AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno de Jóvenes investigadores

Área Temática: **Biociencias y biotecnología**
Nombre: TORRES PEREZ, JOSE VICENTE
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Título: Loss of function MeCP2 during development: influences in pain and social behaviours

Resumen de la Memoria:

I am a neuroscientist with a strong interest in the neural processes influencing pain and sociability, particularly on the associated epigenetic changes. I have been successfully involved in a wide range of multi-disciplinary projects spanning from clinical settings to academic scenarios with engineers/materials scientists and experimental psychologists.
I gained my 5-year degree in Biology at the University of Valencia (UV) and my Master in Neuroscience at the Autonomous University of Barcelona. It was during this time that I became interested on the influences use-dependence processes have on the epigenetics of the nervous system. During my PhD studies at Imperial College London (ICL), I developed a new nociceptive murine model for burn injury and discovered a novel therapeutic intervention for burn injury-associated pain, which has led to run a novel clinical trial at the host institution. Based on my personal interest, I also opened a new line of investigation on the neuroepigenetics of pain processing. My research had a significant impact on the molecular mechanism of pain and has transcended from an initially side-project to the main line of investigation at the host laboratory.
During my first post-doctorate at Queen Mary University of London (QMUL), I performed high-resolution electrophysiological recordings of primary cilia using scanning-ion conductance microscopy. This novel technique allowed me to be the first to obtain spatially resolved recordings within these organelles, which revealed distribution differences on mechanically sensing channels. This research has the potential to revolutionise our knowledge on mechanotransduction. In recognition, I was selected to orally present my research at different congresses and to collaborate in additional projects.
At my second post-doctorate at QMUL, I used zebrafish (Danio rerio) to study different aspects of behavioural genetics. This was part of a much larger collaborative investigation for which I completed projects on numerical abilities, addiction, stress and ageing. Furthermore, I used the CRISPR/Cas9 technology to generate six loss-of-function stable zebrafish lines aiming at genes affected in William□s Syndrome (WS). WS is a neurodevelopmental disorder caused by haploinsufficiency of a genomic region spanning 26 to 28 genes. Most importantly, I managed to shift the focus of my studies towards the epigenetics of social behaviours by focusing on Baz1b, one of the genes affected on WS.
In May 2021, I started a position at ICL as Postdoctoral Research Associate in Epigenetics. I developed a new version of CUT&RUN, a novel technique to interrogate the epigenetic signatures (protein-DNA interactions). I used CUT&RUN to study functional changes in specific cellular populations from post-mortem human brain samples.
Currently, I hold a Maria Zambrano□s contract at the University of Valencia (UV). I am studying both social and pain alterations in a mouse model of Rett syndrome. I am assessing how neurodevelopmental deficiencies of MeCP2, an epigenetic remodeller implicated in this syndrome, influence both processes. My long-term goal is to expand this research to other epigenetically regulated disorders in which pain and/or social behaviours are affected. Getting a Ramon y Cajal contract will help me obtain further funding and thus acquire my full academic independence.

Resumen del Currículum Vitae:

I have 23 publications, of which 18 are in WoS. I am first author of 8, last author of 1 and corresponding of 3. I participated in 16 congresses, of which 7 as oral communications. Some of my awards and recognitions include a Seal of Excellence MSCA-IF, 2x shortlisted □Reserve□ for Juan de la Cierva-Incorporación, and winner of the Headache Trainees Excellence Tournament by the International Headache Society. I have experience using in vitro and in vivo models as well as clinical samples, which gives my research an increased translational impact.
I gained my undergraduate studies in biology at the University of Valencia (UV). During this time, I secured a scholarship as student-collaborator (Spanish Ministry of Education) and obtained a 6-month Leonardo da Vinci□s internship (ADEIT) at the Wellcome Trust Centre for Human Genetics (United Kingdom, UK). During the years 2011-2012, I undertook my Master in Neuroscience at the Autonomous University of Barcelona.
For my PhD in Clinical Medicine Research (2013-2017), I worked with Dr I Nagy at the Chelsea & Westminster Hospital, at Imperial College London (ICL, UK). The knowledge I generated has led to a novel clinical trial. As an acknowledgement, I was awarded the British Pharmacological Society□s Vogt Prize and have been invited at different congresses.
I held two Postdoctoral Research Assistant positions at Queen Mary University of London (QMUL, UK). First appointment took place at the School of Engineering and Materials Science under the supervision of Dr P Novak. I succeeded on performing high-resolution electrophysiology of primary cilia. This work was published at Cellular Physiology and Biochemistry with me as first author. Due to its potential, I was selected to present it at the symposium □Biology meets Physics□ (QMUL, 2019) as the oral communication preceding the plenary lecture by the Nobel laureate Prof J O'Keefe.
My second position at QMUL was held at the School of Biological and Chemical Sciences, where I worked under the supervision of Prof CH Brennan using zebrafish as a reverse genetic model. This was in collaboration with Prof G Vallortigara (Italy) and Prof SE Fraser (USA). I generated 6 mutant zebrafish lines for which I hold 50% of the merits as 1st signing author. I also guest-edited a Biomolecules□ special issue on the translational use of zebrafish.
My third post-doctorate took place at ICL, where I developed a novel version of CUT&RUN, a novel epigenetic technique. This position only lasted few months as I got awarded my own funding by the Programa VALi+d, and then my Maria Zambrano□s contract, to start my own project at UV. Here, I am assessing both social and pain alterations in a mouse model of Rett syndrome, which is caused by deficiencies in the epigenetic regulator MeCP2.
I have been heavily involved in lecturing and supervising multiple students. I held various part-time positions as Teaching Fellow, which allowed me to lecture, assess and mark first-year undergraduate psychology students. I have supervised 1 PhD student, 3 MSc and 8 BSc projects; students under my supervision received multiple awards. Throughout my career, I have obtained substantial funding as sole applicant and devoted time to outreach and to policy and advocacy measures.

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Turno de Jóvenes investigadores

Área Temática: **Biociencias y biotecnología**
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Título: IMPLICATION OF IGF1R AND TELOMERES IN THE PATHOGENESIS OF RESPIRATORY DISEASES

Resumen de la Memoria:

During my career, I have contributed to different research areas. First, I participated in 2 studies on the mitochondrial DNA control region variation in the Basque population, and identified novel mutations in patients with neuromuscular diseases. I also helped to characterize organ phenotypes after IGF1R conditional deletion in mice (these mice were used for brain signalling and metabolic studies, as well as to study different respiratory pathologies). In addition, I contributed to prove that the IGF1 receptor (IGF1R) mediates brain signaling, and that IGF1R is implicated in metabolic homeostasis (manuscript in preparation). Of note, the main research line that I carried out was focused on the study of the ?implication of the IGF1 receptor (IGF1R) and telomeres in the pathogenesis of respiratory diseases?. In this sense, I contributed to identify IGF1R as a key player in acute lung inflammation and bronchiolar epithelial regeneration. In addition, I contributed to identify IGF1R and telomeres as potential pharmacological targets in allergic asthma, and to characterize the release of lipoxygenase mediators upon allergic airway inflammation. I also helped to demonstrate that IGF1R deficiency exacerbates pneumococcal pneumonia (manuscript in preparation). On the other hand, I contributed to demonstrate that telomerase (TERT) treatment prevents lung fibrosis associated with physiological aging, to prove that dysfunctional telomeres in fibroblasts, Club and basal cells do not lead to interstitial lung fibrosis (manuscript under review in Nat Commun), and to demonstrate that telomere dysfunction in fibroblasts exacerbates lung profibrotic pathologies (manuscript in preparation). Finally, I helped to demonstrate that TERT deficiency and dysfunctional telomeres (manuscript in preparation) and IGF1R deficiency (final revision Oncogene) in the lung tumor microenvironment impair tumor progression. I also contributed to characterize early differential responses elicited by BRAFV600E in mice, and tested the cytotoxicity of anti-tumor compounds in several human lung cancer cell lines.

Resumen del Currículum Vitae:

I have received the BSc in Biology from the University of Vigo in 2009, where I participated in the Erasmus Exchange Program at the University of Bordeaux I (France). Hereafter I joined the BIOMICS Research Group at the University of the Basque Country where I achieved a MSc in Forensic Sciences in 2010, presenting a project on the ?Mitochondrial DNA control region variation in the autochthonous Basque Population?. Next, I joined the Neurogenetics division of the Galician Public Foundation of Genomic Medicine to participate in a project for the ?Discovery and characterization of novel mutations in patients with hereditary spastic paraplegia?. In 2013 I worked as a scientific publishing assistant and research technician in the Clinical Genomics department of the EuroEspes Biomedical Research Center (A Coruña). Then, I received a predoctoral fellowship from the Government of La Rioja (December 2013-February 2018) to join the Lung Cancer and Respiratory Diseases Unit of the Center for Biomedical Research of La Rioja (CIBIR) where I conducted my PhD focusing on the ?Implication of IGF1R in acute lung inflammation and allergy?. In the second year of my predoctoral studies, I received a predoctoral fellowship from the COST Association (European Cooperation in Science and Technology) to do a predoctoral stay (September-December 2015) in the Unit of Experimental Asthma and Allergy Research of the Karolinska Institute (Sweden) to study the ?Implication of IGF1R in house dust mite-induced allergy?. In February 2018, I got my PhD in Biomedical and Biotechnological Sciences. Next, I did a short postdoctoral stay (February-April 2018) in the Department of Infectious Diseases and Respiratory Medicine of the Charité-Universitätsmedizin (Berlin) to collaborate in a project to study the ?Implication of IGF1R in pneumococcal pneumonia?. In June 2018, I joined the Telomeres and Telomerase Group at the Spanish National Cancer Research Centre (CNIO) as a postdoctoral researcher to investigate the implication of telomeres in pulmonary fibrosis (collaboration with AstraZeneca, USA) and allergy. In 2019 I have received a postdoctoral fellowship from the Spanish Association against Cancer (AECC) for presenting an original project to study the ?Implication of telomerase in lung tumor microenvironment and to evaluate 6-thio-dG as a novel therapy for lung cancer? in the CNIO. In December 2021 I have received a second postdoctoral fellowship from ?La Caixa Foundation? for presenting an original project to study the ?Development of smart T cells to counteract the inhibitory effects of PD-1 and LAG-3 signaling in lung cancer? to join the Oncoimmunology group of the Navarrabiomed Biomedical Research Centre. Notably, I have published 20 papers in journals from different scientific areas, 6 of them as a first author and another 6 as a second/third author. Notably, I have 1 paper submitted and 2 more papers in preparation as a first author. Moreover, 5 of the papers published and 4 manuscripts which are in preparation were carried out in collaboration with researchers from Sweden, Portugal, Germany and USA. Of note, I have contributed to different subjects including population genetics, neurodegenerative disorders, generation of transgenic mice, brain signaling, metabolism, lung inflammation and regeneration, allergy, pneumococcal pneumonia, pulmonary fibrosis and lung cancer. It should be noted that the main research line that I carried out was focused on the study of t

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Turno de Jóvenes investigadores

Área Temática: **Biociencias y biotecnología**
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Título: Astrocyte-neuron molecular and structural interactions controlling brain circuits and behavior

Resumen de la Memoria:

I always chose to keep a broad perspective about the topics and techniques I could learn in my research career since it was evident to me the importance of having a multidisciplinary approach to science. As an undergraduate student with a major in molecular biology at the University of Naples Federico II, Italy, I learned how to study the brain of invertebrate animals using various anatomical techniques.

Transitioning to my graduate school program in neurobiology at the International School for Advanced Studies (ISAS-SISSA) in Trieste (Italy), I acquired technical skills to functionally investigate the coding and decoding of sensory signals in the brain of the leech. During graduate school, I decided to learn about the brain of vertebrate animals. Thanks to the Doctor Europaeus student fellowship, which supported half of my graduate studies, I was able to work in centers of excellence like the Ecole Normale Superieure in Paris (France) and the Suzhou Institute of Nano-tech and Nano-bionics (SINANO), Chinese Academy of Sciences (China). During this time, I learned how to work with human-induced pluripotent stem cells and differentiate them into motoneurons.
Moreover, I learned how to fabricate 3D scaffolds using natural and synthetic biocompatible materials. I developed innovative platform technologies to obtain three-dimensional neuronal networks using primary hippocampal rat cells. I further tested these 3D cultures for neuroscience applications and tissue engineering. Finally, I mimicked typical environmental properties of the brain, such as stiffness and conductivity, by using graphene-based materials and elastic organic polymers.

As a postdoctoral research associate at Duke University (USA), I have learned to work with in vivo models, including cellular, molecular and genetics, live imaging, and quantitative behavioral techniques. Funded by NIH grants and the Regeneration Next postdoctoral fellowship, my studies identified a cortico-striatal circuit responsible for regulating effortful behaviors, a cognitive ability impaired in many neurodegenerative and psychiatric disorders. I showed that increased excitatory synaptogenesis onto these circuits could regulate the frequency at which neurons receive inputs and communicate to downstream regions of the brain to reduce effort. The excitation of these circuits can be modulated by genetically depleting a synaptogenic pathway involving astrocyte-neuron interaction or optogenetically modulating the behavioral phenotype. I am proficient in several programming languages and have extensive scientific writing training. I have mentored undergraduate and graduate students, who are now successful researchers. Supported by my mentors, I am leading a subgroup composed of a graduate student, an undergraduate student, and a technician. Furthermore, I have carried out teaching activities as an invited lecturer at the University of Rijeka (Croatia) and worked as a reviewer for journals like Neuron, Nature Communication, Cell Report, and Jove.

As an independent investigator, I aim to bring these fundamental findings to the next level by investigating the mechanisms utilized by astrocytes and neurons to communicate with each other and how they affect behavioral and cognitive abilities such as learning, memory, and effortful behaviors.

Resumen del Currículum Vitae:

EDUCATION

2013-2017: Ph.D. Doctor Europaeus in Neurobiology (cum laude), International School for Advanced Studies (ISAS/SISSA), Trieste, Italy
2010-2012: MSc in Molecular biology (cum laude), University of Naples Federico II, Napoli, Italy
2007-2010: BSc in General and Applied Biology, University of Naples Federico II, Napoli, Italy

RESEARCH EXPERIENCE

2018-present: Postdoctoral Research Associate, Duke University Medical Center, Durham, USA
Jan 2013-Oct 2013: Research Technician, International School for Advanced Studies (ISAS/SISSA), Trieste, Italy.

MAIN RESEARCH ACTIVITIES:

Publications: 13 publications in peer-reviewed journals, including 1 Advanced Materials (Last and Corresponding author, IF: 30.85), 1 Scientific Report (1st author, IF: 4.4), 1 Nano Letters (IF: 11.19), 1 Science Advances (IF:14.14), 1 ACS Nano (IF: 15.88). Total time cited = 212.
h-index: 6; Average citation per document: 7.7; Average citations per year: 30.3 (from WoS); i10index: 7.
1 review paper (as corresponding author under review) and 3 preprints in bioRxiv (one as 1st author).

Oral Contributions: (i) 4 invited speaker (2 internationals); (ii) 5 selected talk (3 internationals).

Projects: Direct involvement in 2 European Projects (SI-CODE (FP7), NeuroScaffold (FP7)), and 3 National Institute of Health Projects (Brain Initiative 1U19NS123719-01; 1RF1AG059409-01; 5R01DA040701-02).

Fellowships: (i) Regeneration Next Fellowship #4511578(2018), Duke University; (ii) Doctor Europaeus program (2014), SISSA; (iii) Postgraduate student fellowship (2013), SISSA (iv) SINS science prize for the 2nd Neurobiology Summer School at SISSA, Trieste; (v) SISSA fellowship for the 3rd Neurobiology

Summer School at SISSA, Trieste, Italy; (vi) Undergraduate student fellowship from Agenzia Pubblica della regione Campania per il Diritto agli Studi Universitari (A.DI.S.U).

Awards: (i) Poster prize, Neuroimmunology and Glia (NGG) meeting. Duke institute of brain science; (ii) Poster prize at Biomaterial for Tissue and Genetic Engineering and the Role of Nanotechnology (BioMaH) meeting 2016, Rome, Italy.

Other: Visiting Student to (i) University of Nova Gorica, Center for Biomedical Science and Engineering, Vipava, Slovenia; (ii) Ecole Normale Superieure, Department of Chemistry, Paris, France; (iii) Suzhou Institute of Nano-tech and Nano-bionics (SINANO), Chinese Academy of Sciences (China).

REFEREE ACTIVITIES

Reviewer for: Neuron, Nature Communications, Cell Report, and JoVE.

TEACHING and MENTORSHIP

Mentorship: 5 graduate students (Oluwandamilola Lawal, Riley Mangan, Miao Xiao, Xiaoyun Li, Diletta Pozzi), 2 undergraduate students (Carolyn Myers and Nithin Ragunathan), and 1 research technician (Sarah Johnson).

Teaching: (i) Live cell imaging techniques course in Advanced microscopy in Neuroscience Undergraduate program University of Rijeka - Department of Biotechnology, Rijeka, Croatia (2017); (ii) Assistant laboratory professor for the 3rd Neurobiology Summer School at SISSA, Trieste, Italy (2013).

OUTREACHING ACTIVITY
(i) Collaborating with Diversity and Inclusion (DEI) committee of the Cell biology department, Duke University; (ii) Elected president of the SISSA Student association.

PROGRAMMING SKILLS
Proficient in Matlab and Fiji Macro language. Basic R and Python.

LANGUAGES
Italian (native); English (professional fluent); Spanish (conversational fluent).

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Turno General

Área Temática: **Biociencias y biotecnología**
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Título: Regulation of death and differentiation in the early mammalian embryo

Resumen de la Memoria:

Since the beginning of my scientific career I have been interested in understanding early mammalian development. A number of crucial events take place during this fascinating period: the transition from maternal to zygotic control of gene expression; the specification of the trophoblast that will form the placenta; embryo implantation into the uterine wall; and the formation of embryonic stem cells. I have studied the transcriptional and post-transcriptional regulation of these processes and how this regulation has evolved, with a specific focus on lineage specification and cell death and differentiation.

During my PhD (IIBM/CNIC, Madrid) and first postdoctoral training (Imperial College London) I acquired a strong scientific and technical background in early mammalian development, stem cell biology, and cell death control in the embryo. Through developing my own projects and collaborating in others, I made a number of significant contributions to these fields publishing 12 papers (5 as first author and 7 from collaborations).

In 2015 I was recruited by Dr. Irimia (CRG, Barcelona) for a semi-independent position as senior postdoc to start and lead a research line studying alternative splicing during early mammalian development. Here, in addition to developing my own projects, I have co-directed a PhD student, assisted with the supervision of another PhD and two master students, managed two technicians and co-managed a project led by a postdoctoral researcher. In recognition of this contribution I am a co-corresponding author of the 4 manscripts arrising from these studies (2 published and 2 in preparation). Furthermore I have been involved in the conception and writing of all grant applications related to early mammalian development from the lab. During this period I have faced three important challenges for my career progression: establishing from scratch all the resources required to study mouse development within the laboratory; and two career breaks due to maternity (in 2017 and 2020).

For the next step in my career, I want to study how DNA damage responses and cell death are coordinated with other developmental processes (such as ZGA and pluripotency maintenance) to preserve embryo integrity during the first stages of mammalian development. Altogether the experience acquired during my career places me in an excellent position to develop this research line as an independent group leader

Summary of research quality indicators: i) 17 articles published, 6 as first author and 2 as co-corresponding author. ii) 10 national and international conferences attended, 4 selected talks. 3 invited talks. iii) 3 grants awarded from highly competitive calls (EMBO LTF 2010, Marie Curie IEF 2010, Marie Sklodowska-Curie IEF 2014). iv) 1 PhD student co-directed, 2 PhD students co-supervised and 6 master students supervised.

Resumen del Currículum Vitae:

My research career has been motivated by the understanding of the gene regulatory networks underlying early mammalian development, with a focus on transcriptional and post-transcriptional regulation of gene expression, cell fate decisions and cell death.

During my PhD (IIBM/CNIC, Madrid) I found post-transcriptional regulation by microRNAs is essential for the maintenance mouse extra-embryonic stem cells (Dev Cell; Cell Cycle). I also found fundamental differences in the regulation of the extra-embryonic cell fate decisions in chick and mouse (Dev Dyn). During my first prostdoctoral (Imperial College London) I found a critical difference in the sensitivity to cell death in pluripotent cells of the pre and post implantation mouse embryo. I further identified miRNA-mediated regulation of pro-apoptotic factors and mitochondrial dynamics play a key role in this process (Genes&Dev; Dev Cell). I successfully developed my PhD and postdoc projects in areas (microRNAs and cell death) away from that of my labs expertise (embryo development), what involved the independent acquisition of scientific knowledge and technical skills that I then transferred to the host labs. Overall I became highly knowledgeable on early mammalian embryo development, stem cell biology and cell death regulation and proficient in most techniques required for embryo phenotypic characterization at early developmental stages.

