable AAM communication and other critical applications.
- Address challenges in satellite constellations, such as Doppler shifts and orbital dynamics, to enhance global connectivity and inter-satellite communication.

Resumen del Currículum Vitae:

I specialize in multi-dimensional channel modeling (statistically non-stationary), 6G enablers (non-terrestrial networks and cell-free MIMO), and vehicular technologies, ranging from conventional cars to flying taxis. I earned an MSc in Vehicular Communications at Saint Petersburg Electrotechnical University (LETI) (2009) and a Ph.D. at Université Catholique de Louvain (2017), focusing on multi-antenna technologies and channel modeling. During my postdoc at KU Leuven (2017-2022), I worked on non-terrestrial networks, cell-free MIMO, and wireless communications for drones. Currently, I lead a project at the Technology Innovation Institute (TII) that provides policy advice to the UAE's General Civil Aviation Authority (GCAA) for the upcoming commercial flying-taxi services planned in Abu Dhabi and Dubai for 2025-2026.

- Scientific Contributions: My research has advanced both foundational and applied wireless communication. My first journal paper (2015) on non-stationary channel modeling became a cornerstone in the field, widely cited for its relevance to distributed architectures and signal processing. In 2018, I introduced guidelines for optimal UAV altitudes in NTN systems, and in 2022, I explored O-RAN and cell-free networking in a groundbreaking paper. My safety research for drones and flying cars focuses on reliable cellular connectivity and collision avoidance.

I have authored 20 journal articles (18 in Q1), 27 conference papers, and one book chapter, with an h-index of 15 and over 870 citations (Google Scholar). My work has been presented at leading venues, including IEEE Globecom, ICC, EuCAP, and IEEE/AIAA DASC. In 2023, I received the Best Session Paper Award at IEEE/AIAA DASC for research on remote identification and collision avoidance in multi-agent drone navigation.

I have led multiple high-impact projects, including the GCAA-funded Advanced Air Mobility (AAM) initiative as Principal Investigator and the "Connected Networked UAVs" project as Project Manager. Previously, I managed €2.2M FWO SBO OmniDrone and €560k FWO Senior Research projects. I also led work packages in H2020 PercEvite (€340k out of €900k) and MARSAL (€600k/€6.1M) and supported H2020 MINTS (€770k/€3.9M) as a co-promoter, focusing on mmWave channel modeling.



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- Contributions to Society: Beyond publications, I have served as an Associate Editor for the IEEE Open Journal of Vehicular Technology and Frontiers in Space Technologies and Communications and Networks. I have co-chaired workshops at major IEEE events like ICC and Globecom and reviewed for top-tier journals, including JSAC, Communications Magazine, and TWC. My research has shaped the UAE's flying-taxi policies and informed EASA drone regulations. I have shared knowledge through tutorials on UAV safety and 5G/6G communications (at VTC, Globecom, ICC, EuCAP) and delivered invited talks on autonomous systems.

- Mentorship and Training: At KU Leuven, I give a Master's course on 6G Communication Networks. Currently, I am a co-promoter of 2 PhD candidates and I have been the daily supervisor for 7 PhD students, who now hold positions in academia and industry. Additionally, I have served as a jury member for two Ph.D. defenses. At TII, I lead a team of researchers dedicated to Advanced Air Mobility and organize seminars for the Autonomous Robotics Research Center.



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Turno General

Área Temática: Tecnologías de la información y de las comunicaciones

Nombre: SANTOS CLARO, MARCEL

Referencia: RYC2024-048317-I

Correo Electrónico: marcelclaro@gmail.com

Título: Crystal growth for Quantum Confinement

Resumen de la Memoria:

During my scientific career, I worked on a variety of topics that share the same line, studying the effect of quantum confinement (through epitaxial growth of nanostructures) on the transport and optical transitions in semiconductors, and applying these effects in the development of quantum and optical devices. I will continue developing this line, especially on materials that present Mexican hat dispersions (MHD) and bandgap in visible region, which are still barely studied.

MHD occurs by the inversion of the parabolic dispersion at an electronic band extremum. Ab initio studies have found Mexican hat dispersions in the valence band of many few-layer III-VI materials such as GaSe, InSe, PbO and SnO which I gained extensive experience recently. The uncommon MHD results in step-like and delta-like density of states (DOS) and then in large transport velocity due to the flatness and steepness of the band. Those electronic instabilities can lead to tunable superconductivity, ferroelasticity, and ferromagnetism, and it also enhance the Seebeck coefficient, the power factor, and the thermoelectric figure of merit ZT. Then, MHD materials are of interest for several technological applications.

The main topics to be developed in this line are:

- 1) The growth/exfoliation of GaSe, InSe, GaS, GaTe, PbO, SnO and 2D perovskites heterostructures for visible optoelectronic devices.
 - a. Photoluminescence and absorption due to quantum confinement. (Theory and Experiment)
 - b. Influence of polymorphs and defects on optical and electrical properties. (Theory and Experiment)
- 2) Superconductivity, ferroelasticity, and ferromagnetism caused by electronic instabilities of quantum confinement and MHD. (Theory and Experiment)
 - a. Propose device design and fabrication processes.
 - b. Measuring and analyzing physical properties of exfoliated and epitaxial-grown heterostructures.
 - c. Influence of quantum confinement on MHD using density functional theory DFT and tight-binding methods.
- 3) Phonon transport on vdW heterostructures and interfaces. (Theory and Experiment)
 - a. Thermal conductivity of vdW heterostructures.
 - b. Molecular Dynamics (MD) applied to phonon transport at room temperature.

Resumen del Currículum Vitae:

EDUCATION

03/2013 – 06/2017 University of Sao Paulo, USP – Brazil - Institute of Physics

--Ph.D. in Solid-state Physics

06/2016 Princeton University - USA

--Ph.D. Exchange

03/2014 - 08/2014 International Iberian Nanotechnology Laboratory, INL

--Ph.D. Exchange

2011 – 2013 University of Sao Paulo, USP – Brazil - Institute of Physics

--M.Sc. in Solid-state Physics

2007 – 2010 University of Sao Paulo, USP – Brazil - Institute of Physics

--B.Sc. Physics Class Rank: 28^o of 107

CURRENT POSITION(S)

07/2022 – Universidad de Santiago de Compostela – Spain

Distinguished Researcher

PREVIOUS POSITIONS

07/2020 – 06/2022 International Iberian Nanotechnology Laboratory, INL – Portugal

Postdoctoral Research Fellow (Spintronics)

Materials and Process of spin-transfer torque nano-oscillator devices

09/2018 – 06/2022 International Iberian Nanotechnology Laboratory, INL – Portugal

Postdoctoral Research Fellow (Quantum & Energy Materials)

2D Material Molecular Beam Epitaxy and Device Fabrication

10/2017 – 07/2018 City College of New York – City University of New York / CCNY-CUNY - USA

Postdoctoral Research Fellow

III-V and II-VI semiconductors and Topological insulators: Molecular Beam Epitaxy

COMPETITIVE FELLOWSHIPS AND AWARDS

07/2022 – 12/2024 Maria Zambrano Scholars Fellowship - Talent-attraction grant - Ministerio de Universidades – Spain. Granted: 118,659.37

€

07/2023 – 07/2025 Marie Skłodowska-Curie Actions - Individual Fellowships (MSCA-IF) – Horizon Europe - (Declined)

Granted: 211,000 €



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2023 Principal investigator - ALBA synchrotron funded experiment ☐ Funded: Beam-time and Travel costs
2023 Best Poster Award (non-presenting, last author) - e-MRS spring meeting Strasburg
2021 ☐ 2022 Principal investigator. Indium Selenide memristors based on ferroelectric tunnel junctions for neuromorphic hardware ☐ (2021-2022) ☐ Eureka Internal research grant: INL - International Iberian Nanotechnology Laboratory (Portugal) ☐ Granted: 25,000.00 ☐ -
2015 Best Poster Award (presenting, first author) - XXXVIII Brazilian Condensed Matter Physics Meeting , Brazil
2014 Principal investigator. 2014 Free IC Fabrication mini@sic Program ☐- Interuniversity Microelectronics Centre, IMEC (Belgium) ☐ Granted: 40 dies of 1.5x1.5 mm IC - Technology TSMC 0.18u MS/RF

SUPERVISION OF STUDENTS

2024 - present Ph.D. supervising ☐ Complex oxide interfaces for reconfigurable thermal boundary conductance Student: Victor Alvarez Martinez from USC Scholarship: FPI - Ministerio de Universidades (Spain).