In 2015 I was recruited by Dr. Irimia (CRG, Barcelona) for a semi-independent position to start and lead a research line focused on the study of alternative splicing (AS) during early mammalian embryo development. Here I established from scratch of all the resources (protocols, techniques, equipment, mouse colony) required for the study of mouse embryo development and stem cell pluripotency; I conceived, managed and wrote grant applications for all projects in this area. The research line that I have been leading has so far made important contributions on the role of AS in: i) the regulation of DNA damage response during mammalian zygotic genome activation (Sci Adv); ii) the evolution of the mammalian placenta (Plos Biol); iii) the regulation of the naïve to primed pluripotency transition (PhD thesis and manuscript in preparation); and iv) the role of Yap isoforms in pluripotency maintenance (in preparation). I am first author in two of these works and co-corresponding author in all of them. As part of my manager role since 2015 I have co-directed a PhD student; co-supervised a PhD student, co-managed a project led by a postdoctoral researcher; supervised 2 master students and managed 2 lab technicians. Since my incorporation to the Irimia lab I have had 2 career breaks (2017 and 2020) for maternity leave.

Summary of research quality indicators: i) 17 articles published, 6 as first author and 2 as co-corresponding author. ii) 10 national and international conferences attended, being selected for talk in 4 of them. 3 invited talks. iii) 3 grants awarded from highly competitive calls (EMBO LTF 2010, Marie Curie IEF 2010, Marie Sklodowska-Curie IEF 2014). iv) 1 PhD student co-directed, 2 PhD students co-supervised and 6 master students supervised.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno General

Área Temática: **Biociencias y biotecnología**
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Título: Fast cellular response to environmental stress in plants

Resumen de la Memoria:

My research career has been built around my fascination with the cell biology field. During my scientific training, I have studied different plant subcellular pathways. Particularly, I have characterized proteins that participate in the intracellular trafficking, monitored the microtubules dynamics regulation upon hormonal signaling or in response to biotic stress, exploring the developmental consequences of these changes.

My career as cell biologist started in the group of Dr. Fernando Aniento and Dr. María Jesús Marcote at the University of Valencia, where I obtained my PhD. In this period, I characterized a novel protein family involved in the intracellular trafficking between the Endoplasmic reticulum (ER) and Golgi apparatus in plant cells, the p24 proteins. These proteins act as receptor and are essential for the selective cargo incorporation on the vesicles during the anterograde transport from Golgi to ER. Part of these results were obtained during my stay in the group of Dr. David Robinson at the University of Heidelberg (Germany). My interest about the regulation of subcellular processes led me to a postdoctoral position in the group of Dr. Eva Benkova at IST Austria. In this period, I focused on studying the hormonal regulation of the lateral root formation and during the root growth. We demonstrated that cytokinin hormone is essential in the regulation of both processes, performing its action through the specific regulation of the microtubules dynamics. Interestingly, I observed that cytokinin modulates the microtubules dynamics in animal cells, suggesting that this mechanism might be evolutionary conserved among different kingdoms. During this period, my investigation was sustained by obtaining competitive funding, through the EMBO long-term postdoctoral fellowship and also leading an interdisciplinary project during 2 years as Project leader. Due to my rising interest in the cellular mechanisms in response to hormonal regulation and due to my interdisciplinary background, I decided to start a postdoc in the group of Dr. Clara Sánchez-Rodríguez at ETH Zürich, where I am currently studying as Grant Project leader what are the cellular pathways involved during the fungi colonization, investigating the plant molecular mechanism that delineate the fungus detection and defense responses after the first contact between the plant and the fungus.

The main inspiration for my future research project is derived of the strong interest about the molecular mechanism controlling the subcellular intracellular vesicular trafficking and the microtubules dynamics obtained during my PhD and postdoctoral period. Recent evidences point out that nature has made ample use of the microtubules unique molecular properties to build sensory systems against stochastic noise. In my future project I aim at understanding the participation of microtubules in the signaling pathways triggered by different stresses derived of a growing threat, the climate change (such as heat and UV-B radiation stress). This is a novel and scarcely investigated research area despite its importance for most of the intracellular processes.

The Ramón y Cajal contract is an excellent opportunity to become an independent researcher and to establish a research group where to pursue my future research plan, and to contribute to innovation in the Spanish Plant Biology field.

Resumen del Currículum Vitae:

I am a plant cell biologist trained during my entire research career to elucidate the subcellular mechanisms involved in vesicular trafficking and cellular response to stress. To achieve that, my scientific career has evolved in 4 outstanding international groups.

I completed my PhD (2009-2014) in the group of Dr. Fernando Aniento and Dr. María Jesús Marcote at the University of Valencia, characterizing a novel p24 receptor family that are essential to select cargo in the trafficking between ER and Golgi. As part of the PhD, I did a stay in the group of Dr. David Robinson at the University of Heidelberg. I obtained my PhD in biotechnology, with Cum Laude qualification. The PhD was supported by the Spanish Ministerio de Educacion with a FPU predoctoral fellowship. As outcome of the PhD work, I published 3 fist author papers, and a review as co-author.

During my postdoctoral period, I have worked as postdoc in the group of Dr. Eva Benkova at IST Austria (2015-2020). During this time, I expanded my cell biology expertise, investigating the hormonal regulation of the microtubules dynamics. The results I obtained were published in 6 papers in high impact factor journals, including 2 first-author papers in the EMBO Journal and Nature Communications, 2 second-author papers in Genes and Development and PNAS, 2 co-author papers (Nat Comm and EMBO J) and co-first author in a Review in Plant Comm. During my postdoc at IST, I implemented my independency and leadership skills obtaining competitive funding with an EMBO Long-Term Fellowship (2016-2018), and with an interdisciplinary project grant as project leader for 2 years (2018-2020). I have also attended to the prestigious EMBO Laboratory Leadership course, I acted as consultant in a thesis defense, I was member of the Organizing committee of 22nd Annual ENPER meeting, and I am referee in prestigious peer-reviewed journals (i.e., eLife, The Plant Journal). Since Sept 2020, I joined the group of Dr. Clara Sánchez-Rodríguez at ETH Zürich, where I am applying my expertise as plant cell biologist and my knowledge in hormonal regulation acquired during my PhD and postdoc period to elucidate the subcellular events affected during the Fusarium oxysporum root infection in Arabidopsis. Remarkably, after only 1 year at ETH Zürich, I have 1 paper as co-author in Science Advances, and 2 papers as first- and co-author in preparation. Furthermore, my scientific work has led to the establishment of a network of international collaborators.

My future research program focuses on understanding the plant response to the stress resulting from the increase of temperatures and UV-B radiation, inspecting the microtubules role in the fast cellular response. Throughout my research career I have worked in 4 different countries, published 12 research articles and reviews about advances in the field, giving award-winning international conference presentations (5 colloquiums, 10 talks and 6 posters), as well as teaching (32 ECTS credits) and supervising undergraduate and graduate students (5 PhD and 1 Master students). Together with my

experience in the acquisition of competitive, independent funding, I am well prepared for the whole spectrum of tasks of an academic group leader that Ramón y Cajal contract offers and for establishing my research group and consolidate my position as a world leading scientist.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno General

Área Temática: **Biociencias y biotecnología**
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Título: Virus-host interactions in human infectious diseases

Resumen de la Memoria:

The main interest of my research is to understand the molecular mechanisms that modulate the pathogenesis and immune responses of pathogenic viruses in an effort to illuminate points of viral vulnerability that may help guide the development of novel antiviral strategies.

2009-2015: After obtaining my degree in Biology (Universidad de Málaga (UMA), 2008) and performing a Master in Molecular Biomedicine (Universidad Autónoma de Madrid (UAM), 2010), I was awarded a competitive JAE-pre fellowship (CSIC) to carry out my PhD thesis at the CNB-CSIC under the supervision of Prof. Luis Enjuanes. During this period, my research was aimed at understanding the molecular mechanisms that modulate the highly virulent SARS-CoV-1 immune response and pathogenesis. Among other important achievements, the work I led here resulted in the characterization of the SARS-CoV-1 envelope protein as a new determinant of viral pathogenesis responsible for the deleterious exacerbated immune response triggered during SARS-CoV-1 infection (PLOS Pathogens, 2014) and the design of a genetically stable live attenuated vaccine candidate against SARS-CoV-1 (PLOS Pathogens, 2015). Finally, I graduated magna cum laude and obtained the Extraordinary PhD Award (UAM).

2015-2018: After finishing my PhD, I joined Prof. Michael Malim□s lab at King□s College London (KCL) as a postdoctoral Research Associate to study the interplay between type-1 interferon and HIV-1, the etiologic agent of AIDS. One year later, I was granted the prestigious EMBO Long-Term fellowship (2016-2018) to support my research. Here, I established a siRNA-based screening pipeline for evaluating the effector activities of host-encoded interferon-stimulated genes on virus infection, leading to the identification of human TRIM5a as an effective inhibitor of HIV-1 (Nature Microbiology, 2019).

2018-present: In September 2018, I was appointed Research Fellow at the Department of Infectious Diseases at KCL, UK to study the antiviral immune response to human pandemic viruses. Among other important milestones, my work here led to the identification of new potential antiviral treatments against SARS-CoV-2 infection (Nature, 2021), the characterization of the humoral immune response in SARS-CoV-2-infected patients (Nature Microbiology, 2020; Immunity, 2021 and Nature Microbiology, 2021) and the molecular characterization of the MX2-mediate innate immune response against HIV-1 (Nature Microbiology, 2021).

Furthermore, during my research career, I gained a solid experience in science communication by publishing about research topics in international media. Moreover, I am co-founder of bescienced.com, a site for the advanced teaching of scientific research and a contributor to the Nature Microbiology blog (2018-present).

In summary, I published in international top-tier journals and spent more than 6 years (2015-present) in one of the top research institutions in the world (KCL, UK). I have been awarded several scientific awards, successfully attracted funding from international competitive calls, participated in research projects funded for more than □15,000,000, have been an invited speaker at prestigious institutions and contributed to 35 scientific meetings. Moreover, I have been accredited as a PhD lecturer and supervised and mentored different undergraduate, graduate and Master students.

Resumen del Currículum Vitae:

My research career focuses on understanding the molecular mechanisms that modulate the pathogenesis and immune responses of pathogenic viruses. The final aim of my work is to illuminate points of viral vulnerability that may help guide the development of novel antiviral strategies.

In total, I published 24 peer-reviewed articles and 2 book chapters (2095 citations, h-index: 16 (Scopus)), including 1x paper in Nature, 1x paper in Immunity, 4x papers in Nature Microbiology, 1x paper in Cell Reports, 1x paper in mBio, 6x papers in PLOS Pathogens and 1x paper as corresponding and co-last author in Pathogens. 17 papers were published in the first quartile (Q1), 12 of them in the first decile (D1) and 8 articles have more than 100 citations.

2009-2015: During my PhD, I obtained a JAE-pre fellowship (CSIC) to work under the supervision of Prof. Luis Enjuanes at the CNB-CSIC. My research focused on studying the molecular basis of the highly virulent SARS-CoV-1 pathogenesis. During this period I published 12 research articles and 2 book chapters. The work I led here resulted in the characterization of the SARS-CoV-1 envelope protein as a new determinant of viral pathogenesis (PLOS Pathogens, 2014; 117 citations) and the development of a genetically stable live attenuated vaccine candidate against SARS-CoV-1 (PLOS Pathogens, 2015; 85 citations). Finally, I graduated magna cum laude and obtained the Extraordinary PhD Award (2015, UAM).

2015-2018: As a postdoctoral Research Associate, I worked under the supervision of Prof. Michael Malim at KCL, UK. Here, I was granted with an EMBO Long-Term fellowship (2016-2018) to investigate the host factors involved in the interferon-induced block to HIV-1 infection. Here, I established a siRNA-based screening pipeline for evaluating the effector activities of host-encoded genes on virus infection. The resulting work was published in top journals, including a first author paper in Nature Microbiology (2019; 32 citations) and a second author paper in Cell Reports. Furthermore, my work was presented in different international meetings, including an invitation to talk at the 11th Blizard HIV Symposium, London, UK (2019).

2018-present: In September 2018, I was appointed Research Fellow at the Department of Infectious Diseases at KCL, UK to study the antiviral immune response to different human pandemic viruses. Along with this position, I acquired extensive teaching experience at the Faculty of Life Sciences & Medicine. To date, my work here resulted in the supervision of 2 Master students, the publication of 8 research articles and the establishment of successful collaborations with different companies. Among other important milestones, we identified new potential antiviral treatments against SARS-

CoV-2 infection (Nature, 2021), characterized the humoral immune response in SARS-CoV-2-infected patients (Nature Microbiology, 2020; Immunity, 2021 and Nature Microbiology, 2021) and characterized the MX2-mediated innate immune response against HIV-1 (Nature Microbiology, 2021). Moreover, my increasing recognition in the field was demonstrated by the publication of an article as corresponding and co-last author (Pathogens, 2021), different collaborations with international organisations and an invitation to give a lecture at the Universidad de Guadalajara (México).

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno General

Área Temática: **Biociencias y biotecnología**
Nombre: DE LAZARO DEL REY, IRENE
Referencia: RYC2021-032212-I
Correo Electrónico: irene.lazaro.rey@gmail.com
Título: In vivo cell reprogramming: from proof-of-concept towards applications in tissue regeneration

Resumen de la Memoria:

I have cultivated a multidisciplinary research career focusing primarily on the use of cell reprogramming strategies and, secondarily, on the formulation of nanomedicines and biomaterials, with the common goal of achieving tissue regeneration.
During my PhD at UCL, I contributed to and led pioneering studies that demonstrated that adult cells can be reprogrammed in vivo even to pluripotency via overexpression of defined transcription factors. I have continued this as my main research line, further demonstrating that in vivo reprogrammed cells contribute to skeletal muscle regeneration after injury and, during my postdoctoral training at the University of Manchester and Harvard University, demonstrating that adult postmitotic cardiomyocytes can also undergo reprogramming in vivo and re-enter the cell cycle. This finding has huge implications for cardiac regeneration and heart disease (the number one killer worldwide) given that adult cardiomyocytes are otherwise non-dividing cells.
On the other hand, I started working on nanomedicines for gene delivery and biomedical applications since my MSc at UCL, and I have continued contributing to this research throughout my career, including within international consortia such as the Graphene Flagship (European Commission), Marie Curie actions and an international collaboration between Harvard, the University of Manchester and the National University of Singapore that I have contributed to secure. My latest postdoctoral stage has granted me broader bioengineering skills including in biomaterials, immune engineering and organ-on-chip technologies.
The objective of my future independent research group will be to implement this experience in nanomedicine and bioengineering to develop cell reprogramming strategies with potential for clinical translation, with a primary focus on cardiac regeneration.
I am prepared to direct this research thanks to my multidisciplinary training, demonstrated capacity for independent research, leadership and mentoring skills, capacity to secure research funding at all stages of my career and thanks to the strong international collaborations and networks that I have built.

Resumen del Currículum Vitae:

I have developed a multidisciplinary, international research career on cell reprogramming and nanomedicine, training in Spain, UK, Germany and the USA. I graduated from Pharmacy (U. of Alcalá, 2009), with a final grade of 9.84 and 42 Matriculas de Honor. I received the National Award for the Excellence in Academic Performance (Pharmacy, 2nd place) and gained a competitive Postgraduate Fellowship from la Caixa Foundation to initiate my research career in the UK through a MSc in Drug Delivery and a PhD in Regenerative Medicine (UCL), under the supervision of Prof K. Kostarelos. During my PhD:
We demonstrated, for the first time, that mouse cells can de-differentiated in vivo via the overexpression of transcription factors.
I confirmed that in vivo reprogrammed cells meet all the characteristics of bona fide pluripotent cells, including trilineage contribution upon blastocyst injection.
I demonstrated that in vivo cell reprogramming improves regeneration in skeletal muscle after injury.
I conducted a 2-year postdoc at the U. of Manchester, where I initiated a research line on transcription factor reprogramming of cardiac cells, leading a small team including a PhD student and a Research Scientist. I also contributed to multidisciplinary research in nanomedicine, including biomedical applications of graphene within the Graphene Flagship project (European Commission). I moved to Harvard and the Wyss Institute as Senior Postdoc (David Mooney lab) and was later promoted to Research Associate. Here, I developed one of the first transgenic mouse models to enable cell type specific reprogramming, in this case, of cardiomyocytes. With this unique model I demonstrated that adult cardiomyocytes can be reprogrammed in vivo, even to pluripotency, a question that remained elusive for years. At this stage, I have also contributed to multidisciplinary research in bioengineering. I lead the efforts of a multi-PI grant funded by the National Cancer Institute (NCI, USA) to generate 3D printed models of immunotherapy, and I contributed to securing an international center-to-center grant from the UK Engineering and Physics Research Council hat funds nanomaterials research.
My work has been selected for 12 oral communications (from abstracts submissions) and I have been invited to speak at 4 international conferences and university departments. I have published 25 articles in highly recognized peer-reviewed journals (14 as first author, 3 as corresponding or co-corresponding) including Nature Materials, Nature Nanotechnology, ACS Nano, Science Translational Medicine and EMBO Molecular Medicine, 2 pre-prints (one as first author) and 2 book chapters (one first, one corresponding author). My h index is 13 (452 citations). I have secured funding at all stages of my career amounting in total ~730,000 .
I have directed the thesis of 1 PhD, 5 Master and 4 Undergraduate students and I lecture at the undergraduate and postgraduate Tissue Engineering course (Harvard). I co-founded the Society of Spanish Researchers in the UK (SRUK) in 2012, was Vice-Chair (2017) and Chair (2019) of the Gordon Research Seminar in Tissue Repair and Regeneration and, since 2019, I lead Topics in Bioengineering, a seminar series with >1,000 registered attendees from 39 different countries. I have acted as reviewer for scientific journals (ACS Nano, Biomaterials) and funding agencies (French National Research Agency).

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno General

Área Temática: **Biociencias y biotecnología**
Nombre: KIRST , HENNING
Referencia: RYC2021-034890-I
Correo Electrónico: henning.kirst@gmail.com
Título: Engineering photosynthesis and metabolism

Resumen de la Memoria:

During my training in Biochemistry as an undergraduate student at the University of Hannover (Germany), I wanted to expand my training in about Plant Biology and Photosynthesis and decided to take a semester abroad in 2004 at one of the highest rated Universities in these specific areas, the UC Berkeley (USA). The UC Berkeley is the highest-ranking public University in the USA and the 4th globally. I was working as a student researcher in the Laboratory or Anastasios Melis, which help me financing the stay in Berkeley. I was then given the chance to do my master thesis as well as my PhD research in his laboratory, while being enrolled at the University of Hannover, from which I received my M.Sc. and Ph.D. degrees. During this period I expanded my experience in photosynthesis and developed technology to increase light utilization of photosynthetic organisms by engineering their light-harvesting antenna. This research resulted in two collaboration with industry, 7 first author publications and three patents. I then joined Prof. Cheryl Kerfeld's lab to gain more experience in synthetic biology and bacterial microcompartments (BMCs) in particular to be used in metabolic engineering. For that goal, among other side projects, I have engineered a synthetic bacterial microcompartment encapsulating enzymes to assimilate the cheap and abundant substrate formate and convert it into the central metabolite pyruvate. While manipulating BMCs to build synthetic metabolic modules, I realized that there is a great, yet unrealized potential to repurpose BMCs into devices to be used in nano-medicine and I successfully applied for a Maria Zambrano fellowship to attract talent to Spain with a project that synergistically combines my experience in building synthetic BMCs with the experience in nanomedicine of the group of Prof. Monica Lopez Fanarraga at the University of Cantabria to build novel devices for applications in nanomedicine.

Additionally, I presented my research at 15 conferences and gave 6 invited talks. I taught classes in Bioenergy and Microbiology as a guest lecturer at the UC Berkeley (2014-2017). Throughout my career, I'm committed to mentoring undergraduate and graduate students as well as participated in outreach activities, like mentoring middle school students in science projects (Be a scientist, 2016) and presenting my research to a public audience at a Rotary Club (2020; Celle, Germany) close to the town I grew up in.