2020-2024 (Defended) Ph.D. Project and supervising. - Topological insulators grown by molecular beam epitaxy (MBE) and related quantum devices. Student: Daniel Brito from UPorto Scholarship: Fundação para a Ciência e a Tecnologia (FCT - Portugal)

TEACHING ACTIVITIES

03/2015 ☐ 11/2016 Teaching Fellow. Experimental Physics for engineering (6h/week) - University of São Paulo

08/2022 - present Teaching Fellow. Chemical Physics Department (60h/year) - University of Santiago de Compostela



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones

Nombre: PÉREZ SALINAS, ADRIÁN

Referencia: RYC2024-049242-I

Correo Electrónico: adrian.perezsalinas95@gmail.com

Título: Variational Quantum Machine Learning

Resumen de la Memoria:

-- Research Focus and Achievements --

My work focuses on exploring how quantum computing can enhance machine learning, aiming to unlock its transformative potential. I have authored 17 publications (6 of which are under review) and collected over 1,000 citations. My most notable contribution is the "data re-uploading framework," a foundational work in QML cited over 600 times, which has enabled the use of current quantum computers for machine learning tasks.

Beyond this, my research includes foundational QML questions, applications of near-term quantum computing, algorithm design to accelerate quantum computation, and the development of tools to characterize quantum algorithms. My findings have been applied in a variety of contexts, ranging from abstract theoretical considerations to solving practical problems as found in finance or in experimental High Energy Physics.

I aim to find conceptually relevant advancements rather than incremental contributions, pushing the boundaries of what is possible in this emerging field.

-- Motivation --

Advances in machine learning (ML) and information processing have revolutionized problem-solving across domains, with techniques like backpropagation, convolutional architectures, or hardware like GPUs. Great advances include mastering Go, predicting protein structures, and generating text and images. These successes primarily rely on variational models, which use billions of parameters to learn and adapt from enormous quantities of data.

Quantum computing introduces a paradigm shift, replacing classical bits with quantum bits (qubits), allowing efficient solutions for previously intractable problems. Although current quantum devices are not yet fault-tolerant and face limitations like noise and scalability, they demonstrate experimental quantum advantage, motivating the search for practical applications. Hybrid classical-quantum algorithms, particularly variational quantum algorithms (VQAs), have shown promise in leveraging near-term quantum devices.

Quantum machine learning (QML) merges quantum computing with ML, enabling quantum data processing and novel approaches to solving difficult problems. QML capitalizes on the unique properties of quantum data, offering computational enhancements. Recent advancements highlight QML's competitive advantages, such as transforming cryptographic challenges into learning tasks or applying QML to physics problems.

-- Research Objectives --

The long-term goal of this research is to uncover the practical capabilities of QML and identify learning problems where quantum computers outperform classical systems. Emphasis will be placed on the variational approach, given its success in classical ML and the unique challenges it faces in quantum computing. Key objectives include:

- Investigating whether certain quantum computations provide sufficient advantages while variational components remain classically manageable.
- Determining hardware requirements for quantum advantage, such as the need for universal quantum computers versus specialized machines.
- Addressing the impact of errors and extending QML techniques to the fault-tolerant regime for broader applications.

The outcome of this research is intended to pave the way towards practical and scalable QML, as well as identifying domains in which this disruptive technology can provide relevant advantages.

Resumen del Currículum Vitae:

Adrián Pérez-Salinas - Quantum Machine Learning Researcher

I am a researcher in quantum machine learning (QML), currently a postdoctoral researcher at Leiden University, working under the guidance of V. Dunjko and J. Tura. I hold a PhD in quantum computing from the University of Barcelona/Barcelona Supercomputing Center, obtained under the supervision of J. I. Latorre and A. García-Saiz. I earned my bachelor's and master's degrees in physics from the Autonomous University of Madrid, with Germán Sierra as my master's advisor.

-- Acquired experience --

During my PhD I learnt both the technical and professional foundations of research. I conducted my own research, mainly as first author. In this time I carried out projects based on numerical explorations of quantum machine learning, including experiments on a supercomputer; and also finance and entanglement theory. I completed both the research and the writing and presentation of results.

During my post-doctoral I broadened my experience in topics, (foundations of quantum machine learning, characterization of algorithms, near-term quantum computing), and deepened my understanding through theoretical reasoning, I also contributed to the education of PhD and master's students, including being host for external students, as well as organized the inner group dynamics.



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Turno General

-- Leadership and Mentorship --

Throughout my career, I have developed my leadership and mentorship skills by

- Leading and supervising three research papers as the main author.
- Guiding four master's theses (Leiden) and two bachelor's theses (Milan), with many students continuing into PhD programs.
- Hosting visiting PhD students from institutions like the Barcelona Supercomputing Center and the University of Valencia.

I have also fostered collaborative and stimulating environments within my research group by organizing seminars, focus groups, and lectures, covering both technical research tools and essential soft skills, such as scientific writing and code publishing.

-- National and International Impact --

As one of the pioneering QML researchers in Spain, I actively collaborate with peers like A. Cervera-Lierta and M. Sanz to advance the field at a national level. I have co-organized events such as the first spring school in near-term quantum computing (Benasque 24) and have delivered lectures at prominent gatherings, including QTYR24 and QML-focused workshops.

-- Independent Thinking and Innovation --

I approach research with creativity and a critical mindset, e. g. by exploring underdeveloped areas and connect distinct fields. For example, I am investigating the expressivity of shallow circuits using differential geometry, a novel approach in the field. My work often bridges areas, such as combining optimization theory with quantum computing, leading to fresh perspectives and impactful results.

-- Dissemination and Engagement --

I actively participate in leading conferences like QIP, QTML, and Quantum Information, where I stay updated with cutting-edge research and contribute to the community. I was also part of the QTML24 program committee, reflecting my commitment to fostering knowledge exchange.

Overall, I aspire to play a pivotal role in shaping the future of QML, both in Spain and internationally, and aim to position myself as a leader in this transformative field.



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Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: DOMINGUEZ ALFARO, ANTONIO
Referencia: RYC2024-049469-I
Correo Electrónico: antoniodominguezalfaro@gmail.com
Título: ILUMINA e-Tech. (Integration of Light-based mUlti-Material prInting for the Next-generation of Advanced electronic Technologies)

Resumen de la Memoria:

The objective of executing the RyC funding is to advance printed electronics manufacturing, focusing on innovative technologies for electronic medical devices and wearables. Printed electronics have already proven successful in producing displays, sensors, photovoltaic cells, and batteries, but their performance remains inferior to CMOS technology. Key limitations include difficulties in manufacturing complex geometries, miniaturization challenges, poor integration of integrated circuits (ICs), and issues with controlling composition. However, the emergence of additive manufacturing, especially multi-material additive manufacturing (AM-MM), offers a transformative solution. AM-MM allows the combination of different materials in a single print, significantly speeding up the process while reducing material and labor time compared to CMOS techniques, which rely on time-consuming lithographic processes.

Among the most promising techniques for AM-MM are stereolithography (SLA) and digital light printing (DLP), both of which can achieve sub-100 μm resolution. However, these techniques require low-viscosity inks and modified 3D printers, which limit their use with materials like carbon-based composites. Despite these challenges, DLP/SLA stands out for its potential impact on research, as it offers precise control of geometry and composition. These technologies are key to overcoming the challenges seen in battery-related research, Organ-on-Chips, tissue engineering, wearables, and biosensors, where components are often made from a single material, hindering integration and practical applications.

The ILUMINA e-Tech project aims to address this by integrating light-based multi-material printing with computer-aided design and functional ink development to create the next generation of printed electronics. ILUMINA e-Tech aligns with the European Commission's strategy and IMSE-CNM-CSIC's efforts to establish an advanced European chip ecosystem for the design, production, and testing of electronic devices.

The project will focus on four main work packages: WP1 will develop functional inks, WP2 and WP3 will enhance the resolution and complexity of the DLP-based printing process, and WP4 will apply these innovations to bioelectronics. By developing inks with specific mechanical, electrical, and photo-conductive properties, the project will expand the range of materials available for multi-material printing, enhancing the potential for electronic device manufacturing. WP5 will involve outreach and dissemination activities, such as conferences and publications, to maximize the project's impact and encourage collaboration within the scientific community.

ILUMINA e-Tech will transform printed electronics by enabling the creation of complex, multi-material devices in a single step with precise control over geometry and composition. This project will drive the development of new electronic medical devices and wearables, offering a significant step forward in healthcare technology and opening new opportunities for scientific research and industrial applications.

Resumen del Currículum Vitae:

I am a multidisciplinary researcher focused on integrating materials into unconventional manufacturing techniques and advancing technologies like neuromorphic systems and bioelectronics. I have been part of several research groups and centers, gaining expertise in organic photochemistry, nanotechnology, polymers, biotechnology, bioelectronics, and microelectronics. I have contributed to 48 scientific publications (4 under review) and a European patent, with over 80% in Q1 journals. Eleven publications have impact factors above 9, and my work has accumulated over 1,000 citations. I have participated in multiple European and national funding proposals, including ERC Grants. I have presented my work at over 20 conferences, co-organized the Cambridge Bioelectronics Symposium 2024, and served as Guest Editor for journals like Polymers MDPI and the European Physics Journal. I have supervised over 10 students and was invited to contribute to the Journal of Materials Chemistry C's Emerging Investigators collection.

My research focuses on conducting polymers in electronics. I began as a pre-doctoral researcher at the University of Huelva, synthesizing organic molecules with electron-transfer processes. In 2015, I moved to San Sebastián, developing electroactive scaffolds for tissue engineering using PEDOT. Two publications were featured on journal covers. I also interned at the University of Houston, working on carbon nanotube fibers.

In 2021, I focused on sustainable conducting polymers for bioelectronics. This led to a publication and a patent. In 2022, I received the Margarita Salas Fellowship for a postdoctoral internship at the University of Cambridge, where I integrated mixed ionic and electronic materials into bioelectronics. I published four high-impact papers, including two in Advanced Science. After completing the one-year internship, I returned to the University of the Basque Country for six months. I further enriched my industry exposure with a one-month internship at PANAXIUM, a leading biotechnology company. In October 2023, I secured a Research Associate position at the University of Cambridge within the Bioelectronics Laboratory, where I lead the "Wearables and Sensors" sub-section. Our team explored the use of mixed ionic and electronic materials for electrophysiology. I was honored with an invitation for an oral presentation at the European Congress of Material Science (e-MRS) and recognized as an Emerging Researcher in Material Science by the Journal of Materials Chemistry C.

Since November 2024, and after more than two years abroad, I have been hired as a Postdoc Momentum Fellow at the Institute of Microelectronics of Seville, part of the Spanish National Research Council (CSIC). At the Neuromorphic Laboratory, my research focuses on integrating innovative additive manufacturing techniques and materials with complex electronic architectures capable of processing information. This work aims to create low-power devices that can be integrated into more complex environments. I believe that the key to advancing technology lies in modifying and tailoring materials, enabling their seamless integration into a wide range of applications.



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Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: PRZYBYLA, PIOTR MICHAL
Referencia: RYC2024-050327-I
Correo Electrónico: piotr.przybyla@upf.edu
Título: Machine-Learning Methods for Investigating Text Quality and Credibility in the Context of Misinformation, Social Media, Scholarly Literature and AI-Generated Content

Resumen de la Memoria:

My research activity focuses on the area of NLP, as a sub-area of Artificial Intelligence. As a PhD student, I investigated the problems of NLP through the lens of low-resource language, namely Polish. This work concluded in the creation of RAFAEL, the first open-domain question answering system for Polish. As a postdoctoral investigator, I worked at the University of Manchester (UoM), contributing to large international projects in the area of biomedical text mining, involving coordination with end users for extraction of knowledge from large text corpora. I had an opportunity to lead some of these tasks, as reflected in the authorship of publications from that period. In the current phase (as a PI) I focus on the problems of credibility and how can it be automatically assessed to detect misinformation content, such as fake news, propaganda and machine-generated text. This area was explored through my HOMADOS project at the Polish Academy of Sciences (PAS), where some of the pioneering works in this area were created, as well as during my MSCA fellowship at the Universitat Pompeu Fabra (UPF). This project was focused on verifying the vulnerability of misinformation detection to adversarial attacks, which is a topic of societal importance in the modern world, where social media are crucial for public debate. The investigation of this emerging problem has been contributed by our team and the participants of the shared tasks we organised at the CLEF 2024 conference. My interests go beyond these three areas and I have experience with other topics both in NLP (e.g. text simplification or stylometry) and beyond (e.g. computations for physics). My full record, including 46 publications cited 1036 times, is available on my website.

The aim of the proposed investigation is to explore the open questions around the generation of research articles using Large Language Models (LLMs) deployed as public services, such as ChatGPT. The availability of such tools poses challenges to the scientific publication workflows. It raises the prospect of massive and easy creation of documents that superficially resemble credible articles, but in fact are not backed by any real research. Such "fake" papers may play a role in harmful practices, for example misinformation spreading. I will investigate a variety of new methods for automatic and interpretable detection of machine-generated text. Some of them will be generic, and work on any textual content based on its statistical and linguistic properties. Others will focus on problems specific to scholarly writing, such as malformed citations, inconsistent argumentation or machine-generated illustrations. I will also involve experts in research assessment from different domains to measure the human accuracy in recognising machine-generated documents and learn the best techniques from them. Beyond detection accuracy, I aim to design methods that are (1) interpretable, justifying their output (e.g. highlighting the AI-generated fragments); (2) robust, maintaining their quality even when facing content purposefully designed to avoid detection; (3) multilingual and multimodal. The methods and resources developed will be directly useful for recognising the source and quality of research text, but will also inform other areas, such as misinformation detection, complex document generation or scholarly text understanding.

Resumen del Currículum Vitae:

My current position is an Assistant Professor at the Institute of Computer Science of the Polish Academy of Sciences (ICS PAS), which I hold continuously since 01.01.2019 (permanent position, currently on unpaid leave). My previous positions include:
11.2022 – 12.2024 Marie Curie Postdoctoral Fellow / Universitat Pompeu Fabra / Spain
09.2019 – 06.2020 Researcher / SAPIhub Ltd / Poland
01.2017 – 12.2018 Research Fellow / University of Manchester / UK
08.2015 – 12.2016 Research Associate / University of Manchester / UK
I obtained my PhD from ICS PAS on 18.06.2015.