Resumen del Currículum Vitae:

As of 07/02/2022, I have published in total 19 peer-reviewed publications. On 10 publications I am the first-author and on 4 the second-author. My articles are highly cited, with a total number of 928 citations, giving me a h-index of 15 and an i10 index of 16. My research yielded three patents, out of which one application was submitted and another one was granted and licensed to a company. Currently, I have four manuscripts that are about to be published, in 2 we addressed reviewers' comments, and two other manuscripts are being currently written to be submitted within the next 3 months.
The molecular biologic, biochemical and spectroscopy skills gained in my stay at the lab of Prof. Melis allowed me to become an expert in photosynthetic light-harvesting engineering, which is established by the 6 highly cited first author, 4 co-author research publication on this topic, as well as a review and a book chapter. This was also recognized in the field of photosynthesis and I was invited to 6 research talks on conferences and universities among other presentations at conferences.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno de Jóvenes investigadores

Área Temática: **Biomedicina**
Nombre: GARCIA GARCIA, TRANSITO
Referencia: RYC2021-031614-I
Correo Electrónico: transigarciagarcia@gmail.com

Título: Signal transduction mechanisms in infectious diseases

Resumen de la Memoria:

My research work is focused on understanding the molecular mechanisms interlaying host-pathogens interactions from the physiology of the pathogen to the host response, using a variety of biochemistry, molecular, cellular and next generation techniques (genomic, transcriptomic, proteomics), with a particular interest in post-translational modifications. A large portion of my research has been directed towards the characterization of protein phosphorylation and, in particular, its regulation by Hanks-type Ser/Thr kinases. I has extensive international experience, since my scientific career has been developed mainly in France, where I has participated in two large collaborative and multidisciplinary research projects, one financed by the European Commission and one by the French National Research Agency (ANR). In 2014, I obtained a Marie-Curie ITN fellowship to carry out my PhD at the Institut National de la Recherche Agronomique (INRA, Jouy-en-Josas, France). During my PhD, I participated in deciphering the structure of the initiation controller YabA (Felicori et al, Nucleic Acids Res. 2016; D1) and I demonstrated using biochemical and genetic approaches that the replication initiation controller YabA is specifically phosphorylated by the Ser/Thr kinase YabT highlighting a new regulatory role of YabA in B. subtilis cell fate decision (Garcia-Garcia et al., Front Microbiol. 2018; Q1). Later, I joined the prestigious Institut Pasteur (Paris, France) as a postdoctoral researcher in the Pathogenesis of Bacterial Anaerobes Laboratory to work in Clostridioides difficile physiopatology (DifKin) in collaboration with 4 specialized teams. My main research was focus on deciphering the signal transduction networks involving Ser/Thr kinases and their role in the regulation of key steps of the infectious cycle. Two paper have been published as a result of this project where I am first or second author (1 in mBio, D1; and 1 in Infection and Immunity, Q1) and one manuscript is submitted to Molecular and Cellular Proteomic (D1). Recently, I moved to Spain to the Immunogenomic and Molecular Pathogenesis Group at the University of Córdoba thanks to a COVID-19 Project (CV20-20089) coordinated by Juan José Garrido Pavón (UCO, Córdoba) and María Montoya (CIB, Madrid). In this Project we are studying the role of SARS-CoV-2 accessory proteins. Finally, I have been granted with a Maria Zambrano Postdoctoral Fellowship (Requalification of the Spanish university system, Spanish Ministry of Science, Innovation and Universities) to pursue my scientific career in Spain.

Resumen del Currículum Vitae:

Research background. After my studies in Biology and two Master at the University of Cordoba (Spain), one in Molecular, Cellular and Genetic Biotechnology and second one in teaching capacities, I got an ITN Marie Curie Fellowship (EU FP7 Marie Curie Action Initial Training Network on Molecular Bacteriology-AMBER) to carried out my PhD at Institut National de la Recherche Agronomique (INRA, Jouy-en-Josas, France). During my PhD, I spent 2 months in the industrial partner PURATOS (Belgium) as a secondment to acquire industrial experience. I defended my PhD in December 2017 and then I did a postdoc in the Pathogenesis of Bacterial Anaerobes Laboratory at the Institut Pasteur (Paris, France), an internationally renowned center dedicated to prevent and treat diseases, mainly those of infectious origin. In March 2021, I moved to Spain and I started working in the Inmunogenomic and Molecular Pathogenesis Group (BIO-365), at the Department of Genetics from the University of Cordoba. Recently, I have been granted with a Maria Zambrano Postdoctoral Fellowship (Requalification of the Spanish university system, Spanish Ministry of Science, Innovation and Universities) to pursue my scientific career in Spain.

Research contributions. I have 5 publications in peer-reviewed journals (2 in D1 and 3 in Q1). I have been first author in 3 of those articles, highlighting one publication in mBio (D1, IF: 6,78) and two publication in Frontiers in Microbiology (Q1, IF: 4,3). Co-author of 2 articles, one in Infection and Immunity (Q1, IF: 3,15) and one in Nucleic Acid Research (D1, IF=10,16). 3 manuscripts are recently submitted to Molecular and Cellular Proteomic (D1), Communication Biology (Q1) and Frontiers in Immunology (Q1). Total times cited, 79 (Google Scholar), 55 (Scopus); h-index: 4; i10-index: 3. I have participated in 13 national or international conferences and I have been directly involved in execution of 1 international (AMBER ITN, EU-FP7-PEOPLE) and 3 national projects (INFLACOVID, Junta de Andalucía; DIFKIN, ANR France and AGL2011-30381-C03-03, Ministry of Economy and Competitiveness), participating actively in the experimental setting, data analysis and publications of results. I have international collaborations which are reflected in my publications (Dr. Marie-Françoise Noirot-Gross, Argonne National Laboratory, US; Prof. Ivan Mijakovic, Chalmers University of Technology, Sweden; Pr. Wiep Klass Smits, Leiden University Medical Center, The Netherlands; Dr. Mariette Matondo, Institut Pasteur, France; Dr. Thomas Candela INRAE, France, etc.). I am member of the GDR2038 BPTM French consortium of Laboratories working on Bacterial Post-Translational Modifications and member of the French consortium RCDF ?Réseau Clostridium Difficile France?.

Training and development of young researchers. I have co-supervised 3 student in collaboration with the ANR Difkin groups: 1 PhD student and 1 master?s student M2 from the University of Farmacy, Châtenay-Malabry in collaboration with Unité Bactéries, Pathogènes et Santé (UFR Pharmacie Châtenay-Malabry). 1 degree?s student from the Institut National des Sciences Appliquées et de Technologie (INSAT), University of Carthage (Tunisia) in collaboration with the proteomic and mass spectrometry platform UTechS MSBio (Institut Pasteur). Currently, I?m supervising 1 Final Master Project and 1 Final Degree project.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno de Jóvenes investigadores

Área Temática: **Biomedicina**
Nombre: VIÑAS PEÑA, MARIA
Referencia: RYC2021-034218-I
Correo Electrónico: mvinaspena@gmail.com

Título: Visual Optics and Biophotonics

Resumen de la Memoria:

ERC-Marie Sklodowska Curie fellow at Wellman Center for Photomedicine-Massachusets General Hospital & Research fellow at Harvard Medical School. She investigates in the area of Visual Optics and Biophotonics. Her research focuses in the use of photonic technologies to the study of the physics of vision. First, through the use of Adaptive Optics visual simulators, to image the eye, and to study visual function and neural adaptation in polychromatic conditions under a very wide range of artificially-simulated-conditions. Second, investigating the role of scleral events on Myopia, and the development of novel treatments using microscopy techniques.

Dr. Vinas has a proven track record of achievements and independent research in Visual optics & Optical engineering (>70 peer reviewed publications), as well as a strong management and leadership skills demonstrated during her predoctoral stage, leading a new research line, her postdoctoral stage, as group leader and as MSCA fellow. She has stablished collaborations with top research groups. She has a good track record in competitive calls (JAE-CSIC, FPU, ERC-MSCA). Dr. Vinas has an excellent track record in innovation and technology transfer activities, proven by her participation in 14 competitive R&D projects (9 European competitive funded projects >6.500.000 (PI 265k), and 5 national competitive funded projects (>800.000). She has participated in 15 R&D projects with international companies (5 PI) for >600.000. Since 2015, founding partner and scientific advisor of a spin-off company of the CSIC, 2EyesVision SL (4 patents). Moreover, she is teaching assistant and collaborator in different Universities & Research Centers. She has supervised 5 Master & 3 PhD students. She has excelled in the leadership of scientific and outreach organizations: Former president of the IO-CSIC OSA-EPS-Student Chapter, Chair Visual Sciences & former Chair Women in Optics of the Spanish Optical Society, OPTICA Ambassador 2019.

Resumen del Currículum Vitae:

Dr. Maria Vinas is currently an ERC-MSCA fellow at Harvard Medical School, where she investigates in the area of Visual Optics and Biophotonics. Her research focuses in the use of photonic technologies to the study of the physics of vision. First, through the use of Adaptive Optics visual simulators, to image the eye, and to study visual function and neural adaptation in polychromatic conditions under a very wide range of artificially-simulated-conditions. Second, investigating the role of scleral events on Myopia, and the development of novel treatments using microscopy techniques.

Dr. Vinas has a proven track record of achievements and independent research in Visual optics & Optical engineering (>70 peer reviewed publications). She has demonstrated capability in successful completion of sophisticated experimental developments of going beyond state-of-the-art in addressing relevant scientific and clinical questions,

Dr. Vinas has strong management and leadership skills demonstrated during her predoctoral stage, leading a new research line, with excellent results (10 publications as first author, 20 national/international research projects); her postdoctoral stage as group leader (AO team-ViobioLab) and as MSCA fellow. She has stablished collaborations with top research groups (i.e. University of Arizona, Harvard Medical School, University of Rochester, University of Reno). She has a good track record in competitive calls (JAE-CSIC, FPU, ERC-MSCA).

Dr. Vinas has an excellent track record in innovation and technology transfer activities, proven by her participation in 14 competitive R&D projects (9 European competitive funded projects >6.500.000 (PI 265k), and 5 national competitive funded projects >800.000). Moreover, she has been participated in 15 R&D projects with international companies (5 PI) 5 of them for >600.000. Since 2015, founding partner and scientific advisor of a spin-off company of the CSIC, 2EyesVision SL (4 patents).

She is teaching assistant and collaborator in different national Universities (Schools of Optics, UCM, Madrid; IOBA, UVA, Valladolid, Harvard Medical School) & Research Centers (CSIC, Wellman Center for Photomedicine), and promoter of new teaching projects. She has supervised 5 Master (theses) obtaining the highest marks in all cases (4/9 and 1/10 over 10), and supervisor of 3 PhD students (C. Benedi, S. Aissati, S. Vedhakrishan)(2017-22).

She has demonstrated great leadership qualities, such as promoter & organizer of scientific activities (workshops, seminars, conferences), as well as outreach events, which lead to the publication of an outreach book. She has excelled in the leadership of scientific and outreach organizations: Former president of the IO-CSIC OSA-EPS-Student Chapter, Chair Visual Sciences & former Chair Women in Optics of the Spanish Optical Society, OPTICA Ambassador 2019.

Dr. Vinas has been awarded with different fellowships, and awards of OPTICA and the Association for Research in Vision & Ophthalmology. European Young Researcher Award EYRA2020.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno de Jóvenes investigadores

Área Temática: **Biomedicina**
Nombre: CORDANI , MARCO
Referencia: RYC2021-031003-I
Correo Electrónico: marcord1986@gmail.com
Título: Development of personalized cancer therapies based on the inhibition of oncogenic signalling pathways and treatment with cannabinoids

Resumen de la Memoria:

My PhD thesis (Univ. of Verona, 2014-2017) described novel mechanisms by which gain-of-function of mutant p53 proteins alters metabolism and signalling pathways, leading chemoresistance and tumour progression. This work was completed through a collaboration with p53 biology expert G. Blandino (Regina Elena, Rome), and led to the publication of several articles (Cordani, Br J Cancer 2018; Cordani, BBA-Rev Canc 2017; Cordani, Mol Oncol 2016).

Then, I joined Moreno-Bueno□s lab (UAM-Madrid, 2017-2018), where I acquired expertise on post-translational modification of proteins and in vivo preclinical models. My aim was to better understand why deregulation of essential stress signalling pathways in cancer cells have such a significant impact on cancer progression and identify novel druggable biomarkers and mechanisms of therapy resistance. One of my first research lines suggested a novel functional link between Gasdermin-B (GSDMB) over-expression and LC3B-mediated protective autophagy in response to HER2-targeted therapies. These findings might provide a new and accessible therapeutic approach for HER2/GSDMB+ cancers with adverse clinical outcome.

In March 2018, I joined Somoza□s lab (IMDEA Nanociencia-Madrid) sponsored by Community of Madrid (2018-2020), to explore novel nanomaterials and gene editing strategies as cancer therapies. I contributed my experience in cell biology to develop and evaluate gold and albumin-based nanomaterials for the transfer of i) CRISPR components in tumour cells, ii) additives to improve the efficiency of genome editing and iii) modified oligonucleotides to overcome chemoresistance in cancer cells. These collaborative works led to a publication of several Q1 research articles (Latorre et al. Nanomedicine 2021; Lafuente-Gómez et al. Cancers 2021; Garcia-Garrido. et al. Pharmaceutics 2021; Cordani and Somoza, Cell Mol Life Sci 2018). I collaborated with other researchers of UAM to develop water-soluble coordination compounds for anticancer therapy and BODIPYs as safe biological sensors (Cordani et al. Antioxidants 2021; Rigotti et al. Adv. Synth. Catal. 2020).

In January 2021, I joined Patrick Mehlen□s lab at CRCL (Lyon, France, Jan 2021-Jan 2022). This lab is a pioneer in the field of Dependence Receptors (DRs) and cell death mechanisms. Here, I contributed to describe Netrin-1 (an extracellular ligand of DRs) as an essential player involved in the shift of oxidative metabolism towards glycolysis after DNA injuries in pancreas cancer (Manceau et al., in preparation). These mechanisms could explain Warburg Effect and targeting Netrin-1 in combination with glycolytic inhibitors could prevent tumour progression in preclinical models.

Currently, I hold a senior collaborator scientist position at Complutense University (UCM) and was awarded in December 2021 with a □Maria Zambrano□ contract to work in the group of Prof. Velasco (UCM).
My long-term aim is to better understand the role of MDK/ALK signalling pathways in glioblastoma microenvironment and to identify novel druggable targets and biomarkers involved in oncogenic proprieties of glioblastoma. I will analyse whether the development of combined therapies, including the use of cannabinoids and other antitumor drugs, could change the behaviour of the microenvironment of the different subtypes of glioblastoma and improve the prognosis in cancer patients.

Resumen del Currículum Vitae:

I obtained the Doctorate in Biomedicine at University of Verona (Italy), in May 2017. My PhD thesis described the role of mutant p53 proteins in metabolism, chemoresistance and autophagy. Then, I joined as postdoc to Moreno-Bueno□s lab (UAM-Madrid, 2017-2018) to identify novel biomarkers with prognostic significance in HER2-positive cancer. Between 2018 and 2020, I was research associate at IMDEA Nanociencia (Madrid) in Somoza□s lab, working on novel nanomaterials and gene editing strategies as cancer therapies.
Then, I was senior postdoc at CRCL (Lyon, France) (Jan 2021-Jan 2022) in Patrick Mehlen□s lab, characterizing the involvement of dependence receptors in cell death and cancer metabolism. Currently, I am senior researcher (Maria Zambrano□s Fellow) at Complutense University in Guillermo Velasco□s group (Feb 2022-Mar 2024).
The support of the RyC grant will allow me to consolidate my research program on the role of MDK/ALK signalling pathways in glioblastoma microenvironment and to identify novel druggable biomarkers involved in oncogenic proprieties of glioblastoma.
As a result of my pre and postdoctoral research, I made relevant contributions in the field of molecular biology of cancer:
1) I have shown that mutant p53 proteins are involved in chemoresistance through the dysregulation of AMPK and mTOR signalling pathways leading to suppression of autophagy and increased mitochondrial ROS production.
2) I characterized a novel functional link between Gasdermin-B overexpression and protective autophagy in response to conventional therapies in HER2+ tumours.
3) I developed gold-based nanomaterials for the transfer of - CRISPR components in tumour cells, - additives to improve the efficiency of genome editing and - modified oligonucleotides to overcome chemoresistance in cancer cells.

Overall, I performed postdoctoral stays in Spain and France for a cumulative total of 56 months in research centres different from the doctoral university. My scientific productivity is relevant, having contributed to 36 peer-reviewed publications (21 in Q1, 5 in D1) with h-index of 18 and more than 1200 citations. I am first/co-first author in 12 publications, and corresponding/last author in 9.
I have participated as senior collaborator in 6 national and international research projects founded through competitive calls (University of Verona, Community of Madrid, MINECO, French National Cancer Institute and Complutense University); I contributed as co-authors to 22 international scientific congresses and supervised 4 master's theses and 2 PhD students from different countries. I mentored 2 students within Erasmus+ programme in collaboration with University of Parma.

I am Maria Zambrano Fellow (UCM, 2022-2024) and I have been awarded with 10 fellowships, including 5 travel grants and 5 contracts at pre/postdoctoral level.

I am serving as associate editor for several Frontiers and MDPI journals, and I am Ad-hoc reviewer for MDPI, Elsevier, Springers and Royal Society of Chemistry journals (2019-present).

I am member of EACR, BSNM and AICC scientific societies, and I participate in evaluation committees of international government agencies and funding bodies as Polish National Science Centre (2019-present) and Argentinian Federal Council of Science (2019-present). I was chairman at 2 meetings organized by IMDEA Nanociencia (ESRW-Nanoscience 2018, 2019).

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno de Jóvenes investigadores

Área Temática: **Biomedicina**
Nombre: CABANA DOMINGUEZ, JUDIT
Referencia: RYC2021-031324-I
Correo Electrónico: juditcd91@gmail.com
Título: Genetic and molecular mechanisms of neuropsychiatric disorders

Resumen de la Memoria:

I am a Postdoctoral Researcher at the group of Psychiatry, Mental Health and Addictions at the Vall d□Hebron Research Institute (VHIR) in Barcelona and, since 2020, part-time professor (□Profesor asociado□) at the University of Barcelona (UB). My background is in Biomedical Sciences and Genetics. In 2018, I obtained my PhD on Genetics with distinction (cum laude) at the UB and received the Extraordinary Doctorate Award. My scientific career focuses on the genetic basis of psychiatric disorders, particularly in addictions and Attention-Deficit/Hyperactivity disorder (ADHD). I participated in 7 research projects, 3 of them from the European Commission H2020 Program. I have collaborated with several national and international research groups. I have published 15 articles (80% Q1), cited 73 times, with a h-index of 5.

My main contributions to the field are:
1.Identification of genetic risk variants that contribute to the susceptibility of psychiatric disorders
Using both in-house samples and publicity available datasets, I studied the genetic risk factors that predispose to drug addiction (Sci.Rep., 2016, 2017; Prog.Neuro-Psychopharmacol.Biol.Psychiatry., 2019, 2022; Transl.Psychiatry., 2019;)*, ADHD (Genes, 2022) and other comorbid psychiatric disorders (Transl.Psychiatry, 2022), using both case-control and genome-wide association studies.

2.Characterization of the effect of drugs of abuse on gene expression regulation
I described that cocaine alters the expression of hundreds of protein-coding genes in a dopaminergic cell model and identified seven microRNAs downregulated by cocaine and predicted to regulate many of the identified genes altered by cocaine (Transl.Psychiatry, 2015, 2018).

3.Genetic and epigenetic mechanisms involved in addiction using an animal model
In collaboration with a group in the UPF-PRBB, I investigated the genetic and epigenetic mechanisms that underlie addiction by combining mouse models of drug self-administration with transcriptomic and epigenomic analyses. I found that the PLCB1 gene is a protective factor of cocaine relapse (Transl. Psychiatry, 2021), and several miRNAs with a relevant role in cocaine and food addiction, results included in papers under revision in top journals of the field (Addict.Biol.; J.Clin.Investig.).

Resumen del Currículum Vitae:

I am a Postdoctoral Researcher in the Genetics Psychiatric Unit, in the Department of Psychiatry, Mental health and Addictions at the Vall d□Hebron Research Institute (VHIR), working on the genetic basis of complex psychiatric disorders, with a focus on Attention-Deficit/Hyperactivity disorder (ADHD). I obtained my Bachelor□s degree in Biomedical Sciences (2013) and my Master□s Degree in Genetics and Genomics (2014) both from the University of Barcelona (UB). In October 2018, I obtained my PhD in Genetics at the UB with distinction (cum laude) and doctoral thesis' distinction award, based on the genetic basis of drug addiction.
My publications have been cited more than 70 times, with a h-index of 5. I have 15 scientific papers published in peer-reviewed journals, 12 of them in journals of the first quartile (Q1), 8 as first author and one as corresponding author. I have presented 29 communications to national and international congresses, two of them oral presentations. I have peer-reviewed 7 scientific papers for different indexed journals and I was guest editor of a special issue on the □American Journal of Medical Genetics part B: neuropsychiatric genetics (IF=3.38)□.
Since 2020, I am part-time professor (□Profesor asociado□) at the Department of Genetics, Microbiology and Statistics at the UB and I have broad teaching experience (372 hours in total) in Bachelor□s Degrees of Biomedical Sciences, Biochemistry, Biology and Biotechnology (UB), and in the Master□s Degree in Genetics and Genomics (UB) and in the Master□s Degree in Translational Biomedical Research (VHIR-UAB). I have designed computer practical lessons on □GWAS analysis□ for the Master□s Degree in Genetics and Genomics (UB). Since 2020, I have participated in the evaluation panels of Master□s theses at the UB and the Evaluation Access to University (□Proves d□Accés a la Universitat□, PAU) from the □Generalitat de Catalunya□.
I have co-supervised three Master□s project from different universities (2019-2020, two ongoing 2021-2022) and actively collaborated in the supervision of two Doctoral Theses (2020 and another ongoing). I have participated in several scientific divulgation activities for students and general audience, such as two editions of a science fair organized by the PRBB in Barcelona (□Fira de Recerca en Directe□, 2015 and 2019), imparted 6 dissemination lectures in schools and high schools and I have published 9 on-line divulgation research blogs.
I have participated in 7 research projects with competitive funding, 3 of them from the European Commission H2020 Program [H2020/2014-2020]. I am member of the Centre for Biomedical Network Research on Mental health (CIBERSAM, www.cibersam.es), and several international consortia including the Psychiatric Genomics Consortium (PGC), the International Muticenter persistent ADHD Collaboration (IMpACT), the Comorbid Conditions of ADHD consortium (CoCA), the Effects of Nutrition and Lifestyle on Impulsive, Compulsive, and Externalizing behaviors consortium (Eat2beNICE) and Aggression subtyping for improved insight and treatment innovation in psychiatric disorders consotium (Agressotype). Importantly, I have coordinated several collaborations with national and international research centers, resulting in 11 collaborative papers already published and several under revision.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno General

Área Temática: **Biomedicina**
Nombre: ALVAREZ GUAITA, ANA
Referencia: RYC2021-032398-I
Correo Electrónico: anna.alvarezguaita@gmail.com
Título: Metabolic study of obesity and the related metabolic diseases

Resumen de la Memoria:

In June 2009, I obtained my degree in Biology at the Universitat Pompeu Fabra (UPF), Barcelona, Spain. Next, I got a Masters degree in Pharmacological and Biotechnology Industry again at the UPF. As an undergraduate student, and for my Masters final project, I joined the Pharmacology and Drug Safety department in Almirall SA for an internship.
I continued my studies as a PhD student in the Department of Cellular Biology, Immunology and Neurosciences at the Universitat de Barcelona and the Institut d'Investigacions Biomèdiques August Pi i Sunyer (IDIBAPS), Barcelona, Spain. Under the direction of Prof Carles Enrich, I developed expertise in liver physiology and energy metabolism, related to liver glucose homeostasis and hepatic regeneration. In 2011, I did an internship at Prof Katharina Gaus lab in the University New South Wales Sydney, Australia, were I studied plasma membrane organization through the regulation of cellular cholesterol homeostasis and the actin cytoskeleton. I obtained my PhD in June 2015 with Summa Cum Laude. Next, I and I continued my scientific career moving to Cambridge, UK, where I joined Prof David B Savage and Sir Stephen ORahilly group in the Institute of Metabolic Sciences-Metabolic Research Laboratories at the University of Cambridge as a postdoctoral research associate. In the IMS, I studied lipodystrophies, insulin resistance and leptin regulation becoming expert in adipose tissue and whole body physiology.
Over my research career and collaborating with different labs my work has led to 16 articles, 4 as first author, some of them in high impact factor journals. Moreover, I have mentored undergraduate, master and PhD students projects and research decisions.
Due to my broad range of expertise in whole body physiology and liver and adipose tissues, I believe I will be able to explore highly complex questions related to obesity and the metabolic syndrome and the type 2 diabetes derived, where the communication between multiple organs is essential. More specifically, I believe that, elucidating the genetic obesity mechanisms and insulin resistance as well as leptin regulation are crucial to prevent and develop new therapeutic targets to improve patients life.

Resumen del Currículum Vitae:

Following my bachelors degree in Biology and Masters in Pharmacological Industry and Biotechnology, I did my PhD working in liver physiology and regeneration in the University of Barcelona and IDIBAPS (Institut d'Investigacions Biomèdiques August Pi i Sunyer). Then, I moved to Cambridge where I joined Prof David B Savage and Sir Stephen ORahilly group in the Institute of Metabolic Sciences-Metabolic Research Laboratories (MRL-IMS) at the University of Cambridge, as a postdoctoral research associate studying lipodystrophies, insulin resistance and leptin regulation.
During my PhD, I studied the unknown role of one of the most expressed proteins in the liver, the multifunctional calcium-dependent membrane binding protein Annexin A6 (AnxA6). My work led to the finding that AnxA6 is essential for mice survival during the liver regeneration process. Mechanistically, we found that the low survival of the AnxA6-/- mice was due to the incapacity to produce de novo hepatic glucose from alanine, the main substrate for gluconeogenesis during liver regeneration and under food deprivation. Alanine uptake was impaired in AnxA6 deficient cells, due to the impaired recycling of SNAT4 (Na+-coupled neutral amino acid transporter) to the hepatocyte sinusoidal plasma membrane (Alvarez-Guaita A, Blanco-Muñoz P, Meneses-Salas E, et al., Hepatology, 2020).
Moreover, I spent almost 4 months at the Centre of Vascular Research at the University of New South Wales in Sydney, under Dr Katharina Gaus supervision. With her collaboration, we described a new role for AnxA6 as plasma membrane organizer through the regulation of cellular cholesterol homeostasis and the actin cytoskeleton (Alvarez-Guaita A, Vila de Muga S, Owen DM, et al., Br. J. Pharm, 2014). Besides leading my own projects, I had the opportunity to participate in multiple national and international collaborations, which fructified in 11 more publications. I finally obtained the PhD with a Summa Cum Laude qualification.
Later, as a postdoctoral research associate in the University of Cambridge, I focused on leptin regulation in vivo. Briefly, I studied the metabolic phenotype and leptin regulation in Adipogenin deficient mice (Adig-/-), an adipocyte specific protein which role was poorly understood. Our findings demonstrate that Adig deficiency impairs adipogenesis in vitro. Moreover, high-fat diet (HFD) induced weight gain is ameliorated in the Adig-/- mice, as well as fat mass accumulation. Fat mass-adjusted leptin levels are lower and leptin secretion from Adig-/- adipose explants is also reduced, suggesting an influence on leptin regulation (Alvarez-Guaita A, Patel S, Lim K, et al., Cell Reports, 2021).
On the other hand, I co-leaded a project where we elucidated the function of GDF15, an established biomarker of cell stress, in animal physiology. During the study, we described how GDF15 changes under different physiological and nutritional stress conditions and how its levels raise upon long exposition to HFD, mainly produced in brown and white adipose tissue (AT), where it is principally expressed in the stromal vascular cells. Moreover, GDF15 administration triggers a conditional taste aversion in mice, which suggests a role of GDF15 in the induction of an aversive response upon nutritional stress. This work, which led to a high impact journal publication, was performed in close collaboration with other groups and co-workers (Patel S*, Alvarez-Guaita A*, Audrey Melvin*, et al., Cell Metab

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Turno General

Área Temática: **Biomedicina**
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Título: Inhibition of alpha-synuclein aggregation and glial activation as a therapeutic strategy for Parkinson's disease

Resumen de la Memoria:

My thesis focused on the analysis of the effects of Wnt signaling in human embryonic derived neural stem cells and induced pluripotent stem cell derived neural progenitors. As a starting point for my PhD I had to setup both stem cell models for the laboratory, and over several years we found that Wnt signaling is fundamental for the differentiation of these cells, and specifically that non-canonical Wnt signaling is the signaling pathway that mediates correct differentiation in these models, which could have significant impact for induced pluripotent stem cell-based therapies.

My early postdoctoral years gave me the opportunity to work on several research projects which spanned a range of topics in neurodegeneration such as; the early detection of alpha-synuclein (a-syn) and tau in PD and AD patients, the development of a vaccine against a-syn, the deep phenotyping of our a-syn transgenic animals and the protection of neurons by molecular tweezers. During this time I found that a-syn oligomers accumulate in human SNCA-overexpressing (SNCA-OVX) animals (which develop age-dependent pathology and motor symptoms) in a similar way to humans, and I also found that this was accompanied by astroglial activation. When these animals are treated with anti-aggregation drugs such as the molecular tweezer CLR01, we are able to observe a significant reduction in both motor phenotypes and the neuropathological markers. CLR01 treatment also reduced pathology in induced pluripotent stem cell derived dopaminergic cultures, which are the current state-of-the-art human in vitro model for PD. While these results represented important and exciting findings moving towards a disease modifying therapy for PD, there were also phenotypes that were unaffected by CLR01 treatment. Pro-inflammatory glial phenotypes remained high in SNCA-OVX animals when treated with CLR01. This indicates that while CLR01 can impact a-syn aggregation, there are still other underlying processes linked to glial activation that are ongoing in these animals. As glial activation is sufficient to cause neurodegeneration, these findings immediately drove me to focus my independent research on the interplay between aggregation and glial activation

In 2018 I became a Research Fellow, which allowed to pursue my own scientific interests independently. As highlighted above, my research has shown that while anti-aggregation compounds represent a new milestone in the treatment of PD, there are still glial processes unaffected by treatment that require our attention. Therefore, the aim of my independent research is to determine the role of glia in a-syn aggregation in the central nervous system using state-of-the-art in vitro and in vivo models, in order to find novel therapeutic strategies for PD. My uniquely privileged position, having in situ detection methods for a-syn aggregation, patient derived iPSCs and a highly relevant mouse model allows me to determine the roles glial cells play in the oligomeric progression of the disease. This will not only allow me to paint a global picture of the disease, but also to take advantage of these insights in order to translate findings into therapeutic approaches, which will ultimately result in an important advance for PD.

Resumen del Currículum Vitae:

My training has made me a leading early career researcher in the fields of protein aggregation and Parkinson's disease. My PhD led to 8 insightful Q1 publications and communications at international conferences as well as local oral presentations, and two awards. While my PhD asked a purely non-pathological question, I was always interested by neurodegeneration. This prompted me to seek a post-doctoral position at Oxford with Prof Wade-Martins, where I specialized in alpha-synuclein aggregation, its detection and downstream effects in vitro and in vivo, focusing on the study of Parkinson's and Alzheimer's disease. During this time I was able to work on several research projects including the further optimization on the alpha-synuclein proximity ligation assay and on the characterization of the human alpha-synuclein overexpressing mouse model, which led to the publication of several collaborative articles. I was also able to pioneer the detection of early aggregation in Alzheimer's disease, which allowed me to expand my disease repertoire in neurodegeneration.

In order to continue building a research basis which would allow me to further investigate the complexity of alpha-synuclein in Parkinson's disease, I secured my own funding in the form of one of the three yearly Oxford-Celgene/BMS fellowships for 501,000 £. This funding allowed me to address the multifactorial nature of Parkinson's disease and gave me the chance to become more independent leading a small team working towards my research objectives. Having supervised a total of 4 PhD, 4 Msc and 2 Undergraduate students, and mentored a group of 3 junior post-docs, has given me the opportunity to grow as a manager and mentor. I was also an early career representative for ARUK, a role that allowed me to organize several meetings such as Grant writing workshops, Networking Events or Teaching Seminars, while also teaching Medical students at Oxford University.

Over this time, I have disseminated my research through international meetings and invited talks, as well as multiple outreach activities with charities such as Parkinson's UK, and I have also produced several important papers in journals such as Nature Communications. I have also assumed several editorial roles at journals such as Frontiers and JOVE, as well as departmental roles. Even through the pandemic I was able to publish 3 original articles and get a further two accepted for publication in 2021, while also going on maternity leave. I recently became the academic coordinator for the Alzheimer's Research UK Thames Valley Network, a role that allowed me to expand on my managerial skills, such as administrating the budget of the network, securing and awarding funding, arranging committee meetings and reports, etc.

The events leading to neurodegeneration continue to fascinate me today as much as the very first day I started my research. I am now building on the hypothesis that multifactorial diseases such as Parkinson's or Alzheimer's can only be therapeutically tackled through combined therapies, which is the independent research line I have started in my own laboratory as an Ikerbasque Research Fellow. I therefore believe the Ramón y Cajal program would be an excellent way to establish my fully independent research at Achucarro Basque Center for Neuroscience leading my research group in aggregation and glial activation.

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Turno General

Área Temática: **Biomedicina**
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Título: Exploring the Understudied Kinome for Novel Targets in Squamous Cell Carcinomas

Resumen de la Memoria:

Despite our increased understanding of the genetic and genomic characteristics of squamous cell carcinomas (SCCs), targeted therapies are not widely available for most patients with these tumor types, and, therefore, patient survival remains poor. My research plan aims to fill the existing therapeutic gap in SCCs by decoding the signaling networks that contribute to the progression of these tumors, identifying new kinase-drivers of SCCs, and validating these newly identified oncogenic kinases as potential targets for therapeutic intervention.

My research training has provided me with extensive experience in analyzing cancer signaling networks and the skill set required to conduct my research plan successfully. As a Ph.D. candidate, I studied how diacylglycerol kinases (DGK) contribute to cell survival and metabolic rewiring in colorectal and breast cancer (Torres-Ayuso et al., Oncogenesis, 2015; Oncotarget, 2014). During my postdoctoral fellowship, I identified the protein kinase TNIK, which is amplified in 50% of lung SCC, as an oncogenic driver in this cancer type. I used a combination of genetic and chemical approaches to determine the molecular networks through which TNIK contributes to tumorigenesis. Ultimately, I demonstrated the efficacy of TNIK inhibitors in preclinical models of lung SCC, including patient-derived xenografts. The results from this research suggest that lung squamous cell carcinoma patients with TNIK amplification could respond to TNIK inhibitors (Torres-Ayuso et al., Cancer Discov., 2021; co-corresponding author). Other highlights of my postdoctoral research include the characterization of MAP3K13 in head and neck and in lung SCCs (Edwards et al., Cancer Res., 2017; co-second author), MAP3K19 (Hoang et al., J. Biol. Chem., 2020), and ABL1 in non-small cell lung cancer (Testoni et al., EMBO Mol. Med., 2016; co-second author). Thus, my expertise spans from basic to preclinical research to identify and characterize the function of novel kinases in cancer, define the mechanisms through which these kinases promote tumorigenesis, and generate preclinical mouse models to validate novel small-molecule inhibitors and protein degraders that target these oncogenic kinase drivers.

In addition, I have written and successfully secured competitive funding, including a Marie Curie Individual Fellowship and a Lung Cancer Research Foundation Research Grant. My scientific performance has been acknowledged in multiple awards, including an AACR Scholar-in-Training Award and the National Institutes of Health (NIH) Fellows Award for Research Excellence. I have also gained extensive leadership and mentoring experience. I have co-mentored and trained eight junior scientists, including co-directing three master theses, and I received an NIH Summer Mentor Award.

In conclusion, I have gained extensive knowledge of signal transduction pathways relevant to cancer and the methods used for their study. I also have the necessary experience in the acquisition of grant funding and in mentoring. The Ramón y Cajal Program will be an ideal opportunity to continue my research program as an independent investigator.

Resumen del Currículum Vitae:

Following my B.Sc. in Biological Sciences, I completed my Ph.D. in Signal Transduction and Cancer Biology at the National Center for Biotechnology and the Autonomous University of Madrid. I contributed eight publications, including two first-author articles describing a family of lipid kinases, named diacylglycerol kinases, as oncogenic drivers in colorectal and breast cancer (Torres-Ayuso et al., Oncotarget, 2014; Torres-Ayuso et al., Oncogenesis, 2015).

I then joined the Cancer Research UK Manchester Institute as a postdoctoral fellow; in 2017, the lab relocated to the National Institutes of Health-National Cancer Institute (USA) where I continued my postdoctoral fellowship. During my postdoctoral training, I capitalized on recent advances in next-generation sequencing and proteomic techniques to elucidate mechanisms of tumorigenesis and use that information to develop precision medicine approaches to cancer care. I have secured funding from the Ramon Areces Foundation, the Lung Cancer Research Foundation, and a highly competitive Marie Skłodowska-Curie Individual Fellowship. My postdoctoral training has been highly productive; I have published three reviews and two original articles. To complete my projects, I have established multiple collaborations. I have validated the protein kinase TNIK as a potential new target for therapeutic intervention in a subtype of lung cancer (Torres-Ayuso et al., Cancer Discovery, 2021 - co-corresponding author), where no targeted therapies are approved for treatment. My results indicate that lung cancer patients that harbor an amplification in the TNIK gene (approximately 250,000 worldwide) could benefit from treatment with TNIK inhibitors. Moreover, I published another study describing the use of protein-analysis methods to identify therapeutic vulnerabilities that would allow enrollment of cancer patients into early-phase clinical trials (Torres-Ayuso et al., NPJ Genomic Medicine, 2018). In addition, I have contributed to three peer-reviewed publications validating additional protein kinases as cancer targets.

Besides my publication record, I have received several awards, including the Fellows Award for Research Excellence, from the National Institutes of Health and an AACR Scholar-in-Training Award. My training has been complemented with teaching duties and the mentoring of eight junior scientists, resulting in the reception of a National Institutes of Health Mentor Award. I have widely participated in ad hoc peer reviewing for journals including Cancer Discovery, Cancer Cell, the Journal of Biological Chemistry, and Science Signaling. In addition, I have been actively involved in public engagement activities by collaborating with the Societies of Spanish Scientists in the UK and in the US.

Collectively, through my graduate and postdoctoral research, I have gained extensive knowledge of signal transduction pathways relevant for cancer and the methods used for their study, acquired expertise in developing and optimizing preclinical culture and animal models of cancer, including patient-derived xenografts, and experienced translating basic research findings into medical applications. I also have the necessary experience in the acquisition of grant funding and in mentoring to be a successful and productive independent investigator.

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Turno General

Área Temática: **Biomedicina**
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Título: Biofísica e inmunología aplicadas a la investigacion biomédica

Resumen de la Memoria:

Me gradué en Biología y me doctoré en Biología Molecular y Celular. Mi trayectoria abarca dos áreas científico-técnicas, la biofísica y la inmunología, enfocadas en el campo de la biomedicina clínica y aplicada. Inicialmente mis estudios predoctorales se centraron en el campo de la virología, caracterizando biofísicamente las proteínas no estructurales del virus de la Hepatitis C y el del Dengue, implicadas en el mecanismo de replicación vírico. De dichas proteínas se consiguió estudiar su estructura y su dinámica mediante el uso de biomembranas de diferente composición lipídica. Los resultados obtenidos permitieron identificar regiones membranotrópicas para diseñar nuevas aproximaciones terapéuticas de acción antiviral. Tras terminar mis estudios predoctorales, me incorporé en el Centro de Investigación de Enfermedades Infecciosas de Quebec donde adquirí amplios conocimientos sobre las funciones inmunológicas implicadas en las reacciones víricas. La orientación de mi trayectoria hacia un perfil inmunológico, me permitió incorporarme en el grupo de investigación de enfermedades alérgicas, especializándome en el estudio de la respuesta celular innata y adaptativa inducida por fármacos y diferentes alérgenos. Actualmente estoy involucrada en diferentes líneas de investigación: i) Estudio de los mecanismos inmunológicos implicados en la reacción alérgica a alergenos y a fármacos. ii) Evaluación de la respuesta de tolerancia inducida por inmunoterapia alérgeno específica, y iii) desarrollo de aproximaciones terapéuticas novedosas y evaluación de sus efectos. Los objetivos de estas líneas de investigación se basan en la mejora del diagnóstico y tratamiento de las enfermedades alérgicas, favoreciendo la transversalidad de mi investigación en el área de salud. De hecho, el poder investigar los mecanismos patogénicos de una de las patologías más relevantes en la sociedad, como es la alergia, y que cada vez está incrementado su incidencia a nivel mundial, brinda la posibilidad de que mi investigación refuerce la medicina personalizada.