Funding:

Since 2019, my main work is funded by my own grants. Firstly, I obtained 292,740 € through the Polish Returns program for the realisation of a 3-year project HOMADOS, which also covered two researchers working under my direction. Secondly, I have been granted 165,312 € through the Marie Skłodowska-Curie Postdoctoral Fellowship of the EU for a 2-year stay at the UPF till October 2024. Thirdly, I have received several computational grants in commercial and public platforms, including Google Cloud, Oracle, PLGrid and PCSS. Finally, I continue to apply for further funding, currently having a proposal under review in the ERC Consolidator programme.

International collaboration:

My stay at the UoM allowed me to establish valuable ties and since I left the centre in 2018, I have published 10 articles with these collaborators. In terms of institutional cooperation, I have both participated in large multinational projects (in OpenMinTeD, H2020 project), as well included such cooperation in my own project in HOMADOS (with Universidad Nacional del Sur in Argentina) and ERINIA (with University of Sheffield). The international aspect of my work also includes mentorship, and I have co-supervised students at different level in Poland, UK and Spain.

Leadership:

I have always strived to work independently and set my own course in research, which is reflected in my record: of the 46 publications, in 27 I am the first author and 10 of these are single-author works. I had an opportunity for direct leadership during the HOMADOS project, where I managed work of one postdoc and one PhD student. Finally, I have so far led 6 teams in shared task competitions, in the last one (on machine-generated text detection) winning the first place.



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Teaching:

While my focus is on research work, I have also contributed to many AI-related courses, giving invited lectures and associated laboratory sessions on NLP topics. These took place at the Technical University of Warsaw, Cardinal Stefan Wyszyński University, PAS and UoM. I have also been a co-supervisor or supervisor of BSc (2 theses), MSc (3 theses) and PhD (2 theses) students.

Outreach:

My work on style-based fake news detection (HOMADOS project) has attracted some media attention and resulted in several publications appearing in Polish popular media: Polska Agencja Prasowa, Dziennik Gazeta Prawna and Wirtualna Polska.

Organisation:

I have participated in the organisation of several scholarly events: as a member of the organising committee (ICMM 2013, PoITAL 2014), co-organiser of a shared task (Task 4 at PolEval 2021, Task 3 at PolEval 2022/2023) and the organisation chair (Task 6 at CheckThat! Lab at CLEF 2024).



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Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: AMOR MARTÍN, ADRIÁN
Referencia: RYC2024-050015-I
Correo Electrónico: aamor89@gmail.com
Título: Computational Electromagnetics and its Applications

Resumen de la Memoria:

First, I plan to extend the systematic approach for Nédelec curl-conforming basis functions to develop basis functions of arbitrary order in affine coordinates. Specifically, I will construct a homogeneous subspace for a hypertetrahedron that yields a complete space for a tetrahedron, a methodology not yet reported in the literature. In parallel, in collaboration with Prof. Dyczij-Edlinger, I am working on combining serendipity basis functions and Model Order Reduction (MOR), which may require an enlarged dimension in the reduced space, as well as merging non-conformal Domain Decomposition Methods (DDM) with MOR, which could substantially accelerate wideband microwave-circuit characterization. I will also examine the combination of 3D hp adaptivity with non-conformal DDM, which has shown promising results in some of my contributions. Given my interdisciplinary perspective, these CEM advances can be transferred to fields such as Artificial Intelligence (AI) and microwave imaging, both central to the forthcoming X Plan Estatal de Investigación Científica y Técnica y de Innovación (2024-2027). Finite Element Method (FEM) simulations, with their predictable approximation error, are ideal for generating data that feed AI models estimating electromagnetic properties. Moreover, gradient-based optimization of inverse problems requires partial derivatives of the forward solution with respect to material or geometric parameters, motivating the integration of Automatic Differentiation (AD) techniques. In particular, I plan to implement Bernstein-Bézier polynomials in a FEM solver capable of sum-factorization for element assembly, while using dual numbers to handle AD. In addition, I will explore parametric MOR to further reduce computational overhead, working closely with Prof. Dyczij-Edlinger.

Accurately determining electromagnetic properties is critical in fields such as medical diagnosis, industrial contaminant detection (Industry 4.0), and subsurface mapping in exploration missions, and often involves custom hardware designs. Building on my experience with high-frequency and geophysical applications, I will continue formulating and simulating problems alongside a PhD student, especially in real-time industrial settings that demand HPC and heterogeneous computing. If these algorithms are to be deployed in space, we must incorporate fault-tolerance algorithms. Finally, I intend to investigate Physics-Informed Neural Networks (PINNs) as an optimization route for inverse problems, which motivates collaboration with other institutions—such as Prof. Naranjo's group at UPV—to further expand my AI-related research. Beyond these lines, I aim to develop a European project centered on solving inverse problems in the high-frequency regime, merging our FEM developments (optimized for lossy media through a joint PhD student) with existing microwave sensor designs for industrial and healthcare scenarios in collaboration with Prof. Vipiana in Turin. I have also visited Prof. Dyczij-Edlinger to establish future proposals on parametric MOR, essential for an autodifferentiable forward solver benefiting AI-driven solutions. Overall, I anticipate the launch of two additional projects, two further PhD theses, and the publication of around twenty JCR papers over the next five years, thereby maintaining my current rate of four JCR articles per year.

Resumen del Currículum Vitae:

My main research interest is in Computational Electromagnetics (CEM), and I have also pursued interdisciplinary collaborations with international groups in physics, mathematical modeling, heterogeneous computing, and geophysics. In CEM, I have contributed substantially to developing a Finite Element Method (FEM) code geared toward High-Performance Computing (HPC), including new curl-conforming basis functions for various element shapes and Domain Decomposition Methods (DDM) for large-scale simulations. These efforts underpin high-impact publications, a national research project, a PhD thesis I tutored in 2020, and an ongoing private contract with AIRBUS (from 2022).

Leveraging my experience with antenna measurements (coordinating antenna certification with Telefónica), I became involved in designing and fabricating sensors and antennas for non-destructive testing, supervising a PhD thesis in this area. In the coming years, I plan to solve the inverse problem using AI-based approaches and measurements from these custom circuits. Because this challenge demands real-time capabilities, I teamed up with Dr. Belloch to explore new HPC paradigms such as heterogeneous computing. This line of research has led to three public research projects (as Principal Investigators), a private contract with Arquimea (2023), and several high-impact publications; we are also co-supervising two PhD theses on this topic.

I served as a postdoc at Saarland University (two years) under Prof. Dyczij-Edlinger, gaining autonomy while collaborating on new curl-conforming basis functions (two Q1 papers). During my PhD, I obtained funding for research stays at the University of Macau (producing a Q4 paper) and at the ElectroScience Laboratory (Ohio State), where I spent seven months (in two visits) and co-authored a Q1 paper on DDM. I have also disseminated my findings at major conferences, identifying a lack of benchmarks for CEM solvers; I subsequently published an open-access testbench and joined the IEEE P2816 APS/SC/CEM working group to help define recommended practices. I am an IEEE Senior Member, a Sigma Xi Full Member (2023), and obtained R3 certification in 2024.

Beyond research, I have been committed to technology transfer and outreach since earning a start-up award in 2013. Since 2020, I have coordinated the "GT Jóvenes" working group at COIT, co-founding the "ment-it" mentoring program (55 mentees this edition). I also created "GT Ciencia," bridging academia and industry, and lead an outreach plan that established the Ambassadors program to promote STEAM careers and reduce the gender gap. I have fostered young talent through the URSI national committee—founding a 3MT thesis award—and joined the QoMEX 2025 organizing committee. In 2024, I was elected Treasurer of the Spanish joint section of IEEE AP-S and MTT.

To date, I have authored or co-authored 25 JCR-indexed papers (ten Q1, ten Q2, four Q3, one Q4) and 50 conference contributions, and I hold one six-year research period (2015-2020). I have served as PI on two regional and one national public research project, one private contract, and one



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promotion project, and contributed to five other research projects and nine private contracts. I have supervised one PhD, eight MSc, and five BSc theses.



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Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: MONTESINOS BALLESTER, MIGUEL
Referencia: RYC2024-049185-I
Correo Electrónico: mimonbal2@gmail.com
Título: Photonic integrated circuits and novel laser sources operating in the mid-infrared
Resumen de la Memoria:

I am a senior postdoctoral researcher at the Physics Department of ETH Zurich (#11 worldwide in the Times Higher Education ranking for 2024). My research experience of more than 9 years has always been focused on the development of integrated photonic devices, operating mainly in the mid-IR spectral range, but also in the telecom/datacom bands. Throughout my BSc thesis in Spain, my MSc thesis in Belgium, my PhD in France, and my current postdoc in Switzerland, I have developed different active, passive, and nonlinear functionalities in different platform materials (i.e., Si, III-V, and lithium niobate), pushing the boundaries of the state-of-the-art with a total of 35 contributions to international congresses (10 delivered by me) and 16 publications in international peer-reviewed journals (6 as first and corresponding author). My current h-index is 12, with >620 citations (G. Scholar), allowing me to review in high-impact journals, such as Nature Communications.

During this time, I have acquired the necessary knowledge and competencies to carry out the integral development of integrated photonic devices, covering their design, fabrication, and characterization. Proof of this is the broad portfolio of photonic devices that I have developed from concept to final experimental demonstration. As a PhD student at C2N (France), I further developed a high-performance, Si-based mid-infrared platform, demonstrating different active (electro-optic modulator, integrated spectrometer), passive (broadband and low-loss waveguides and interferometers), and nonlinear (supercontinuum generation) functionalities, while developing the required fabrication process at C2N and Polytechnic University of Milan cleanroom facilities. Later, as a postdoc at ETH Zurich, I developed a high-performance platform based on III-V materials and novel laser sources operating in the mid-infrared spectral range (e.g., integrated dual-comb source).

My postdoc responsibilities include a lab room with an optical transmission setup that I build, and wire-bonding and ICP-RIE equipment. My deep involvement and responsibility in highly competitive projects and research groups have provided me with excellent preparation for my career as a multidisciplinary researcher, as well as a wide collaboration network with prestigious research institutions. Among others, I lead a scientific Work Package in the UNISON (EIC-Pathfinder) project and my group's contribution to the MIPS4LIFE project.

My teaching activities during my PhD and postdoc comprise 3 different courses at Paris-Saclay University (89 hours) and experimental and theoretical courses at ETH Zurich, leading 2 Physics courses. I have also mentored and scientifically assisted a total of 2 BSc, 3 MSc, and several PhD students.

The combination of my multidisciplinary knowledge together with my leadership and management skills, independent thinking, and international network of collaborators will guarantee the success of my future research lines, focused on the development of cutting-edge technologies. I am excited about the opportunity to develop my innovative ideas in active and passive integrated devices operating in the mid-infrared, as well as novel laser sources capable of generating frequency-modulated combs by the quantum walk process in the telecom bands through different approaches.

Resumen del Currículum Vitae:

I am a researcher with more than 9 years of experience in the design, fabrication and experimental characterization of integrated photonic devices.

I obtained my B.Sc. and M.Sc. degrees in Telecommunications Engineering from the Polytechnic University of Valencia (UPV) in 2015 and 2017, respectively. During my studies, I had the opportunity to develop lithium niobate integrated photonic waveguides at DAS Photonics (BSc thesis and MSc internship) and characterize the saturable absorption of graphene in SiN waveguides at telecom wavelengths (MSc thesis) as an Erasmus exchange student at the University of Gent (Belgium). In 2018, I started as a PhD student at the C2N laboratory (University of Paris-Saclay, France), where I successfully developed a Si-based photonic platform operating in a wide mid-infrared spectral range and several integrated devices based on it: low-loss waveguides and interferometer, electro-optic modulator, integrated spectrometer, nonlinear supercontinuum generation. This work paved the way for 3 PhD students (which I mentored) and 3 national and international projects (LIGHTUP, UNISON and ELECTROPHOT). I also taught at the University of Paris-Saclay in 3 different courses, where I adapted to different pedagogical approaches and participated in the definition of pedagogical objectives and in the careful writing of exam topics and exercises.

After obtaining my PhD in 2021, I started as a postdoctoral researcher at ETH Zurich (since January 2022). My research activities include the development of a broadband, high-performance passive platform based on buried InGaAs/InP waveguides, and novel and innovative laser sources, both operating in the mid-infrared spectral range. I have mentored 2 undergraduate students, 1 master's student and provided scientific support to several PhD students within the research group. I also teach theoretical and experimental courses for undergraduate students. My teaching experience at ETH Zurich includes leading 2 Physics courses as head of exercises, which involves tasks such as preparing exercises, preparing and correcting exams, teaching lectures and coordinating and organizing a team of nearly 10 teaching assistants. I am also responsible for a lab room, an optical transmission characterization setup that I build, wire-bonding equipment typically used for laser mounting, and ICP-RIE equipment used for dry-etch fabrication steps in cleanroom facilities. Among others, I also lead 2 projects at my institution (MIPS4LIFE and UNISON) with tasks such as leading a work package or participating in recruitment processes, while contributing to scientific development.



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I have made a total of 16 contributions to high-impact, peer-reviewed journals (6 of them as first and corresponding author) and 35 international conferences such as CLEO or Photonic West. My current h-index is 12, with >620 citations (G. Scholar), which has allowed me to review in high-impact journals such as Nature Communications.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: MITTELMANN , MUNYQUE
Referencia: RYC2024-048775-I
Correo Electrónico: munyquee@gmail.com
Título: Verification and Synthesis of Multi-Agent Systems

Resumen de la Memoria:

MunIQUE MittelmANN's (MM) research is focused on logics and formal methods for strategic reasoning, modelization, and verification of Multi-Agent Systems (MAS). Most formalisms she investigated are based on Strategy Logic (SL), the Alternating-time Temporal Logic ATL* and its fragment ATL. Her research has interdisciplinary aspects, as she has drawn inspiration from problems from Algorithmic Game Theory and Economics. In summary, most of her contributions are related to modeling problems using logic-based formalisms or formally studying the logics with respect to computational problems (such as model checking, and synthesis) and expressiveness. Her main research lines are (i) logic-based approaches for the design and verification of mechanisms for social choice, (ii) quantitative verification of MAS with strategic agents, (iii) probabilistic model checking for MAS, and (iii) general auction representation.

The research community has recognized her work and trajectory: (i) she is the recipient of a Marie Curie Individual Fellowship, (ii) she received an international early career award from KR inc, (iii) her thesis received the best thesis award from the French association for AI.

In terms of leadership and internationalization, MM is the main author in most of the publications she has co-authored, and she has co-authored works with the research groups she has visited. In total, she has publications in collaboration with more than 20 researchers from several countries. She co-organized the workshops LAMAS&SR 2024 and SPIRIT 2024, and was a part of the local organization of EUMAS 2023 and CSL 2024. She was a program committee member for multiple international conferences. She also supervised students' internships and undergraduate thesis.

The line of research to be developed addresses the issue of phenomena related to the dynamics of information and opinion and their interplay with agents' strategies. The proposed project aims to provide formalisms and methods for the specification, verification, and synthesis of MAS in which agents' information and opinions are dynamic. This topic is important because (i) autonomous agents in a MAS are required to coordinate and interact with other system components which may possess unique points of view and distinct semantic meanings for the state of the world, and (ii) to properly act in such environment, agents' strategies and knowledge should adapt to new available information.