Mis estudios se centran en la caracterización de las bases celulares, moleculares y genéticas implicadas en la inmunopatología y desarrollo de la enfermedad alérgica, para la identificación de biomarcadores que nos indiquen los mecanismos inmunológicos que subyacen a las alergias. Para ello se evalúan el papel de las subpoblaciones celulares implicadas en la respuesta inmunológica, profundizando en la interacción entre linfocitos T y células dendríticas frente a diferentes alérgenos o fármacos, y se realizan estudios celulares que implican la interacción entre las células linfoides innatas y las células T para estudiar la amplificación de la respuesta alérgica e identificar biomarcadores de utilidad diagnóstica. En los últimos años, dirijo dos proyectos en el que se pretende comprender los mecanismos implicados, para detectar la predisposición inmunológica subyacente a dichas reacciones alérgicas y mediante un enfoque □omico□ poder determinar potenciales biomarcadores que ayuden al diagnóstico y tratamiento de esta patología. Por tanto, el carácter transversal de la investigación que desarrollo presenta un enfoque multidisciplinar.

Resumen del Currículum Vitae:

Licenciada en Biología por la Universidad de Alicante. Durante el último año de licenciatura colaboré con el Departamento de Agroquímica y Bioquímica de la misma. Después, empecé los cursos de doctorado en Biología Celular y Molecular en la Universidad Miguel Hernández (UMH), donde defendí mi tesis doctoral. Durante mis estudios predoctorales realicé una estancia internacional en el Instituto de Medicina Molecular (Lisboa, Portugal), financiada por la Federación de Sociedades de Bioquímica Europeas (FEBS). Esta etapa predoctoral fue reconocida por el Premio Extraordinario de Doctorado de la UMH

Como investigadora postdoctoral me incorporé en el Centro de Investigación de Enfermedades Infecciosas de Quebec (Canadá). Tras mi incorporación participé en dos líneas de investigación dentro del grupo (virología e inmunología). Durante esta estancia adquirí importantes conocimientos inmunológicos que orientaron mi perfil científico hacia el área de la inmunología. En el 2014, me incorporé al Instituto de Investigación Biomédica de Málaga (IBIMA) gracias al contrato Sara Borrell del Instituto de Salud Carlos III (ISCIII) (CD16/00042). En el último año realicé una estancia internacional en el Departamento de Medicina Experimental y Clínica de la Universidad de Florencia (Italia), financiada por el programa de movilidad del ISCIII (MV18/00014). Actualmente, sigo en IBIMA, con contrato propio concedido por la convocatoria "Stop Fuga de Cerebros" de Roche Farma, como única beneficiaria (SFC-0002-2020). Me gustaría que recalcar que de este contrato se concede solo uno y con él se potencia la retención del talento para continuar investigando en España.

A lo largo de mi trayectoria investigadora he participado en 16 proyectos de investigación financiados en convocatorias públicas competitivas nacionales, regionales e internacionales que han abarcado diferentes áreas biomédicas. En dichos proyectos, he participado como miembro del equipo investigador, y como investigadora principal. Globalmente, los proyectos son multidisciplinares en diferentes áreas científicas en los que mi área de responsabilidad se ha focalizado en la dirección y consecución de los objetivos, obteniendo resultados que han sido presentados, en 41 congresos nacionales e internacionales, y publicados en revistas de alto impacto, lo que indica la relevancia y conocimiento de los resultados y mi capacidad de liderazgo. Soy autora y co-autora de 36 artículos científicos publicados en revistas especializadas de alto impacto, de las cuales el 27 % son D1/Q1. El total de veces que se citan las publicaciones es de 390, se y he alcanzado un índice h de 12.

Mi labor se ha visto completada con la participación de diferentes cursos, y labores de divulgación. Soy investigadora colaboradora de la RETICS ARADyAL y miembro de la nueva RICORS de Enfermedades inflamatorias. Colaboro con grupos de investigación y con compañías biofarmacéuticas nacionales e internacionales. En este sentido mi capacidad de transferencia de tecnología o de conocimiento se ha visto reforzada. Soy miembro de varias sociedades nacionales e internacionales. A todo ello se le suma que dirijo trabajos finales de grado de dos estudiantes lo que refuerza mi capacidad formativa, la cual se verá potenciada por la futura incorporación de un titulado superior para la realización de una tesis doctoral.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno de Jóvenes investigadores

Área Temática: **Ciencias agrarias y agroalimentarias**
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Título: Metabolomic strategies to determine compounds of interest in food/plant matrices and biological fluids

Resumen de la Memoria:

Lucía Olmo-García is a Doctor in Chemistry with a strong background in Analytical Chemistry (including separative techniques, mass spectrometry and chemometrics) and food analysis. Her scientific-technical interests and goals in the medium/long term are the development and validation of high-throughput and accurate metabolomic strategies to determine compounds of interest in food/plant matrices and their related metabolites in biological fluids.

Her doctoral thesis focused on the application of Metabolomics to the study of products and by-products derived from the olive tree. To that end, she combined the use of different sample preparation techniques with targeted and untargeted approaches based on chromatography (LC and GC) coupled to several detection systems (MS having a leading role), as well as with statistical tools that facilitated data management and results interpretation. She carried out the characterization of previously unexplored matrices and optimized methods to authenticate virgin olive oil (VOO) geographical or botanical origin and to accurately quantify some of its most relevant metabolites. Her major achievement was the development of a multi-class method for the simultaneous determination of olive bioactive compounds (i.e., phenolic and triterpenic compounds, tocopherols and sterols) in a single run. Her PhD work represents a good example of development and application of powerful analytical tools to solve real problems of the olive industry (indeed, the collaboration with diverse private companies was extremely important and the optimized methods are currently applied by control laboratories working for the olive sector).

During the postdoctoral stage, she opened up her research interests to new matrices in the field of Plant and Food Metabolomics and initiated collaborations with other research groups focused on the study of the effects of food intake on health, what led her to draw her attention to Health and Nutrition Metabolomics. For instance, she studied the antidiabetic potential of biophenols-rich VOO extracts that act as α-glucosidase inhibitors, and assessed the digestive stability and bioaccessibility of VOO phenolic compounds in collaboration with the University of Vigo. During her postdoc at Imperial College London, she was responsible for the development and validation of targeted assays (LC-TQ-MS) to determine several metabolites in human biofluids and cells, with different purposes (e.g., prediction of preterm birth or assessment of drugs intake by cancer cells). In this way, she expanded her expertise in sample preparation and targeted quantification (MSn). Upon her return to UGR she started new research lines with avocado and argan oil as objects of study.

In summary, her research career has developed around the use of Metabolomics to address some challenges faced by different agro-industries as well as in clinical research. Thanks to all the scientific activities and projects in which she has participated, her research stays in national and international leading laboratories, and her collaborations with worldwide recognized experts and cutting-edge instrumentation companies, she has acquired a multidisciplinary knowledge and has built technical skills and teams management abilities that will allow her to tackle any research project she will lead in the future with a great prospect of success.

Resumen del Currículum Vitae:

Lucía Olmo-García earned a bachelor□s degree in Chemistry (2013) and a master□s degree in Food Science and Technology (2014) at the University of Granada (UGR). She developed her PhD studies (2014-2018) under the supervision of Dr Alegría Carrasco-Pancorbo and Dr Alberto Fernandez-Gutiérrez at UGR funded by a FPU grant. During the predoctoral stage, she worked in the optimization of analytical methods (LC-DAD/FLD/MS and GC-MS) and their application to the study of secondary metabolites in olive tree derived matrices. She spent 3 months at UC Davis (CA, USA), and 3 months at the leading instrumentation company Bruker Daltonics (Bremen, Germany), supported by FPU and UGR-CEI Biotic mobility programs. As a postdoc, first, she stayed at UGR (funded by the Internal Research Plan) and initiated collaborations with other research groups working on Health and Nutrition Metabolomics through two 3-months research stays, one at University of Vigo, and the other at the prestigious Imperial College London (ICL). In January 2020, she moved to ICL thanks to a fellowship from Alfonso Martín Escudero Foundation. In January 2021, she got a postdoctoral grant from the Andalusian Government but stayed at ICL, partially supported by a mobility grant from the UGR Internal Research Plan. During the 23 months she spent at ICL, she led the R&D unit within the National Phenome Centre and set up strategic collaborations with other research groups (she was responsible for 1 project and 2 service contracts that led to 3 research papers). Since October 2021, she is an Interim Substitute Lecturer at the Department of Analytical Chemistry (UGR).

She is coauthor of 25 papers (+6 under review) published in prestigious international journals (16Q1/13D1) and 8 book chapters (h-index=12, >300citations (90/postdoctoral year)). She is corresponding author of >25% of these contributions and is listed as 1st author in >60%. Her research works are coauthored by more than 60 researchers from 15 world-wide recognized institutions. In addition, she has participated in 35 national and international scientific conferences (40 posters, 12 oral communications, 3 invited talks). She also regularly acts as reviewer of scientific journals (1 paper/month). Her research work has been awarded several prizes (including two best communications in congresses and two best Thesis awards). She has taken part in 7 research projects and 2 teaching innovation projects funded by national and European sources. Moreover, she has developed 4 research contracts with public and private entities and has worked for two years in the R&D department of a private company as scientific advisor and coordinator of research projects funded in public calls; as a result of this activity, she is listed as co-inventor in 5 patents (+1 application). She is currently supervising 2 PhD candidates, has directed 7 Degree□s and 7 Master□s final projects, has overseen several international visiting researchers and has accumulated 320 hours of teaching experience. She has also taught at the Open Centre for Lifelong Learning (UGR) and participates in science outreach activities. She belongs to the Organizing Committee of the online congress Divulga NextGen and is a committed contributor to scientific magazines. She holds a positive evaluation of teaching and research activity from ANECA as Contracted Professor since January 2020.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021

Turno General

Área Temática: **Ciencias agrarias y agroalimentarias**

Nombre: ROMERO GASCON, FRANCISCO

Referencia: RYC2021-033378-I

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Título: Understanding the hormone regulation and the molecular and physiological bases of ripening and stress responses to increase fruit quality and nutritional value to obtain more sustainable and healthy fruit.

Resumen de la Memoria:

My research career has addressed the socio-economic challenge of reducing postharvest fruit quality loss caused by biotic and abiotic stresses. During my PhD, I studied the molecular bases of citrus fruit dehydration, its hormonal regulation and its relationship with ripening and the development of peel disorders that depreciate their external quality. The scientific progress is supported by an Extraordinary Thesis Award and 7 SCI publications (Romero et al., 2012a,b; 2013a,b; 2014b; 2019; 2021a). During the PhD period and further competitive contracts I was involved in parallel projects dealing with the effects of ethylene on peel damage (PD) (Lafuente et al., 2014; Establés-Ortiz et al., 2016). Likewise, I studied starvation stress produced after fruit detachment, its hormonal regulation, and its link with phospholipid metabolism and the development of PD (Romero et al., 2020a,b). Moreover, I studied the elicitation of resistance against the major pathogen of citrus fruit (Penicillium digitatum) by led blue light and the role of phospholipases in the susceptibility to infection (Lafuente et al., 2021a,b,c). From my PhD results, two major questions caught my interest and drove my three postdoctoral periods: 1) how the cuticle, the first barrier against dehydration is regulated in response to water stress and how the hormone abscisic acid (ABA) may influence such response, and 2) why/how copper (Cu) homeostasis is involved in the fruit water stress response. Funded by my first MSCA project (3F:FutureFreshFruit, Co-PI), I continued the study of the molecular bases of tomato and citrus fruit resistance to dehydration, considering the cuticle as a key factor. During a 3-year postdoctoral stay, coordinated between USA (Prof. Rose, Cornell University; 2 years) and Spain (Dr. Lafuente, IATA-CSIC; 1 year), I acquired great knowledge on cuticle characterization, built important connections for my network of collaborators and improved my CV by 6 SCI publications in which my leadership as corresponding author highly increased (Martin et al., 2017; Romero and Rose, 2019; Romero and Lafuente, 2020; 2021; 2022a,b). To investigate the second question, I joined Prof. Peñarrubia lab (University of Valencia) after obtaining through competitive call a Junior Postdoctoral contract. During a 1-year postdoctoral stay, I studied the interconnection between Cu transport and hormone and stress signaling in model plant. This collaboration resulted in 3 SCI publications (Peñarrubia et al., 2015; Carrió-Seguí et al., 2016; Carrió-Seguí et al., 2019) and set the basis for my second MSCA project (TOMACOPT, Co-PI). This two-year postdoctoral stay dealt with the effects of Cu-deficiency on tomato fruit quality, and has resulted in 1 SCI publication (Romero et al., 2021b) up to now. Recently, I obtained a competitive CSIC project (MSCA-ERC-CSIC, PI) that will set a bridge between my last MSCA project and the ERC proposal I will submit in the next call. With these projects I have opened a new research line in the Postharvest Biotechnology, Physiology and Pathology group at the IATA-CSIC aiming to provide innovative solutions to problems facing European agriculture (i.e. Cu deficiency and water stress) by transforming their deleterious effects into a sustainable benefit for food quality and safety, and hence for human health.

Resumen del Currículum Vitae:

Graduated in Biological Sciences and with a MSc in Genetic, Cellular and Molecular Biology, I started my research carrier in 2007 in the Postharvest Biotechnology, Physiology and Pathology group at the Institute of Agrochemistry and Food Technology (IATA). My PhD in Biotechnology (2012) received cum laude, International Mention and an Extraordinary Thesis Award. During that period, I performed a 4-month stay at Prof Jacqueline K Burns Lab at the Citrus Research and Education Center (Florida, USA). Next, I obtained 3 research contracts in competitive calls (one of them with the industry), followed by a Junior Postdoc position and two consecutive Marie Sklodowska Curie Actions (MSCA) postdoctoral contracts, which earned me the recognition of Fellow of the Week from the MSCA Association. The first MSCA allowed me to perform a 2-year stay at Prof Jocelyn Rose Lab at Cornell University (NY, USA), while the second served for coming back to IATA-CSIC for 2 additional years. Recently, I obtained one of the 15 MSCA-ERC-CSIC Postdoc positions granted by CSIC in 2021. I have participated in 8 projects funded by different Agencies, including 1 coordinated with the Industry (ITENE). Notably, I have been the Co-PI of the 2 MSCA European Projects.

My work resulted in 25 SCI publications, being first and corresponding author in 16 and 5 of them, respectively. I have authored 4 book chapters, 6 articles in non-SCI journals and 5 publications for stockholders and industry audience. My h factor is 13 and my articles have been cited 494 times, with 146 citations only in 2021 (Scopus). According to the Scopus database and considering the number of citations per article and its relevance within a specified area, my normalized impact factor for the 2012-2019 period is 2.14. I participated in 10 national and 20 international conferences, 3 as invited speaker and 5 as oral presentations. I supervised 7 students in Practicum, 2 Erasmus+ students, mentored an Internship student during my stay at Cornell University and labor-trained 3 undergraduate and 1 graduated technicians. I am, per invitation, Editorial Board Member of the American Journal of Plant Biology and of Plant Membrane Traffic and Transport section of Frontiers in Plant Science. I reviewed 17 manuscripts for 12 different SCI journals and reviewed a book proposal for the Elsevier Editorial. I am Member of the Spanish Society of Biochemistry and Molecular Biology and of the International Society for Horticultural Science. I actively participate in dissemination events, including seminars and interviews. I am the founder of the IATAs Outreach Sessions, for which I have formed a team of researchers who visit Primary and Secondary Schools to bring Science closer to children. I am also responsible for the entries in the Facebook profile of the IATA-CSIC and Representative of the Food Biotechnology Department in the Outreach Commission of the IATA-CSIC.

Three different aspects of my career support my leadership. First, my ability to obtain national and international funding and my role in such projects. Thus, I have been Co-PI of two consecutive MSCA European projects and a MSCA-ERC-CSIC Project in which I am the only PI. Secondly, my track record of publications and my authorship in them also demonstrate my leadership. Last, I mentored/supervised 13 students of different degrees in last years.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021

Turno General

Área Temática: **Ciencias agrarias y agroalimentarias**

Nombre: LAFARGA POYO, TOMAS

Referencia: RYC2021-031061-I

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Título: Development of microalgae-based processes to increase the sustainability of the food industry

Resumen de la Memoria:

My first international experience was in 2010 at the Karlsruhe Institute of Technology (Germany) under an EU-funded mobility scheme where I investigated in the production of novel feed ingredients. In 2012, I was granted a Leonardo Mobility Grant at the Irish Agriculture and Food Development Authority (Ireland) where I developed (i) strategies to reduce food processing waste generation and (ii) processes to produce high-end food ingredients. Both are my main research lines since then. In 2013, I was granted a Teagasc Walsh Scholarship and continued to investigate on the production of high-value ingredients including proteins and enzymatic hydrolysate with health-promoting benefits from food processing co-products. I was awarded a PhD in University College Dublin in 2016 and a Wang Shang Fellowship conferred by the ISNFF on recognition for my performance in research on functional foods. In 2017, I joined IRTA where I leaded research lines on novel protein sources and the development of processes to produce functional ingredients and sustainable and safe foods. That same year I was awarded a Juan de la Cierva Formación grant and simultaneously worked as an Assistant Professor at the University of Lleida and as a lecturer for the Catalan Government. During those years, I also collaborated with other research lines on the use of novel non-thermal technologies for the food industry and on the use of sustainable alternatives to chlorine disinfection. In Lleida, I supervised several BSc and MSc students and participated in 3 national, 3 regional, and 1 EU-funded projects all of them related with the management of food co-products and wastes and the development of high-end products. I am since 2020 a senior researcher at the University of Almería under the Juan de la Cierva Incorporación programme. I am participating in 4 regional, 4 national, and 3 EU-funded projects, being the PI of 4 of them. In 2021, I joined the Desalination and Photosynthesis Functional Unit of CIESOL, a joint centre UAL-CIEMAT. I lead research lines on (i) the development of processes to produce edible microalgae, (ii) the valorisation of food processing co-products and the development of functional foods, and (iii) the development of microalgae-based processes for the bioremediation of urban and industrial waste streams, which is a more recent personal ambition. In this sense, I am responsible for the design and construction of a microalgal biorefinery in Mali, funded by the Government of Andalusia, to promote gender equality, process aquaculture wastewater and produce food and agricultural products in the region. I am also supervising 2 PhD candidates, one of them working on the utilisation of waste streams as nutrients for biomass production at a demonstrative scale and the other on the utilisation of flue gases for the production of edible microalgae and novel food ingredients

All these activities led to a high international recognition, being a member of the Editorial Board of 3 international journals and a member of EABA, EFFoST, and RENUWAL. I participated in almost 80 scientific publications, most of them as main or corresponding author, and edited 3 books. I have organised several dissemination activities, written scientific articles for The Conversation and taught courses on food science, engineering and biotechnology at the universities of Lleida and Almería.

Resumen del Currículum Vitae:

MSc in Chemical Engineering, specialisation in Biotechnology and Food Science. I conducted my Master Thesis at the Department of Bioprocess Engineering in the Karlsruhe Institute of Technology in Germany in 2010. In 2012, I was awarded a Leonardo Scholarship at the Irish Agriculture and Food Development Authority, where I investigated in the fields of food sustainability and functional foods. In 2013, I was granted a Teagasc Walsh Scholarship, a highly competitive Irish doctoral grant and completed a PhD in 2016 at University College Dublin. My doctoral studies led to a Wang Shang Fellowship, conferred by the International Society for Nutraceuticals and Functional Foods on recognition for my outstanding performance in graduate studies and research on functional foods. After completing my PhD, I worked under the Juan de la Cierva Formación Programme at IRTA in Lleida. In IRTA, I worked on (i) functional foods and agro-food waste valorisation and (ii) plant-derived proteins for food applications. I also lectured on food sustainability and waste management at the University of Lleida and the Catalan Government (Plan Anual de Transferencia Tecnológica). I work since 2020 under the Juan de la Cierva Incorporación Programme at the Department of Chemical Engineering of the University of Almeria an as I am member of the Functional Unit Desalination and Photosynthesis at CIESOL. Currently, I lead research lines on (i) reutilisation and revalorisation of food processing co-products and wastes to obtain novel products with biotechnological potential, (ii) the production and characterisation of proteins and biologically active compounds from microalgae, and (iii) the development of microalgae-based processes for the bioremediation of wastewater and waste streams. My research led to a Leonardo 2020 Grant for Researchers and Cultural Creators in the Area of Engineering, a highly competitive Grant funded by the BBVA Foundation, and being finalist of the Daniel Carasso Fellowship. I am the PI of 4 research projects funded under competitive calls all of them in the areas of microalgal biotechnology, food production, sustainability, waste management, and circular economy.