Resumen del Currículum Vitae:

MunIQUE MittelmANN was awarded several scholarships and grants, namely a Marie Curie Individual Fellowship in 2023, an academic mobility grant from the University of Toulouse Capitole and the Erasmus+ program in 2021, a PhD scholarship from the French National Research Agency in 2019, an undergraduate research scholarship from CAPES-Brazil in 2017, and a scientific initiation scholarship from Instituto Federal Catarinense (Brazil) in 2015. In terms of scientific production, she has co-authored a total of 30 peer-reviewed publications, including a publication in the Artificial Intelligence journal and 11 full paper publications at the A* conferences IJCAI, KR, AAMAS, and AAAI. Those conferences are very prestigious and have a low acceptance rate for full papers (around 15%-27%). She also published several papers at A conferences and short papers at A* conferences.

MunIQUE MittelmANN obtained her PhD in Computer Science in 2022 from the University of Toulouse Capitole (France) supervised by L. Perrussel. During her PhD, she was a member of the Computer Science Research Institute of Toulouse (IRIT). Her postdoctoral research is carried out at the University of Naples Federico II and supervised by A. Murano (EurAI fellow) since October 2022. Since August 2023, she is the Principal Investigator (PI) of her own research project under a Marie Curie Fellowship. In 2023, she received the Best Thesis Award from the French Association for Artificial Intelligence (AFIA) and the Early Career Award from the foundation Principles of Knowledge Representation and Reasoning, Incorporated (KR Inc., organizer of the international conference KR). MunIQUE MittelmANN has also participated in communication activities to academic and non-academic audiences, including an atelier at the Researchers' Night (2024) in Toulouse, tutorials at conferences (KR 2024, KR 2023, and AAMAS 2023), and a course at a summer school (ESSAI & ACAI 2024). She also gave an invited talk at the conference PFIA 2023.



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Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: SEGOVIA AGUAS, JAVIER
Referencia: RYC2024-050163-I
Correo Electrónico: jsego6@gmail.com
Título: Representation Learning for Provably General and Scalable Planning
Resumen de la Memoria:

My main research interest is building scalable and efficient computational systems that learn to solve complex decision-making tasks. This research lies in Automated Planning (AP) and Machine Learning (ML) among other foundational branches of the Artificial Intelligence (AI) field. My long-term goal is developing an integrative AP and ML system with the ability to learn world representations from raw data (e.g., state graphs, images, $\mathbb{R}^n$), that plan and reason with these models to compute near-optimal solutions that generalize to similar problems, that compactly represents the acquired knowledge and inductively improves either the learning or the reasoning of novel decision-making problems.

The posed challenges have been partially addressed in my work on Generalized Planning, a hot topic in the AP community that aims to compute algorithm-like solutions that generalize, named generalized plans, to a (possibly infinite) set of planning problems. In my publications, the learned knowledge is shown to be reusable, composable, explainable and provably general, where at least the last two overcome the major limitations of black-box approaches (e.g., deep (reinforcement) learning). These research works were awarded with the "Distinguished Paper Award" at the IJCAI 2016 conference (CORE-A*), the "2018 Artificial Intelligence Dissertation Award" sponsored by the European Association for Artificial Intelligence (EurAI), and more recently, with the "Sister Conference Best Paper Track" at the IJCAI-ECAI 2022 conference (CORE-A*).

My research to be developed in the Ramón y Cajal 2024 research track is to go one step further in the integration of AP and ML methods for computing world models and generalized solutions in the form of high-level programs which may be coded in common programming languages (e.g., C++ and Python). My recent work has started to tackle these ideas: (i) learning and recognizing the missing actions of a planning domain from observations [Hernández-Suárez et al., 2021, Segovia-Aguas et al., 2023]; (ii) computing bisimulation metrics efficiently which are extensively used in representation learning; and (iii) scalable methods for computing general solutions with heuristics for program synthesis [Segovia-Aguas et al., 2024]. This opens the door to combining representation learning with verification and exploitation in a meaningful way, bridging the gap between planning, learning and program synthesis communities.

[Calo et al., 2024] Sergio Calo, Anders Jonsson, Gergely Neu, Ludovic Schwartz and Javier Segovia-Aguas, "Bisimulation Metrics are Optimal Transport Distances, and Can be Computed Efficiently". NeurIPS, 2024.

[Hernández-Suárez et al., 2021] Alejandro Suárez-Hernández, Javier Segovia-Aguas, Carme Torras and Guillem Alenyà, "Online Action Recognition". AAAI, 2021.

[Segovia-Aguas et al., 2023] Javier Segovia-Aguas, Jonathan Ferrer-Mestres and Sergio Jiménez, "Synthesis of Procedural Models for Deterministic Transition Systems". ECAI, 2023.

[Segovia-Aguas et al., 2024] Javier Segovia-Aguas, Sergio Jiménez and Anders Jonsson, "Generalized Planning as Heuristic Search: A new planning search-space that leverages pointers over objects". Artificial Intelligence, 2024.

Resumen del Currículum Vitae:

I am a postdoctoral researcher in the AI&ML group at the Dept. of Engineering, Universitat Pompeu Fabra (UPF). In my academic journey I accomplished pre/postdoctoral periods at the AI and Autonomy lab (University of Melbourne, 2018, 39th best university worldwide by the Times Higher Education 2025) and the Institut de Robòtica i Informàtica Industrial (IRI, CSIC-UPC, 2018-2020) under the prestigious "Juan de la Cierva - Formación 2019", a competitive individual Spanish fellowship. Also, I have been a reserve candidate in the last two "Ramón y Cajal" fellowship calls and provisionally hold an R3 certificate as an established researcher.

Over the last years, I have collaborated with leading international research groups such as AIICS (Linköping University, Sweden), Inria (France), and AAIR Lab (Arizona State University, USA). With over 30 peer-reviewed publications, including 11 at flagship AI conferences and 6 in top-tier journals, my research has earned excellent international accolades: the "Artificial Intelligence Dissertation Award" (EurAI, 2018), the "Distinguished Paper Award" (IJCAI, 2016), and the "Sister Conferences Best Paper" (IJCAI-ECAI, 2022).

I have contributed as a research team member to 3 large-scale EU-funded projects and 4 Spanish national research projects. As part of the H2020 IMAGINE project, I played a leading role between IRI and project partners to develop a prototype for automating disassembly tasks of electronic devices, and advising and collaborating with two PhD students (Alejandro Suárez-Hernández and Antonio Andriella) in the process. This project was featured in the CORDIS Results Pack for AI and Industry. Additionally, as Principal Investigator, I secured €60K from a competitive European research subgrant in the context of the AIPlan4EU project and €89K for the "RELEWAT" project with ACCIONA, resulting in energy-efficient decision-making systems for water treatment plants and funding for a postdoctoral researcher.

My service to the AI scientific community has been recognized with the "Distinguished Program Committee Member" at IJCAI-ECAI 2022 (top 3% out of +3,000 reviewers), I have also taken leadership roles organizing workshops and competitions at A* international conferences (AAAI, IJCAI, ICAPS),



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I served in more than 20 (Senior) Program Committees in the same conferences, and as a reviewer of top-tier journals (AIJ, JAIR, MLJ, Mechatronics). Furthermore, I have participated as a project reviewer for the Swiss National Science Foundation (SNSF).

My research dissemination includes contributions to AI Magazine report (2021 & 2023), the AAIP Dagstuhl Seminar (2021), invited talks at the AAIR Lab (USA, 2021) and the Agents-VIC (Australia, 2018), a summer school at IRI (Spain, 2018) and the book chapter "Artificial intelligence, robotics & data science" by the CSIC on AI challenges, among other outreach activities.

Finally, I am also committed to teaching, where I have taught over 400 hours of lectures, coordinated 4 courses including 3 undergraduate and 1 master course, supervised 7 undergraduate theses (1 ongoing), and currently mentor a master's student and a PhD student, Sergio Calo Oliveira, with expected date of defense in October 2026. In addition, I have participated as a partner in the EUTOPIA 2050 and EUTOPIA MORE projects, and I hold a Lecturer certificate by AQU (2020).



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Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: CHEN HU, KUN
Referencia: RYC2024-048736-I
Correo Electrónico: kunchenhu@gmail.com
Título: Signal processing for wireless communication in 6G

Resumen de la Memoria:

I have extensive expertise in signal processing for wireless communication, covering waveform design, multi-antenna systems, non-coherent demodulation, and reconfigurable intelligent surface (RIS) technologies. My work has focused on developing novel pilot sequences and channel estimation techniques to reduce pilot-induced overhead and enhance system efficiency while preserving performance, particularly for 5G systems in both static and dynamic channels. I proposed several training sequences for several multi-carrier waveforms, such as CE-OFDM, FBMC, CB-FMT, etc. Additionally, I have explored non-coherent modulation schemes that eliminate the need for pilot transmission or channel estimation, offering significant gains in resource efficiency. I have a patent for designing new non-coherent constellations for high-mobility environments. Currently, I am advancing a groundbreaking research line in non-linear RIS, which goes beyond simple signal reflection to actively manipulate impinging signals. I introduced the frequency-shifting RIS (FS-RIS), which shifts the carrier frequency of the input signal, enabling critical applications in millimetre-wave bands and revolutionizing spectrum and interference management for more efficient resource utilization. Furthermore, I leveraged the concept of non-reciprocity in wireless channels through RIS, pioneering its use for innovative services, particularly in enhancing physical layer security by avoiding eavesdropping and fake data injections. I also lead research in joint sensing and communication (JSAC) across various scenarios, including cell-free massive MIMO systems and vehicular communications. My work includes analyzing the theoretical performance bounds of JSAC with realistic 5G models and designing new training sequences for the joint purpose. Moreover, I am venturing into the integration of quantum communications into classical Ethernet/IP networks, pushing the boundaries of wireless and quantum communication convergence.

Resumen del Currículum Vitae:

I am an expert in signal processing for the physical layer of wireless communications, contributing significantly to 4G/5G advancements with innovative concepts and inventions in Spain and Denmark. All my contributions have been disseminated in top-tier Q1 journals, international conferences and COST meetings, fostering global collaborations. I participated in several communication activities, such as the Week of Science, European Researchers' Nights, the Technological Week in Córdoba and numerous scientific talks at middle schools (2017-2022). I also spread my research in different Spanish TV channel (TVE) talking about 5G and Li-Fi. My research has been funded through public grants (Spain, Denmark, and the EU) and private contracts with leading companies like Huawei, Nokia, and Vodafone. I actively participated in project applications led by Prof. Popovski and Prof. García Armada, serving as the management and technical leader for several work packages, particularly those involving physical-layer signal processing and testbed deployment. Collaborating with top researchers worldwide has honed my technical expertise in waveform design, advanced filtering, and RIS, while industry partnerships have deepened my knowledge of testbed development to validate theoretical findings. Through these projects, I have developed strong management skills, gained experience supervising Ph.D., MSc, and BSc students, and enhanced my ability to lead multidisciplinary research initiatives. I have actively collaborated on various research projects with industry leaders in my field. With Huawei, I prepared a numerical simulator and technical reports contributing to standardization efforts. In collaboration with Nokia, I participated in deploying a mmWave cell in a nursing home assisted by my numerical simulator. I implemented a 4G/5G-compliant network using OpenAirInterface to study the integration of NB-IoT in an existing cellular network with a partial support from Eurecom and Nokia. I developed a Li-Fi testbed with Uvax and created technical reports for Vodafone, serving as reference manuals for configuring different precoding techniques. During my tenure at Indra, I developed numerical simulators, testbeds, and reports that introduced novel physical layer techniques to the NATO consortium, contributing to advancements in military communication standards. These collaborations have provided me with invaluable experience in bridging theoretical research and practical implementation across diverse domains in wireless communications. Recently, I was elevated to IEEE Senior Member in recognition to my professional career. I am actively involved in IEEE, I am reviewer in several top journal and conference papers and I help to organize international conferences. I belong to the Signal Processing and Computing for Communications (SPCC) Technical Committee, where I organize online talks given by high-cited researchers in my field.



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Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: MARTÍNEZ CAÑADA, PABLO
Referencia: RYC2024-049595-I
Correo Electrónico: pablomc@ugr.es
Título: Biophysical modelling of neural circuits and field potentials

Resumen de la Memoria:

I have taken a leading role in global research efforts to develop innovative, interdisciplinary methods (combining neural circuit modelling based on spiking and multicompartment neuron models, machine learning, field potential calculation and biomarker research) for uncovering the relationships between key neural-circuit parameters, such as excitation (E) and inhibition (I) interactions, and properties of electrophysiological recordings, including LFP, EEG and MEG. My research has been successfully applied to understand how these neural-circuit parameters are altered in major brain disorders, such as autism and Alzheimer's disease. I have identified a series of biomarkers that track E/I imbalances in autism (first co-authorship in the eLife paper, the paper was selected by the Simons Foundation (USA) as the 5th most notable paper in autism research in 2020) and regional patterns of E/I imbalances during progression of Alzheimer's disease. As a PhD student my research focused on computational neuroscience of vision, developing mathematical tools and models to investigate the function of neural systems in the visual pathway. The models and tools developed were integrated in the Neurorobotics Platform of the Human Brain Project (HBP).

Resumen del Currículum Vitae:

Research funding and leadership: I am currently the PI of the MS-BrainMarker project funded by AEI (Proyectos de Generación de Conocimiento 2022). I have been the PI of a prestigious EU-funded MSCA Individual Fellowship (ESNECO project). I have been the PI of a project funded by University of Granada (Plan Propio de Investigación). I lead the Neural Engineering and Computing Laboratory of University of Granada (<https://www.ugr.es/~bcilab/personal.html>). During my MSc, PhD and postdoctoral studies, I have been awarded relevant and competitive national and European research scholarships: Erasmus Mundus Master Scholarship, Ayudas para la Formación de Profesorado Universitario (FPU), Personal Investigador Doctor de la Junta de Andalucía and, recently, Proyectos de Investigación para la Incorporación de Jóvenes Doctores a Nuevas Líneas de Investigación en Grupos de la Universidad de Granada.

Other examples highlighting my leadership in my field include: (i) my eLife paper (first co-authorship) was recognized by the Simons Foundation (USA), one of the most prestigious funding bodies in autism research, as the fifth most influential paper in autism research in 2020; (ii) I received the best paper award at the Conference on Brain Informatics 2021; (iii) I have served as an associate editor for Frontiers in Computational Neuroscience; (iv) I have published an editorial article (as last author) and organized a research topic titled Computational Modeling and Machine Learning Methods in Neurodevelopment and Neurodegeneration: From Basic Research to Clinical Applications for Frontiers in Computational Neuroscience; (v) I am reviewer for the BECA database of the AEI (Biomedicine) and the Medical Research Council (MRC), UK, and I have reviewed numerous articles for various high-impact journals in the field; (vi) I have been interviewed by an international magazine (International Talks); and (vii) I have been (am) member of the program committee, as well as organizer of special sessions, for international conferences such as IWANN 2023 and 2025, BRAININFO 2024 and 2025, and I have been invited to present my work at various PhD/MSc courses.