Moreover, I lecture on food science, biotechnology, and engineering at the University of Almería and participate in a COIL Programme in conjunction with the Technical University Federico Santa Maria (Valparaiso, Chile). I have a vast experience in supervising BSc and MSc students as well as PhD candidates and postdoctoral researchers at the Universities of Lleida and Almería. I participated in almost 80 publications including 10 book chapters on varied aspects of waste management, biotechnology, and food science and technology and have over 40 contributions to national and international conferences. I am a member of international networks including the European Algae Biomass Association (EABA), the European Federation of Food Science and Technology (EFFoST), and the Ibero-American Network for the Treatment of Effluents with Microalgae (RENUWAL). I am also a member of the Editorial Board of (i) International Journal of Food Science and Technology, (ii) Phycology, and (iii) Frontiers in Food Science and Technology. I am the editor of three books and I write science communication articles for The Conversation with more than 120,000 reads in over 20 countries.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021

Turno General

Área Temática: **Ciencias agrarias y agroalimentarias**

Nombre: GALLEGO ALBIACH, VICTOR

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Referencia: RYC2021-031558-I

Título: Gamete quality and cryobanking for improving the aquaculture production and preserving the biodiversity

Resumen de la Memoria:

During my research career I have participated in different research lines focused on gamete quality, sperm physiology, cryobiology, and fish reproduction. Over the PhD period at the Aquaculture& Biodiversity Group (UPV, Spain) the main research line was focused on controlling the reproduction in captivity in some key aquaculture species, and as result of that research we could designed the hormonal treatment for inducing the sexual maturation in the European eel, developing also protocols for the short- medium- and long-term gamete storage. These protocols are currently used by both public and private institutions in Europe, and breeding in captivity of this species is getting a little closer. During the PhD period I could enjoyed some training periods abroad at state-of-the-art centres (Spain, Japan, and UK), learning new techniques and consolidating excellent relationships with other research groups.

Once finishing the PhD, I followed the research career abroad expanding the range of techniques and skills and learning the reproductive handling of new fish species. On the Department of Animal and Plant Sciences at the University of Sheffield (UK) I learned the management of freshwater cichlids belonging to the Lake Malawi. On the other hand, the stay in the Brazilian Agricultural Research Corporation (Brazil) allowed me to go deeper into the cryopreservation techniques focused on Amazonian freshwater species. The experience gained abroad in different research topics helped me to win 3 excellent two-year grants (2015, 2017, and 2019) destined for researchers with great potential to be hired to the Spanish System of Science, Technology, and Innovation, highlighting the achievement of a Juan de la Cierva -Incorporación-.

During the last years I have leaded novel research lines and projects focused on the conservation of threatened freshwater and marine fish through a cryobiology and biotechnology approach. In this sense, the first line is focused on the gamete and embryo cryobanking for the conservation of threatened Iberian freshwater fish; the second line is focused on the development and application of assisted reproductive technology for the conservation of elasmobranchs (sharks, rays, and chimaeras); and the third line is focused on the application of new techniques for controlling the reproduction of the European eel. It is important to note that I have codirected 1 PhD (and 2 more are in a running process) linked to these research lines.

Thanks to the high scientific production reached over my research career (54 peer-reviewed papers, 140 communications to congresses, and the participation on 16 R+D research projects leading 5 as PI),the last year I was awarded with a Marie Curie Individual Fellowship under the H2020 programme for developing the project CRYO-FISH at CCMAR (Portugal), which is aiming to progress on the basic knowledge of the reproductive biology of fish from Portugal rivers. During the project we will develop and apply novel cutting-edge cryo-technologies for improving the ex-situ conservation programs in fish.

Resumen del Currículum Vitae:

During my research career I have published a total of 54 peer-reviewed papers (70% on the Q1 rank and 30% in D1 rank), being 1st, 2nd, or last author in half of them (27 articles). These manuscripts have contributed to the generation of knowledge thanks to i) the development of maturation protocols for key aquaculture species with reproductive bottlenecks, ii) the standardization of techniques for assessing the gamete quality in fish, and iii) the generation of cryoprotocols for several endangered aquatic species. These articles had significant acceptance in the scientific community and my quality research indicators show high-values: Total number of citations=830, h-index=19, and i10-index = 30. Thanks to the 3-years training period abroad, the list of co-authors amounts to 89 scientists of 52 research institutions belonging from 16 different countries, which denotes a high internationalization of my research career. I have also published 10 book chapters and 140 contributions to congresses (attending 4 as an invited speaker).

I have been involved in 16 R+D National and European projects with an accumulated budget of 1.6 million euros, collaborating with several public and private institutions and achieving important knowledge & technology transfers. Nowadays I am developing new research lines and leading projects focused on the study of the biology & conservation of threatened freshwater and marine fish. In that sense, I have obtained funding for leading 5 research projects as a principal researcher, managing funds with a total value of 235.065 . Between these projects it is important to highlight the recent achievement of a Marie Curie Individual Fellowship for developing the project CRYO-FISH.

I have also organized some R+D activities among which it is important to highlight the Workshop on Reproductive Biotechnology & Cryobanking in Aquatic Species in 2021 (212 assistants). In addition, I have leaded some outreach activities, highlighting 4 seminars/conferences about Science & Aquaculture, 4 outreach days focused on biodiversity preservation, 2 practical courses for discovering the urban biodiversity, and some publications for disseminating the reproductive biology of fish.

I have also leaded some supervision tasks, highlighting the co-direction of the Ph.D. Thesis Improvement of techniques for sperm evaluation and cryobanking in European eel defended in 2019. Nowadays I am codirecting 2 more PhDs which are in a running process. From 2016 to date, I work as Editor on the area Genetic & Fish Reproduction in the journal Revista AquaTIC; and from 2021 I am an Editorial Board Member on Animals, editing a special Issue entitled "Gamete, Embryo and Larvae Handling in Aquatic Animals".

I have complemented my research career teaching 45 ECTS during 8 academic years in several masters and bachelors at UPV and covering a wide range of subjects from biotechnology to ecology. I have also supervised 5 Master Thesis and 2 Bachelor's Final Projects. In 2017 I obtained a positive evaluation as Lecturer/Associate Professor by the ANECA. I have been also fortunate to receive several awards and mentions over my career, highlighting 4 scientific photography awards; and last year I was awarded with the Dayong Gao Young Investigator Award Winner on CRYO 2021 event for the best research trajectory in cryobiology for junior researchers.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno de Jóvenes investigadores

Área Temática: **Ciencias físicas**
Nombre: MILES PAEZ, PAULO ALBERTO
Referencia: RYC2021-031173-I
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Título: Atmospheric characterization of ultra-cool dwarfs via polarimetric and spectro-photometric measurements

Resumen de la Memoria:

Very low-mass stars and brown dwarfs (ultra-cool dwarfs) are a high-fidelity atmospheric laboratory for studying exoplanet-like atmospheres, whose canonical picture involves the presence of clouds just like in Jupiter. However, a full picture of these atmospheres will only be achieved after answering some fundamental questions such as the role that magnetic fields and chemical dis-equilibrium processes play in the observed spectra. While most studies address these by observing and modelling the flux of ultra-cool dwarfs, my research makes use of another property of the light: its polarization state.

Atmospheric cloud particles can linerarly polarize the output flux of an ultra-cool dwarf by means of scattering processes. I was the first one to show that cloudy ultra-cool dwarfs with fast rotations are more likely to exhibit high values of linear polarization. Building up on this, I found that the signal of linear polarization of ultra-cool dwarfs change with their rotation phase, which provides direct information on the patchiness of these cloudy atmospheres and shows the benefits of incorporating polarization data in atmospheric characterization. I was also the first one to investigate the polarimetric spectrum of the Earth in the near-infrared, and found several molecular features highly polarized that can be used to validate Earth-like atmospheres in the future.

I have developed additional lines of research like the search for transiting planets around ultra-cool dwarfs, for which I was the Principal Investigator of both a 1075-hours-long program and a 318-hours-long DDT using the Spitzer Space Telescope. I am also involved in the development of a Canadian space satellite that will extend my Spitzer project. Finally, as part of my ESO Fellowship and to try to understand better the transition in the nature of magnetic activity from stellar-like to planet-like, I have started to search for Jupiter-like aurorae emission at 2-5 micron in ultra-cool dwarfs.

Resumen del Currículum Vitae:

I am an observational astrophysicist interested in the atmospheric characterization of very low-mass stars, brown dwarfs and giant exoplanets (ultra-cool dwarfs). I did my PhD in Astrophysics at the Instituto de Astrofísica de Canarias (Spain, 2011-2015). Then I spent 3 years as a postdoct at the University of Western Ontario (Canada). Since September 2019 I am an ESO Fellow at the European Southern Observatory (ESO, Germany).

My main expertise is in the use of linear polarimetry to the detection of clouds in ultra-cool atmospheres. One of my main contributions is the first observational evidence that ultra-cool dwarfs with fast rotations are more likely to show non-zero linear polarization, and that their polarimetric signal changes with the dwarfs rotation phase. I also investigated the polarimetric spectrum of the Earth from the optical to (for the first time) the near-infrared, and found several molecular features highly polarized that can be used to validate Earth-like atmospheres. I became a member of the Weather in Other Worlds and Cloud Atlas collaborations. One of our most recent results is the discovery of 3 brown dwarfs with rotation periods of only 1 h. I have recently started to search for transiting planets around ultra-cool dwarfs, for which I was the Principal Investigator of a 1075-hours-long program (funded with USD 50k by NASA) and a 318-hours-long DDT program using the Spitzer Space Telescope. Now, I am involved in the design of a Canadian satellite that will extend these programs.

Since 2012, I have been the Principal Investigator of 22 successful observing proposals, that used ground-based 1-10m telescopes in various observatories, and have participated as co-Investigator in other 16, including 2 space programs using TESS. I have been observing at the telescope in more than 100 nights using different techniques in the optical and near-infrared. I published a total of 10 papers as first-author and other 22 as co-author, with a major contribution in 7.

I have presented my work in 12 oral contributions at international meetings, 2 as invited speaker, and gave other 8 outreach talks.

Currently, I am a support astronomer, who assist other observers with approved programs in technical questions related to the instruments FORS2, ESPRESSO, and CRIRES on the Very Large Telescope (VLT). I am also experienced in coordinating projects and successfully building communication between different institutions: In 2018 I served as the project manager of POEP a Science Maturation Study funded by the Canadian Space Agency.

I have co-supervised of 2 PhD students in Canada and Germany that defended in 2021. Currently I co-supervise other 3 PhD students based at ESO. I also have experience in different committees. For example, I have acted as an expert in the Canadian Time Allocation Committee (2017-2019) and the Spanish Time Allocation Committee for the observatories of the Canary Islands (2020-2022), and at several student selection committees at ESO. I have been an external reviewer for the Swiss National Science Foundation, and I am included in the database of experts of the Agencia Estatal de Investigación (Spain). Finally, I have been a referee in some of the top journals in astronomy such as A&A, ApJ, AJ, or MNRAS.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno de Jóvenes investigadores

Área Temática: **Ciencias físicas**
Nombre: CRIADO ALAMO, JUAN CARLOS
Referencia: RYC2021-030842-I
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Título: Effective Field Theories for physics beyond the Standard Model

Resumen de la Memoria:

During my FPU fellowship, my research was focused on the development and application of theoretical and computational tools for the study of physics beyond the Standard Model (SM) within the Effective Field Theory (EFT) framework. Together with collaborators, I constructed a general EFT description of new unstable particles, by extending the SM EFT (the EFT for the SM fields). One of the main results we obtained from it was the construction of a complete dictionary providing the tree-level matching conditions between the SM EFT and any extension of the SM with new particles. Another application was to systemically study vector-like quarks with non-renormalizable interactions. I also coauthored a comprehensive study of the effects of field redefinitions in EFTs at higher orders, and single-authored 2 computer tools for EFT calculations: one for tree-level matching and reducing of effective Lagrangians, and one for the calculation of bases of effective operators.

As a postdoctoral researcher at the NICPB, Estonia, I started contributing to dark matter studies, with a first paper analysing the consequences of new measurements of stellar streams on the nature of dark matter. I was also one of the initiators of a line of research that was new to the group at the time: the construction of a consistent quantum field theory description of particles of spin higher than 1. We developed an EFT that only involves physical degrees of freedom, thus overcoming some of the problems of previous approaches. Even after I started my second postdoc, we have continued to apply this EFT to different scenarios: the description of higher-spin dark matter and the Delta baryon, and the effects of higher-spin particles in collider physics and the muon g-2.

In my postdoc at the IPPP, Durham University, UK, I have studied the emergence of electroweak skyrmions, a kind of soliton, in the SM EFT and in its version with non-linear realisation of the electroweak symmetry: the Higgs EFT. To compute the skyrmion solutions we employed a computer program I coauthored, which solves differential equations and variational problems using neural networks. Together with other collaborators, I have constructed and studied the phenomenology of a general EFT for dark matter with any electroweak quantum numbers. I have also implemented a code for fast simulations in GPU devices of magnetic skyrmions, which arise in condensed matter systems. We have already used this code in a study of magnetic anti-skyrmions.

Resumen del Currículum Vitae:

My main line of research is the application of the effective field theory framework to different aspects of the physics beyond the Standard Model, including dark matter, new resonances at colliders, and topological effects. Along with this, I have also contributed to other fields including: modular models of neutrino masses, the construction of a consistent formalism for the description of higher-spin particles, Monte Carlo simulations of magnetic skyrmions, and the development of a method for differential equation solving using machine learning.

This research has been presented in 18 papers and 2 conference reports. 14 of the papers are published in high-impact peer-reviewed journals (listed in the first quartile by JCR), while the others are currently in the publication process. The total number of citations according to the INSPIRE database is 496, and 2 papers have more than 100 citations each. Many of these works have led to invitations to give talks in international conferences and seminars at leading research institutions.

I have also developed 3 publicly-available computational physics packages: MatchingTools, BasisGen (2 forks in GitHub), and Elvet. They have all been used in several works of mine and of other groups.

My independence and leadership as a researcher is shown by the 2 papers I have published as a single author, my contribution to one of the first few papers in the field of modular models of neutrino masses, which has gained massive attention since; and the development of a new formulation for higher-spin particles, which was a completely new area of research at the centre at which I was working at the time. Currently, I am co-supervising a masters student working on magnetic skyrmions.

The computational part of my work has led to applications beyond high-energy physics. The Elvet package I coauthored solves differential equations and variational problems using neural nets, and it can be applied to any area of science and engineering. I have also developed a code for Monte Carlo simulations of chiral magnets in a GPU device, which it can be used for fast simulations of any lattice system with nearest-neighbours interactions.

Most of my research has been supported by national-level projects: 2 from the Spanish Ministry of Economy, 3 from the Estonian Research Council and 1 from the United Kingdom Science and Technology Facilities Council.

I have been in 3 stays in internationally recognised institutions: a 3-month stay as PhD student at the University of Padua, Italy; a 10-month postdoc at the National Institute of Chemical Physics and Biophysics, Tallinn, Estonia; and a 3-year postdoctoral researcher position at Durham University, United Kingdom, of which I have completed 16 months. In all of them, I have initiated long-lasting collaborations with the members of the group.

I participated several times in the outreach activities of the Science Week at the University of Granada, giving talks about particle and astroparticle physics.

Other merits are: having the Extraordinary Award to the highest scores in my bachelor Degree in Physics; an extra bachelor Degree in Mathematics; teaching at bachelor and masters-level courses on general physics, data analysis, machine learning and dark matter; having the Professor Contratado Doctor accreditation from ANECA; and reviewing several articles in high-impact journals.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno de Jóvenes investigadores

Área Temática: **Ciencias físicas**
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Título: Physical and Neural Networks in Soft Condensed Matter Physics

Resumen de la Memoria:

I am the PI of a Conex-Plus Marie Skłodowska-Curie grant at Universidad Carlos III de Madrid (UC3M) where I study active matter using machine learning techniques, theory of deep learning, and the physics of nonlinear flow networks. Before joining UC3M, I was an Assistant Professor (Profesor Ayudante Doctor) at Universidad Politécnica de Madrid (UPM), School of Industrial Engineering, from September 2020 to June 2021. From 2017 to 2020 I was a postdoctoral researcher in the Soft Matter Theory Group at the University of Pennsylvania. During this time, I was the PI of a research grant financed by the National Science Foundation (NSF, USA) through the Extreme Science and Engineering Discovery Environment (XSEDE). I participated as a researcher in two more projects founded by the NSF and was a collaborator of the Simons Collaboration: Cracking the Glass Problem.

During my PhD I was awarded some of the most prestigious scholarships in Spain (FPU, Residencia de Estudiantes, UC3M PIF), and was a member of three research projects founded by Spanish public institutions. I also secured funding to carry out short research visits to Princeton University, École Normale Supérieure Paris, University of California Santa Barbara and University of Iceland. I graduated in 2017 with the highest distinction (Sobresaliente Cum Laude), an International Mention and the Extraordinary Award from UC3M. Previously, I was a physics undergraduate student at Universidad de Sevilla (US) where I received the award to the best student in the class of 2012.

Resumen del Currículum Vitae:

I have published 17 papers (6 more submitted or about to be submitted) and have a broad network of international collaborators. My h-index is 10 according to Google Scholar. I am starting to build my own research group, mentoring 3 undergraduate and 3 master students. I have received several honors and awards, I have been awarded three research grants as a PI (one declined) and have participated as a researcher in 7 research grants.

I have an extensive experience presenting my work at international venues. I have been invited to give 19 talks and seminars in some of the most recognized institutes and universities in the world, such as Harvard University, Princeton University, Oxford University, University of Pennsylvania, The Fields Institute for Research in Mathematical Sciences or the Banff International Research Station for Mathematical Innovation and Discovery. I was also invited to give one long talk at the 2021 International Conference on Machine Learning, a great honor within the Machine Learning community. I have also presented my work through 22 contributions at international conferences and workshops. I organized two sessions at the APS March Meeting 2020 and one mini-symposium with another two sessions at the 2019 Society for Industrial and Applied Mathematics Conference on Dynamical Systems. My work has also had broad dissemination in the media.

I am committed to the spread of scientific knowledge to diverse audiences. I co-organized a weekly seminar (Seminario Junior IGMB) for graduate students of all disciplines at the UC3M, and I also co-organized a workshop to familiarize high school students with scientific thinking that was founded by the Spanish government (FCT-16-10873). Finally, I have proven my excellence at teaching, being congratulated at UPM and UC3M after every academic year, due to the outstanding outcome of my teaching.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno de Jóvenes investigadores

Área Temática: **Ciencias físicas**
Nombre: SANCHEZ ALONSO, CARLES
Referencia: RYC2021-031194-I
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Título: Cosmology with imaging galaxy surveys

Resumen de la Memoria:

The study of the Universe represents one of the most fundamental goals in science. In the past century we have developed a deep and detailed understanding of the Universe, thanks to both theoretical and observational advancements. Remarkably, we now have a detailed cosmological theory for which predictions agree quantitatively with astronomical observations. This standard cosmological model appears to be robust and simple, but requires the addition of two main physical components of unknown nature and origin: dark matter and dark energy, which constitute two of the biggest challenges in science today. Galaxy imaging surveys provide 3D maps of the Universe which are used to understand its composition. In particular, these surveys measure the clustering of galaxies in combination with its weak gravitational lensing effect and provide robust constraints on the amplitude of matter fluctuations at late times. In recent years, these measurements from surveys such as the Dark Energy Survey(DES), Hyper Suprime Cam (HSC) or the Kilo-Degree Survey (KiDS) reveal a hint of tension with the predicted value from the cosmic microwave background (CMB), in a crucial test of the validity of the cosmological model. More data will be needed to statistically confirm such tension, which would break the standard cosmological model and point to an additional as-of-yet undiscovered aspect of the Universe.

Imminently, the enormous amount of data from new surveys such as the Vera Rubin Observatory Legacy Survey of Space and Time (LSST) and ESA's Euclid mission will lower the statistical uncertainties to greatly tighten this test and shed light into the dark components of the standard cosmological model. However, such galaxy surveys will be limited by systematic uncertainties and suboptimal cosmological inference with current analysis techniques. In particular, the current techniques perform separated inferences for the shapes and distances of galaxies, while they are directly connected as further galaxies have traveled through more structures across the Universe. Crucially, I play a world-leading role in the measurement and characterization of galaxy distances and shapes, and I currently lead the DES Working Group in charge of characterizing distances. Also, I have led numerous cosmological analyses in the context of DES, and I have published several articles developing a new Bayesian and principled approach to analyzing imaging surveys. With the RyC fellowship I will conduct a research program to perform the optimal extraction of cosmological information from the combination of LSST and Euclid. The program will be based on a new approach to joint inference the photometric redshifts, lensing and matter density fluctuation statistics in a principled, Bayesian scheme, as opposed to the current independent inference of these pieces. This is the only way to include the interplay between cosmological parameters and the leading sources of systematic uncertainty, redshift and lensing calibration. Furthermore, the combination of space and ground photometry from Euclid and LSST will enable the exploration of a higher redshift regime (probing earlier times in the Universe). This approach represents a unified and principled analysis of LSST and Euclid, and will result in stringent tests of the cosmological model in redshift regimes that remain unexplored by galaxy surveys.