Research output: (i) I am the first, corresponding or last author on most of my publications, coordinating the research project in the latter case; (ii) most of my research papers have been published in Q1-ranked journals, with several of my papers receiving significant citations in the fields of neuroscience, biomedicine, and computational neuroscience (e.g., eLife paper: 30 citations/year, 130 citations, DADM and Front. neurorobot. papers: 20 citations/year, 150 citations accumulated for the latter one); and (iii) most of my publications involve collaborations with several prestigious international laboratories. I have also developed a wide range of open-source code projects, including, for example, a visual system simulator (19 stars, Github), which was integrated into the Neurorobotics Platform of the Human Brain Project (HBP).

International collaborations and mobility: I completed a 3-year postdoctoral fellowship in Italy. I have also completed a 3-month research stay at University of Oslo, for my PhD studies, and a 2-year MSc degree at University Jean Monnet (France), University of Gjøvik (Norway) and UGR. I have built a strong and



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Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: ANADÓN BARCELONA, ALBERTO
Referencia: RYC2024-050501-I
Correo Electrónico: anadonbarcelona@gmail.com
Título: Driving advancements in spintronics, ultrafast magneto-optics, and thermal transport through nanoscience for more efficient MRAM devices

Resumen de la Memoria:

Mi trayectoria científica se centra en el estudio y desarrollo de dispositivos avanzados de espintrónica y magneto-óptica ultrarrápida, con aplicaciones en tecnologías emergentes como la memoria magnetorresistiva (MRAM). A lo largo de mi carrera, he trabajado en la intersección de la espintrónica, el transporte termo-spin y los procesos ultrarrápidos, desarrollando materiales y dispositivos que combinan funcionalidad avanzada y alta eficiencia.

Poseo una sólida experiencia en la fabricación y caracterización de películas delgadas y estructuras híbridas 2D, utilizando técnicas avanzadas como la pulverización catódica, deposición por láser pulsado y epitaxia por haz molecular. Además, domino la fabricación de dispositivos a escala nanométrica en entornos de sala limpia mediante litografía óptica y técnicas relacionadas, lo que me permite explorar fenómenos de transporte spin-calor y dinámicas ultrarrápidas de magnetización con aplicaciones prácticas en dispositivos electrónicos de última generación.

Durante mi doctorado en la Universidad de Zaragoza, me centré en el estudio de dispositivos de alta eficiencia para la recolección de energía mediante fenómenos espín-caloríticos, explorando el efecto Spin Seebeck en sistemas bilayer y multicapa. Combinando técnicas de fabricación de materiales, nanolitografía y mediciones de transporte térmico, logré cuantificar por primera vez la magnitud de la generación de corriente de espín térmica, arrojando luz sobre su origen. Estos avances quedaron reflejados en revistas como Applied Physics Letters y Physical Review B.

Primer Postdoc: IMDEA Nanociencia, Madrid (2018-2020)

En IMDEA trabajé en interfaces entre espintrónica y materiales 2D, desarrollando sistemas epitaxiales en entornos de ultra alto vacío. Descubrimos interacciones de tipo Dzyaloshinskii-Moriya en grafeno/cobalto, que permiten la formación de skyrmions estables, esenciales para almacenamiento magnético eficiente (Nano Letters, 2018). También estudié la conversión termo-spin en sistemas con grafeno, observando cómo este material modula las corrientes de espín generadas térmicamente (APL Materials, 2021). Además, mejoré el torque de espín-órbita en estructuras multicapa, con aplicaciones en memorias magnetorresistivas (ACS Appl. Nano Mater., 2021).

Segundo Postdoc: Institut Jean Lamour (IJL), Nancy, Francia (2020-2024)

En IJL, avancé en materiales multifuncionales como Ga_{0.9}Fe_{0.1}O_{0.9}, demostrando su capacidad para generar corrientes de espín manipulables eléctricamente (Phys. Rev. Applied, 2022). Destaca mi trabajo sobre conmutación magnética ultrarrápida con pulsos eléctricos en el rango de picosegundos, lo que reduce el consumo energético en un orden de magnitud y transforma los mecanismos de inversión magnética. Este trabajo, publicado en Nature Nanotechnology (2024), establece nuevas bases para memorias ultrarrápidas. También exploré la conversión espín-carga en aislantes topológicos y revelé los efectos de la química interfacial en su eficiencia (Phys. Rev. Materials, 2023).

Actualidad: INMA, Zaragoza (2023-presente)

Actualmente trabajo en el INMA, en Zaragoza, en mi proyecto MSCA 3D-Sky, explorando la influencia de gradientes térmicos en la dinámica de skyrmions en nanodispositivos tridimensionales, con aplicaciones en almacenamiento y lógica espintrónica.

Resumen del Currículum Vitae:

Soy Marie Curie Postdoctoral Fellow en el Instituto de Nanociencia y Materiales de Aragón (INMA, CSIC), Zaragoza, desde 2024. Mi investigación se centra en el desarrollo de dispositivos avanzados de espintrónica, con un interés particular en fenómenos como la espín-caloritónica, el acoplamiento espín-órbita y el magnetismo ultrarrápido, así como la fabricación de materiales 2D, películas delgadas magnéticas y dispositivos nanométricos en 3D. A lo largo de mi carrera, he trabajado para integrar descubrimientos fundamentales en aplicaciones prácticas, contribuyendo al desarrollo de memorias magnetorresistivas y dispositivos de lógica espintrónica más eficientes y sostenibles.

He liderado dos proyectos competitivos como investigador principal. El primero, HISTRA, financiado por IEEE con 10.000 €, se centró en la conversión espín-carga en sistemas epitaxiales de alta eficiencia. Este proyecto permitió avanzar en la comprensión de las propiedades anisotrópicas de conversión en sistemas cristalinos, destacando un comportamiento isotrópico en bilayers de Pt/Co epitaxiales orientados (111). Estos resultados, publicados en Physical Review Materials (2023), representan un avance clave para el diseño de dispositivos espintrónicos basados en conversiones espín-carga más eficientes. El segundo proyecto, 3D-Sky, es una beca MSCA de la Unión Europea (181.000 €) que actualmente desarrollo en el INMA, Zaragoza. Este proyecto busca comprender los efectos de gradientes térmicos en la dinámica de skyrmions en nanodispositivos tridimensionales, explorando su potencial para aplicaciones en almacenamiento y lógica espintrónica. Este trabajo se realiza en colaboración con el Laboratorio Albert Fert en París y TU-Wien y donde soy investigador invitado.

En mi trayectoria, he publicado 30 artículos científicos en revistas de alto impacto como Nature Nanotechnology y ACS Nano, logrando un índice h de 15 y más de 800 citas. Entre mis contribuciones recientes destaca la demostración de la conmutación magnética ultrarrápida mediante pulsos eléctricos



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en el rango de los picosegundos, trabajo publicado en Nature Nanotechnology (2024). Este estudio mostró cómo la reducción del tiempo de pulso disminuye el consumo energético en un orden de magnitud y transforma los mecanismos de inversión magnética, estableciendo nuevas bases para dispositivos de memoria ultrarrápidos y eficientes.

Además, he participado activamente en la formación de nuevos investigadores, supervisando actualmente un trabajo fin de máster, así como mentorizando muchos otros estudiantes que han continuado con éxito en el ámbito académico. También he presentado mi trabajo en más de 20 conferencias internacionales, incluyendo 2 contribuciones invitadas, y colaboro como editor asociado invitado en un tema creado sobre espintrónica ultrarápida. Mi compromiso con la divulgación científica se refleja en mi participación en más de 20 actividades de difusión para estudiantes de secundaria y público general, buscando inspirar y acercar la ciencia a la sociedad.