Resumen del Currículum Vitae:

I graduated in Physics in 2011 at Universitat Autònoma de Barcelona (UAB), and then in 2013 I completed the Master in High Energy Physics, Astrophysics and Cosmology at UAB. During that time, I joined the Observational Cosmology group at the Institut de Física d'Altes Energies (IFAE), where I did my doctoral work on the cosmological analysis of galaxy surveys. After completing my PhD in Physics at UAB and IFAE in 2017, I joined the Ivy-League University of Pennsylvania (USA) as a postdoctoral researcher, where I obtained a five-year fellowship ending in 2022.

My research focuses on the study of the cosmological large-scale structure and its connection to the dark components of the Universe, namely dark energy and dark matter, through the history of cosmic expansion as well as the history of the growth of those structures in the Universe. In order to access that information through observations, I concentrate on the analysis of galaxy survey data, in particular from imaging surveys via galaxy clustering and weak gravitational lensing. During my career, I have made crucial contributions to the success of imaging surveys as a new key cosmological probe, and several of my publications have been central to the development of the field. In particular, I have played a leading role in the current biggest imaging galaxy survey, the Dark Energy Survey (DES), where I am a member of the Science Committee and the convener of the Redshift Working Group, leading a team of around 30 scientists and coordinating more than 10 redshift-related publications in the past two years. Within DES, I have led several analyses and publications in photometric redshifts, cosmic voids and cosmological inference from the combination of large-scale structure and weak gravitational lensing, playing key roles in the cosmological analyses of DES Year 1 and Year 3 data, which constitute the leading analyses in the field. Outside of DES, I have led a number of publications that constitute the state-of-the-art in redshift characterization. This experience grants me a unique profile, with a deep understanding of galaxy survey science and established leadership in the community, that places me in an ideal position to face the challenges of the new generation of galaxy surveys: LSST and Euclid.

So far, I have published more than 50 original articles in the top peer-review journals in astronomy, with over 4000 total citations (from NASA ADS), with an h-index of 31. I have been invited to present my work at numerous top universities and conferences in the USA, Chile, the Netherlands and Spain. In addition, I have mentored two PhD students (including several derived publications that have been a central part of their respective PhD theses) and one undergraduate student. I act as referee for the most important peer-review journals in astronomy, and the excellence of my research has been recognized by several organizations including the European Commission and NASA. Last but not least, throughout my career I have participated in numerous outreach events and advocated for a more inclusive environment in astronomy. In particular, I have given several talks to high-school students, organized hands-on activities with them, imparted several tutorials on statistical techniques for cosmology and also on the usage of those tools for the analysis and understanding of public city data.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno General

Área Temática: **Ciencias físicas**
Nombre: APARICIO REBOLLO, FRANCISCO JAVIER
Referencia: RYC2021-034385-I
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Título: ADVANCED MATERIALS AND DEVICES FOR MULTIFUNCTIONAL APPLICATIONS BY NOVEL PLASMA AND VACUUM DEPOSITION PROCESSES

Resumen de la Memoria:

Dr Aparicio has successfully addressed the development of novel plasma/vacuum deposition techniques and the implementation into the synthesis of organic nanomaterials for multifunctional applications. The proposed deposition techniques are of very high technological interest as they are based on techniques extensively present in the current microelectronic and photovoltaic industrial processes. Dr Aparicio has pushed the state of the art of plasma methods by the development of advanced functional plasma polymer coatings implemented in different technology fields: photonics and optoelectronics, advanced packing solutions, energy harvesting and the very recently initiated investigations on wearable electronics.
In photonics, Dr Aparicio demonstrated, for the first time, the viability of plasma processes for the development of coloured, luminescent and photonic-sensor organic nanocomposite thin films. The deposition approach, developed by the candidate during his PhD at the Institute of Materials Science of Sevilla (CSIC-Universidad de Sevilla), provides a wide range and effective control over the optical, luminescent and sensing response of these materials, which makes them excellent candidates for the implementation into advanced photonic devices and sensors, as demonstrated within the EU project PHODYE.
Dr Aparicio completed successful postdoctoral stays in leading laboratories in plasma deposition techniques (with Prof. Snyders at the University of Mon Belgium) and biophotonics (at the University of Trento with Prof. Pavesi), in a total of 31 months. Afterwards, the know-how acquired by Dr Aparicio during his postdoctoral stays was applied in his return to Spain.
The sensors nanocomposites developed by him were selected by the technological-transfer-program RECUPERA 2020 for the fabrication of a new technology of smart labelling systems applied to the agro-food sector in the Andalusian region. During this period, Dr Aparicio also pursued the settlement of his own research line by the development of evolved sensors materials and laser devices, which motivated a granted MS Curie proposal. Thanks to the JdC Incorporation contract, he consolidated his senior research profile by opening a new research line about advanced packing solutions for emerged technologies: e.g. 2D and organic electronics materials and perovskite solar cells.
In 2018, he joined the company ALTER TECHNOLOGY TÜV NORD to develop and lead a new scanning acoustic microscopy laboratory.
In 2020 he decided to return to public research within the frame of the EU project 3DScavengers where he implements innovative plasma methods to the fabrication of hybrid nanogenerators.
Very recently, he has won 2 research projects as PI on the Development of dielectric materials for flexible electronics (PlasmaDielec - Proyectos de I+D+i - Programa Operativo FEDER- 30k€) and flexoelectricity (FLEXDIELEC - Captación del Talento Investigador, Programa EMERGIA-256k€). This financila support allows him to reactivate the research line on advanced packing, which now deals with conformable electronics by the development of high-k and low-k plasma nanocomposites, compatible with delicate flexible electronics systems, and flexoelectric materials as continuation of his research on energy harvesting.

Resumen del Currículum Vitae:

*Scientific publications relevance: Dr Aparicio develops an intense scientific career as evidenced by his 36 indexed papers (+6 proceedings), including 20 articles D1/Q1 and 32 articles Q1 (e.g. Adv. Mater., Adv. Funct. Mater., ACS Appl. Mater. Inter., Chem Mater.). These researches have been highlighted in the covers (8) and editorials (3) of reputed journals, 20 invited talks (7 as 1st author) to international conferences and cited 706 times, including books (7) and reviews (68) in reference journals.

*Knowledge transfer: He is inventor of a patent that drew the attention of the Royal Mint of Spain (Fábrica Nacional de Moneda y Timbre). The technological impact of his research is also supported by the 6 industrial contracts with technological companies (Arquimea, Alter Technology and SOS Cuetara) and public bodies (ESA and Spanish government). This includes the program RECUPERA 2020, for the transfer of new technologies to the Andalusian agricultural sector, which selected a novel smart labelling technology based on the sensors nanocomposites he developed. Dr Aparicio led an industrial research project (Torres Quevedo program).

*Student mentoring and teaching activities: He is currently supervising 2 PhD thesis
(1 FPI funded and 1 by his projects), he mentored 4 Master Theses (at the Universities of Trento and Seville). He has supervised 2 Final Degree projects (University of Seville), and mentored exchange students during their international internships.

*International research experience: Dr Aparicio was awarded as principal investigator 2 EU funded research projects. He performed two international postdoctoral stays: i) at the University of Trento with Prof. Pavesi (Advanced ERC Grant 2017) (3 papers + 2 proceedings) (ii) at the University of Mons (4 papers+ 1 proceeding) in leading groups in biophotonics and plasma polymerization processes, respectively. These researches critically contributed to 2 research projects (NAoMI and PSI) involving international partners from 4 countries. In addition, the photonic and sensors materials developed by the candidate were the decisive element in a new technology of photonic sensors chips developed within the EU project PhoDye. Ans currently participate in the EU project 3DScavengers

*Leadership: Demonstrated by the capacity to initiate new research lines in the hosting groups and to raise funds (546K€) for his research line. The applicant was awarded as principal investigator 6 competitive grants and projects (European, national and regional). In ALTER TECHNOLOGY he successfully developed and led the Acoustic Microscopy Laboratory, being in charge of the technical qualification of the laboratory.
Recognition of his own research line: Since 2020 he is Topical Editor of Coatings. Invited lecturer at the 20th International Plasma School. He has participated as first author of 7 invited talks in international conferences.

*Panels and committees: Evaluation panel of PhD Tesis of D. Thiry(University of Mons in 2013), 2014-2018 member of the scientific committee of the Annual International-Invited-Seminars at the Institute of Materials Science of Seville (ICMS), Anonymous evaluator of the Programa de Ayudas Margarita Salas 2021. Selection panel for technical staff at the US scientific equipment at the University of Seville.

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Turno General

Área Temática: **Ciencias físicas**
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Referencia: RYC2021-031798-I
Correo Electrónico: hannu@iac.es

Título: Exoplanets

Resumen de la Memoria:

Measuring the brightness of a star repeatedly produces a time series, a light curve, and this light curve can be searched for periodic dips produced by transiting extrasolar planets, that is, planets orbiting stars other than the Sun periodically crossing the line of sight of its host star and the observer. A lot can be learnt about the nature of these planets and their host stars simply by studying the periodic dips they cause, the transit signal. Further, combining the transit method with other observational techniques, such as radial velocity measurements, has allowed us to gain substantial insights into the formation, composition, and structure of individual extrasolar planets and planetary systems during the last two and a half decades.

The modern field of extrasolar planet (exoplanet) research was born from the radial velocity (RV) discovery of a planet orbiting 51 Pegasi in 1995 (Mayor and Queloz 1995). The detection brought the debate whether planetary systems were an extreme rarity to a conclusion (they certainly are not), and was soon followed by a vast number of new discoveries. The early years from 1995 to 2005 were dominated by discoveries and studies based on RV measurements, but other methods were also applied with increasing success. Radial velocity surveys require long-term observations of individual stars with large telescopes and extremely stable instruments and are hard to extend to cover a large sample of stars. Methods that could reveal more about the physical properties of the discovered planets, while simultaneously being cheaper, easier to automatise, and easier to extend were devised to compensate for these shortcomings.

Photometric surveys searching for planetary transits by simultaneously observing hundreds to hundreds of thousands of stars turned out successful. First, the ground-based photometric surveys started yielding discoveries as the transit-detection methods improved and the survey time-spans increased. Next, the space-based telescopes CoRoT (Baglin et al. 2006) and Kepler (Borucki et al. 2010) began producing photometric time series of a quality unattainable from the ground from hundreds of thousands of stars simultaneously, leading to a rapid increase of known planets and planetary systems.

Since 1995, we have learnt that not only are exoplanetary systems common but also that the variety of planets and orbital configurations is more diverse than what could have been imagined. With 4969 confirmed planets in 3660 planetary systems (as of 7.2.2022) and planet sizes spanning from 0.29 Earth radii (Kepler-391 b) to 49 Earth radii (TOI-2076 c), we have reached the stage where we can, among many interesting topics, study the composition and structure of atmospheres of individual planets (Sing et al. 2015, for example), probe the formation histories of planetary systems, and discover correlations between host star properties and planetary properties, such as the existence of a transition region between rocky and gaseous planets suggested by Fulton et al. (2017).

Resumen del Currículum Vitae:

I am an astrophysicist with expertise in the search and characterisation of extrasolar planets and planetary systems. My scientific work combines Bayesian statistics, computational science, and observational astronomy.

Invited reviews: chapter in the Exoplanets Handbook titled "Bayesian Methods for Exoplanet Science" (Springer, 2018)
Refereed 1st author papers: 17
Refereed 2nd and 3rd author papers: 24
Total refereed papers: 102 (ADS)

Statistics from Google Scholar:
Total citations: 2811
h-index: 29
i10-index: 64

I am a Reviewing Editor for the physics and astronomy section of "Experimental Results" (Cambridge University Press).

Software development experience:
I am the lead developer of the open source Python packages PyTransit (Parviainen, H., MNRAS 450, 2015, used in 117 refereed papers) and LDTk (Parviainen, H. & Aigrain, S. MNRAS 453, 2015, 157 ref. papers); of the K2SC K2 data detrending pipeline (Aigrain, Parviainen, Pope, MNRAS 459, 2016, 201 ref. papers); and of a light scattering and soft X-ray fluorescence simulation code used in the Helsinki University (Parviainen et al., JQSRT 112, 2011). The three first packages are available from GitHub.

Work experience:
- Advanced Severo Ochoa Fellow in the IAC (2021-current)
- Postdoc in the Instituto de Astrofisica de Canarias (IAC, 2016-2021)
- Postdoc in the Oxford University (2013-2016)

Invited peer-review panels:
- ESO Observing Programmes Committee (OPC) 108, 2021
- ESO Observing Programmes Committee (OPC) 106, 2020

- NASA APRA/SAT18 peer review panel in Maryland, USA, 2019

Refereeing experience:
- A&A, ApJ, MNRAS, Astrophysics and Space Science, Optics Communications, and Journal of Space Weather and Space Climate

Talks and posters:
- Invited seminar talks in the Cambridge University and IAC
- 34 talks in international conferences, workshops and meetings
- 24 posters in international conferences

Personal grants:
- 5 personal research grants through competitive calls

Teaching experience
- I lectured a part of the "Exoplanetas & Exobiologia" course in the University of la Laguna in 2021, and will repeat this in 2022.
- I worked as a tutor in two summer schools 2019 and 2020.
- I lectured the course "hands on methods in astronomy" in the University of Helsinki in 2006, 2007, and 2008. The course was aimed at 1st and 2nd-year astronomy students, and I had the full freedom to design and lecture it.

Supervising experience
- I am supervising a PhD student in the IAC (started Dec 2019)
- I have supervised 2 summer school projects in 2019 and 2020 both leading to a refereed paper led by my students.
- I have supervised 3 summer projects in the Oxford University: one in 2014 and two in 2015. The students were in their last undergraduate year, preparing to apply for PhD positions.

Astronomical observing experience
- Over 250 nights with the telescopes located at the Teide and Roque de los Muchachos observatories

International collaborations
- I'm a participating member in the PLATO team, CHEOPS team, TFOP SG1 team, and Internationa Space Science Institute (ISSI) funded team.
- Collaboration in the MuSCAT2 project between the IAC exoplanet research group and Japanese exoplanet researchers.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno General

Área Temática: **Ciencias físicas**
Nombre: APRILE , FRANCESCO
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Correo Electrónico: dascancellare@gmail.com
Título: Quantum Fields, Gravity and Strings

Resumen de la Memoria:

Trajectory: During my PhD [Universitat de Barcelona 09/2013] I acquired broad expertise on Quantum Field Theories in various dimensions, General Relativity, Supersymmetry, Supergravity, old fashion String Theory, and the AdS/CFT correspondence. My thesis, and its annex publications, focussed on Holography, with a view towards applied Holography, in particular, applications to Condensed Matter Physics. At that time, Holography was proposed as a framework where to understand strongly coupled phenomena in Condensed Matter, by studying analog properties of black hole physics in AdS. For example, high temperature superconductivity. With a similar motivation, during my first Post-Doc I studied aspects of Holographic Entanglement Entropy on the Coulomb brach of various Dbranes, my e-Print: 1410.7773, and pointed out its relation with the connectivity index of the gravitational backgrounds.

Soon after I shifted my interests towards a line of investigation dedicated to Exact Results in Gauge Theories, such as the study of dualities in susy theories and the use of supersymmetric localisation techniques, with a notable new duality found in e-Print:1812.08142.

More specifically for my career, I started a quantum gravity/analytic CFT bootstrap program for large N gauge theories, whose purpose is that of solving quantum gravity in AdSxS spaces, by using the dual CFT. In the 2016/2017 I contributed extensively to the development of such a program. My results range from e-Print: 1706.0282 to 2007.09176, and include the first computation, ever performed, of the 4pt scattering amplitude of graviton supermultiplet in AdS5xS5, at one-loop in the Newton's constant. In parallel, I solved the spectrum of all tree level anomalous dimension of two-particle operators at strong coupling in N=4 SYM at large N, e-Print: 1802.06889. This was the first exact result for an infinite family of operators in a full-fledge theory. It also led to the discovery of a new hidden symmetry in N=4 SYM.

Line of investigation I: The quantum gravity/analytic CFT bootstrap program is part of my ongoing research. It is an active subject and well motivated by Quantum Gravity investigations. If such a theory exists it is most probably unique, and therefore theorically searchable also within the AdS/CFT correspondence, where higher are the chances to understand its mechanism, rigorously. A list of examples where this program is currently being investigating includes: AdS3, with my e-Print 2104.00036; the aforementioned AdS5, with the inclusion of stringy corrections, as in my e-Print 2012.12092, and forthcoming stringy loop corrections; finally AdS7 for its relevance with M-theory. A number of technical problems about susy CFT in 6d, and diverse dimensions, have been solved in my e-Print 2112.12169, paving the way to a clear and detailed study of M-theory in the supergravity regime.

Line of investigation II: A related and fashinating aspect of AdS/CFT is the way correlation functions are geometrized. This is well understood for insertion of small operators but unexplored for insertion of operators which are so heavy to source a backreaction, e.g. black hole or extremal geometries multi-point correlators. This questions are key and yet unxeplored. My current research project will explain how Einsten's equations solve this problem, providing yet a new perspective on Gravity.

Resumen del Currículum Vitae:

Undergraduate studies: University of Pisa, Physics (Bachelor 07/2006), and Theoretical Physics (Master 09/2008). The latter with a Thesis on "Supersymmetry Breaking in meta-stable vacua" [Supervisor: Matteo Bertolini SISSA] approved cum laude.

PhD in Physics (09/2013), University of Barcelona with a Thesis on "Applied Gauge/Gravity Duality, from Supergravity to Superconductivity" [Supervisor: Jorge Russo], approved cum laude. URL for the digital deposit: http://diposit.ub.edu/dspace/handle/2445/49083

I started my Post-Doc journey in september 2013, and in the order, I passed through the University of Crete (Greece), 09/2013-09/2015, University of Southampton and the STAG Centre (UK), 09/2015-09/2017,University of Milano-Bicocca (Italy), 09/2017-03/2021, finally arriving at the Institute of Physics of the ICTP-SAIFR in Sao Paulo (Brazil) in july 2017, after the COVID situation improved. I

Among the internationally reknowned centers I visited I acknowledge a long-term period at Perimeter Institute during fall/spring semester 2012, and a short-term one-month visit at the Weizmann Institute, during the spring semester 2014.

Topics covered by my research over the years: Holography, AdS/CFT, Amplitudes, CFT Bootstrap, String Theory, Exact Results in SUSY Gauge Theories, SUSY Dualities. A throughout career summary is detailed in the Memoria attached to this application. Closer to the present, my most recent work on 4pt Quantum Gravity amplitudes in AdS/CFT and N=4 SYM is very well known and continues nowadays. It established a novel line of investigation which I refer to as Quantum Gravity/ CFT bootstrap. It embraces both Amplitudes and Bootstrap communities, as well as the String Theory and AdS/CFT community. This is the result of personal initiative, putting together my competencies in theoretical physics, in programming algorithms, and also social skills in establishing valuable collaborations tables.

Online summary of my research available at: https://inspirehep.net/authors/1065389?ui-citation-summary=true

papers 21; published 20;
citation 641;
h-index 13;

citations/average per paper 32;

Main Collaborators: Pedro Vieira (Perimeter Institute and ICTP-SAIFR), Rob Myers (Perimeter Institute), James Drummond (Southampton), Paul Heslop (Durham), Sara Pasquetti (Milano-Bicocca), Francesco Sanfilippo (Roma 3), Vasilis Niarchos (Crete), Jorge Russo (Barcelona), Diego Rodriguez-Gomes (Oviedo), Sebastian Franco (N.Y.) and Diederik Roest (Groningen)

Organizers of Workshop on holography, gauge theories, and black holes, STAG centre, University of Southampton, 18-20 July 2016. https://www.southampton.ac.uk/stag/news/events/2016/ 07/18-workshop-on-holography-gaugetheories-blackholes.page

Organizer of Workshop on holography, black holes and numerical relativity, STAG centre, University of Southampton, 3-5 April 2017. https://sites.google.com/site/stringtheoryseminars/ workshops/2017-edition-1

Teaching Experience: For the University of Barcelona: Frontal, tutoring Computational Physics (hrs 22 in the 2011/2012 and hrs 24 in the 2012/2013); Frontal, tutoring Lab of Physics for Chemists (hrs 12 in the 2011/2012 and hrs 6 in 2012/2013); Frontal, tutoring Lab of Modern Physics (hrs 10 in the 2011/2012). For the Taller de Alras Energias 2011, tutoring "Quantum Field Theory" by M.A.Vazquez-Mozo (hrs 48 in the 2011). For the University

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno General

Área Temática: **Ciencias físicas**
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Título: Quantum Resources for Quantum Information

Resumen de la Memoria:

Over the next five years my plan is to continue to develop and apply the techniques I helped develop in order to harness the potential of quantum technologies, particularly near-term quantum devices. Specifically, my research lines lie predominantly in the following three areas (i) the development and application of sequential analysis in quantum information theory, (ii) the use of machine learning, and more specifically reinforcement learning, for the design of high performance quantum error correcting codes for near term quantum computing and (iii) the development of a spectrally engineered atomic clock capable of delivering quantum limited time-keeping precision.

The first steps towards a genuine quantum sequential analysis have already been taken by my collaborators and I here at UAB. Specifically, we have developed for the first time to our knowledge a sequential protocol for the fundamental primitive of quantum binary hypothesis testing. There, we showed that sequential protocols can offer significant advantages, both in performance, as well as in experimental design, over the more traditional approaches on quantum hypothesis testing. My plan is to extend the use of sequential analysis to other fundamental primitives, such as parameter estimation, quantum state and device certification, and to apply these techniques for the design of quantum sensors and quantum protocols on small, near term quantum devices.

My second research direction focuses on the use of powerful machine learning techniques and neural based networks for the design on high capacity and high error threshold quantum error correcting codes. Thus far, we have successfully applied these techniques for designing optimal decoders for topological error correcting codes of small size. I intend on developing and extending these techniques further in order to tackle more general error correcting codes for near term quantum computers. I also plan on migrating these techniques to address open problems in error corrected quantum sensing, and more specifically to sensors subject to general non-Markovian noise, for which it is still unclear whether quantum limited precision is achievable or not, and for which the design of error correcting codes remains an open problem.

My third research direction involves the construction of an atomic clock based on an entirely new idea i have developed known as spectral engineering. This technique was used successfully by my colleagues and I to design quantum limited magnetometers that use a single atom. The technique allows for prolonging the interrogation time in an atomic clock sequence indefinitely (in principle) while maintaining quantum coherence throughout. In doing so, I believe that such a clock has the capability of outperforming all other clock designs to date. My aim is to develop a theoretical model of the operation of such a clock, analyse its performance under realistic experimental constraints (imperfect spectral engineering, decoherence, thermal effects and stochastic fluctuations), and provide an experimental realisation using current technology.

Resumen del Currículum Vitae:

I am a theoretical physicist currently at the quantum information group (GIQ) in the Physics Department of Universitat Autònoma de Barcelona in Barcelona, Spain. My expertise lies in the field of quantum information theory; particularly in quantum statistical inference and metrology, quantum information and error-correction, as well as in the foundations of quantum theory. My contributions in these fields number in excess of 20 articles most in Q1 and D1 peer-reviewed journals with over 350 citations (800 citations according to google scholar), and have an h-index of 9 (14 according to Google Scholar). I have participated in 7 competitive R & D projects, one as principle investigator, and have presented my work in over 20 national and international conferences.

I obtained my PhD in Physics in 2012 from the University of Calgary, Canada. My thesis focused on a hot topic at the time, the resource theory of quantum reference frames, and dealt with how to communicate reference frame information (such as clock times, Cartesian axis etc) using quantum mechanical systems as well as how to perform pertinent communication and computation tasks in the absence of a shared frame of reference. In July 2012 I moved to the University of Innsbruck for my first post-doctoral appointment where I remained until 2016. During this time I focused on more practical applications of quantum information and in particular quantum metrology, where I helped pioneer the use of techniques from quantum information and quantum control in order to combat the deleterious effects of noise in quantum sensors. In addition, I also developed several key quantum information protocols, chief among which the super replication of unitary quantum gates, as well as quantified the resources needed in order to achieve the maximum advantage furnished by quantum mechanics in these as well as several related tasks. Two of my results namely the use of quantum error correction in sensing and the protocol for super replicating quantum gates have been demonstrated experimentally.

In 2016 I moved to the Universitat Autònoma de Barcelona, where I received the Juan de la Cierva post-doctoral fellowship in 2017. Whilst in Barcelona, I have continued to contribute actively in quantum sensing with the design of optimal protocols for estimating the overlap between arbitrary quantum states, super resolution imaging, as well as quantum sequential analysis. In addition, my collaborators and I have designed near optimal protocols for quantum communication using experimentally friendly quantum encodings, as well as in the design of optimal, resource efficient quantum sensor for the atomic magnetometer in the experimental group of Prof. Morgan Mitchell at ICFO under the Quantum Cat initiative of the government of Catalunya. I have also helped develop powerful machine learning techniques for the design of optimal decoders for quantum error correction for near term quantum devices.

Over the next five years I plan to harness the power of quantum features in the field of sequential analysis focusing on applications of quantum technologies such as atomic clocks, quantum error correction, magneto-optical sensors, as well as in quantum biological systems.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno General

Área Temática: **Ciencias físicas**
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Título: Multi-scale galaxy evolution within the complete baryon cycle

Resumen de la Memoria:

The current concordance cosmological model provides a physically motivated description of the Universe on large scales (> 10 Mpc), where it is dominated by gravity. On the scales of clusters, groups, and individual galaxies, the picture is less clear as the involved processes are more complex. Even though our understanding of both the properties of large-scale structure (LSS) and the processes through which galaxies form and evolve has greatly improved over the last decades, we are only starting to understand how deeply cosmology and galaxy formation are intertwined.

My research falls within a broader landscape of galaxy formation and evolution science. It is focused on understanding properties of galaxies in the cosmological context, with a particular emphasis on their interplay with the environment, both local, at the scale of dark matter halos, and global, at scales defined by the large-scale structure.
My objective is to answer the longstanding questions in the field of galaxy formation and evolution such as i) What is the role of the environment in shaping galaxy properties?
ii) Is the quenching of star-forming galaxies in part driven by LSS?
and iii) How well do we understand the star formation process itself?
In short, can we understand galaxy properties within the context of the complete "baryon cycle", i.e. as the result of interaction between the cosmic web and the galaxies through complex processes of inflows and outflows?

To this purpose, I use state-of-the-art numerical simulations and observations, and their confrontation with the theoretical studies of both the formation of LSS of the Universe and processes operating on scales of galaxies. My expertise in running and analysing hydrodynamical and N-body simulations using different codes at the scales of galaxies, but also below (star forming clouds) and beyond (the cosmic web), combined with my experience in using observations of individual galaxies and large galaxy surveys (photometric, spectroscopic and integral field unit) together with my effort in developing a wide range of analysis tools (quantification of morphological
features based on Fourier analysis, an analytical model of star formation, an anisotropic group finder algorithm), and my expertise in topological tools (skeleton, Minkowski functionals), gives me a unique opportunity to address complex physical processes that govern galaxy formation and evolution.

The goal of my research is to tackle the upfront challenges of galaxy evolution in a cosmological context within the rapidly evolving landscape of contemporary astrophysics.
By combining in a unique way state-of-the-art observations, simulations and theoretical models, I aim to propose a comprehensive picture of the complex physical phases of the baryons filling the large-scale structure. As a result, my research program will allow me to i) provide a more complete environmental paradigm for the dynamics and morphology of galaxies, ii) improve the modelling of the impact of baryons on cosmological observables, iii) unveil the processes at stake at various scales, and iv) help optimise future observational strategies to obtain a complete picture of the baryonic matter in the Universe.
The next generation of ground and space-based surveys, with Spanish involvement, are designed to achieve this goal, making this area of research thrive in the coming years.

Resumen del Currículum Vitae:

Currently, I am a postdoctoral researcher at Laboratoire d'Astrophysique de Marseille (LAM), where I continue to work on topics closely related to the formation of galaxies and cosmological structures, after spending 3 years as a Postdoctoral Research Associate in galaxy formation and theoretical cosmology at the Institute for Astronomy in Edinburgh. Prior to this, my first postdoctoral appointment at LAM, focused on the cosmic origin of the Hubble sequence.

I received my undergraduate education in Fundamental Physics and Cosmology at the University of Paris VI and XI. A competitive CFR grant has allowed me to carry out a doctoral project at CEA-Saclay, France, in the field of numerical hydrodynamical simulations, both in the close-box and zoom-in cosmological context. I designed, ran and analysed these simulations to study the links between galaxy evolution, morphology, and internal physical processes, with a particular focus on star formation, which I supplemented with analytical work.

During these appointments, I have pursued and developed my own research at the interface between astronomy and theoretical physics, with an emphasis on galaxy formation on multiply connected scales. My signature expertise is often identified with the multi-method and multi-scale approach to study their evolution over cosmic time. I use numerical simulations and analytical models to interpret observations from galaxy surveys, to make predictions for upcoming surveys. On megaparsec scales, my work focuses on the large-scale structure of the Universe and its impact on the physical properties of galaxies. On intermediate scales, I work on the connection between galaxies and the filamentary network of the cosmic web incorporating the effects of angular momentum and gas, important fuel for star formation on small, (sub-)parsec scales. Building on this expertise, I now propose to investigate the exact role of baryons in order to understand their complete cycle in the context of galaxy formation and evolution. This needs to be done both observationally and numerically. Being a member of several ongoing and future consortia both on the side of observations and simulations, I am in an ideal position to tackle this task over the next decade.

As often as possible, I take the responsibilities within the scientific community and I have always participated in the wider activities of each institute that hosted me. As a part of broader service activities, I participate in the evaluation of publications in peer-reviewed scientific journals. During my postdoctoral appointments, I was organising the weekly colloquia, and I have been involved in the organisation of several international conferences.

Since my doctoral days, I have developed a strong interest in teaching. My teaching experience involves a total of 268 hrs at various levels of undergraduate and graduate education. I have been supervising undergraduate students, PhD theses and providing scientific guidance to junior post-docs. I also have valuable experience in team management and leadership that I developed while working as a software engineer in the private sector. I enjoy preparing and delivering talks and lectures and, in the last three years, I have been invited to present talks and seminars at ten world-leading international institutions, including one summer school, receiving very rewarding feedback.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno General

Área Temática: **Ciencias físicas**
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Título: Nuclear structure and dynamics of exotic neutron-rich nuclei and hypernuclei

Resumen de la Memoria:

My main research lines are:
- Study of nuclear fission using spallation and quasi-free scattering reactions in inverse kinematics
- Investigation of hypernuclei and their properties
- Excitation of baryonic resonances in neutron-rich nuclei
- Development of dynamical hadronic models for GEANT4 simulations
- Design of high resolution silicon tracker detectors for nuclear physics experiments

65 scientific publications in high-impact peer-reviewed international journals, including: Physical Review Letters, Physical Review C, and Physics Letters B. More than 45 contributions to international conferences, workshops and schools with 7 invited talks.

I carried out my PhD at the University of Santiago de Compostela (Spain) in just three years. The focus of my thesis was the study of proton-induced fission reactions in inverse kinematics using state-of-the art detectors developed at the GSI facility for the understanding of the nuclear structure and nuclear dynamics at small and large deformations. My work resulted in 5 first-author refereed publications and 8 first-author contributions to international conferences and workshops. One of the most relevant results was the discovery of a new fission observable sensitive to the saddle-to-scission dynamics that allowed to constrain the viscosity coefficient at large nuclear deformations. With my PhD work I also proposed to use quasi-free scattering reactions to induce fission reactions on exotic nuclei since it provides a good control over the properties of the fissioning compound nuclei, opening this new line of research at GSI. I actively pursued my research in this field during my postdocs at the IRFU and GSI institutions, improving dynamical reaction models that describe the quasi-free scattering collisions of heavy nuclei inducing fission reactions and developing the data analysis software for the new experiments. My postdocs at IRFU and GSI also allowed me to start new lines of research in the investigation of hypernuclei, in the study of baryon resonance excitations in neutron-rich nuclei and in the design of new silicon tracker detectors for the R3B collaboration, in which I am a member of the technical board leading the data analysis tasks.

Resumen del Currículum Vitae:

My career focuses on answering key questions in nuclear physics today: the understanding of nuclear dynamics and nuclear structure of unstable nuclei and the investigation of the production mechanism of exotic nuclear systems like mesic-nuclei and hypernuclei. Member of the international Super-FRS, R3B and GEANT4 collaborations. During my career I have participated in more than 24 successful experiments (+4 ongoing experiments) assuming key roles in the experiment preparation, data analysis and interpretation of results. Currently, I am a member of the R3B technical board leading the data analysis tasks of the present R3B experiments. Additionally, I am a frequent reviewer of high-impact journals in physics.

My career in science started in 2011 participating in competitive research programs for students funded by the Education & Science Ministry (Beca de Colaboración). Thanks to my academic records, I got a PhD grant at the University of Santiago de Compostela (USC) from the ENSAR European project to work on nuclear fission studies within the SOFIA collaboration at the international GSI facility. The fission experiments were focused on answering two fundamental questions in nuclear physics using novel observables and fission product correlations: what is the value of the nuclear viscosity and if the nuclear viscosity depends on temperature and/or nuclear deformation. The results of my PhD research program were published in 5 peer-reviewed journals and 8 conference proceedings (first author in all of them). As consequence of the scientific breakthrough, I was awarded as the best nuclear physics young scientist by the GSI international community of exotic nuclei (GENCO), the best thesis awarded by the Nuclear Physics board of the Royal Spanish Society of Physics and the extraordinary doctoral prize of the USC. However, the most important recognition was given by the European Physical Society when I was awarded to the best 2015-2017 PhD thesis in Nuclear Physics.

Then I started a postdoctoral position at IRFU (France) in the nuclear physics department to work on the development of dynamical nuclear reaction models for the European project ENSAR2, co-supervising 2 PhD students. In November 2017 I was awarded with a competitive postdoctoral contract funded by Xunta de Galicia to work at GSI, leading state-of-the art experiments at the fragment separator FRS to understand the production of baryonic resonances in neutron-rich nuclei and light hypernuclei. Additionally, I am also co-leading nuclear fission experiments within the R3B Collaboration. In the last two years I have also collaborated in the analysis and data interpretation of experiments performed at RIKEN (Japan), resulting in 3 publications in Phys. Rev. Lett. and Phys. Lett. B. Since 2019, I am a research associate at USC, where I have supervised 2 undergraduate students and 1 PhD student. I am actually supervising 2 PhD students. Concerning my teaching experience, I am involved in 4 subjects of the Degree and Master of Physics.

My main goal for the next years is to fully exploit the FAIR-GSI potential performing new experiments to study for the first time the production mechanism of heavy neutron-rich hypernuclei and to investigate the nuclear dynamics and nuclear structure of exotic heavy nuclei involved in the r-process stellar nucleosynthesis.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno General

Área Temática: **Ciencias físicas**
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Título: New directions in physics beyond the Standard Model

Resumen de la Memoria:

I am currently a postdoc at the high energy theory group at the University of Maryland, College Park (2018-current). Prior to this position, I was a postdoc at the Stanford Institute for Theoretical Physics (2015-2018), and obtained my PhD from Boston University in 2015. My research is in theoretical particle physicist, focusing on the interface of particle physics, astroparticle physics and cosmology. My primary interests are on new field theoretic mechanisms and cosmological signatures arising from theories beyond the standard model, their connections to the central questions in fundamental physics, and their experimental signatures.

I have worked extensively on axion model building and cosmology, leading to a number of new mechanisms to change axion cosmology, which led to expanding the motivated experimental parameter space of axion models, and to novel observables which can be used to search for the axion. Another central direction in my research relates to dark matter and dark sectors, with focus on finding cosmological imprints of interactions in the dark sector, and using extreme astrophysical environments to search for dark sectors. The latter led to strong new bounds and showed that future direct detection experiments will have reach to lighter dark matter that can be produced in Supernovae. In addition, in recent years, I have started to investigate ways to use gravitational waves to search for imprints of physics beyond the standard model in the early universe, and showed that this could allow one to detect changes to the equation of state of the universe and the presence of free-streaming relativistic particles.

During my scientific career I have published 20 peer reviewed articles, and given 38+ scientific seminars in Universities and Research centers in North America, Europe and Asia. I have also participated in 20+ Conferences, Workshops and Meetings, including 4 programs at KITP and 3 programs in the Aspen Center for Physics and 3 at the Galileo Galilei Institute.

Resumen del Currículum Vitae:

My work in theoretical particle physics combines ideas and tools from quantum field theory, astroparticle physics and cosmology to propose new models and field theory mechanisms, explore their connection to the open questions in particle physics, and to discover observable signatures that expand the experimental program in novel directions. I have published several scientific papers (20 published, 995+ citations, 3 topcite 100+ papers) in the well-known peer reviewed journals. Due to my expertise I have also been asked to referee articles for: Journal of High Energy Physics; Journal of Cosmology and Astroparticle Physics, Nuclear Physics B and The European Physical Journal C, Physics Letter B and SciPost.

I obtained my PhD from Boston University in 2015, under the supervision of Prof. Martin Schmaltz. During this time I made contribution to several areas in high energy physics, and was awarded a number of prizes and fellowships due to the impact of my work:
- Model building for collider anomalies and new experimental searches at the LHC;
- Developed a new method for solving strongly coupled field theories: conformal space truncation
- Discovered new cosmological regime for dark matter interacting with massless particles, providing a new template for the matter power spectrum.
- Received two prestigious fellowships to fund my research:
  - LHC Theory Initiative Graduate Fellowship (USD$40,000.00)
  - DOE High Energy Physics Graduate Fellowship in Theory (USD$108,000.00)
- The Gertrude and Maurice Goldhaber Award in Physics from Boston University

After graduating I became a postdoc at Stanford Institute for Theoretical Physics, at Stanford University (2015-2018) and afterward at the Maryland Center for Fundamental Physics, at the University of Maryland (2018-current), two of the most important centers in high energy physics in the United States. During this time I became internationally recognized as a leading expert in the theory and phenomenology of axions and other light fields; astrophysical and accelerator probes of dark sectors and in the connections between physics beyond the Standard Model and cosmology. Some of the most important contributions were:
- Introduced the idea of using particle production to cosmological solutions of the hierarchy problem.
- Studied the impact of particle production in the cosmological evolution of the axion field.
- Discovered new astrophysical signatures of dark sectors, including the first proposal to search for dark sectors through multi-messenger observations of neutron star mergers.
- Proposed new searches using rare kaon decays to search for signatures of models that explain the discrepancy in the measurement of the muon magnetic moment.
- Discovered new effects of free-streaming particles on gravitational wave signals and explored ways to obtain information about early stages of the university from gravitational waves.

International conferences and workshops (20+), including four programs at the KITP in Santa Barbara (USA), and three programs at the Aspen Center for Theoretical Physics in Aspen (USA); plenary talks at conferences at the Galileo Galilei Institute (Italy), Aspen Center for Theoretical Physics (USA) and the Weizmann Institute (Israel); 32+ invited seminars in universities and research centers.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno General

Área Temática: **Ciencias matemáticas**
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Título: Invariant subspaces and approximation theory

Resumen de la Memoria:

The shift operator can be defined as an infinite matrix with zeros everywhere, except on the diagonal below the main one, where it has ones. Once the Jordan canonical form answers questions about invariant subspaces for linear operators acting on finite dimensional spaces, the next natural step is to understand invariant subspaces for the shift operator acting over a separable Hilbert space.
Most of my career has been devoted to this end, for which a rich theory is available from the work of
Beurling. There, the Hilbert space elements are interpreted as holomorphic functions over the unit disk (in what is called the Hardy space). Extending the work of Beurling to other choices of Hilbert space has been a central goal of complex analysis for the last 80 years and I have done reasonable contributions to this objective. Particular examples of such problems include the Brown-Shields conjecture, the Invariant
Subspace Problem and the distribution of prime numbers.
A function is cyclic when the smallest invariant subspace it belongs to (the space it generates) is the whole Hilbert space where it lives, and it is called inner when it coincides with the orthogonal projection of the constant function 1 onto the space it generates. My focus has been on trying to understand cyclic and inner functions in a family of Hilbert spaces called RKHS (reproducing kernel Hilbert spaces), which are relevant for their applications ranging from signal theory and machine learning to the Riemann Hypothesis.
My main contributions include:
- A simpler but more explicit theory of cyclicity, in terms of a sequence of polynomials, constructed explicitly for each given function. We called these polynomials OPA (optimal polynomial approximants) and studied their properties;
- A characterization of inner functions in terms of their properties as multiplier operators;
- A characterization of cyclic polynomial functions of 2 complex variables;
- Finding connections between the study of invariant subspaces and approximation theory, special functions and the distribution of prime numbers.

My research interests have evolved from geometric measure theory and sampling and interpolation theory in the unit disk of the complex plane, during the first years of my thesis, to an intense focus in questions related to invariant subspaces and the operator theory of the shift operator in Hilbert spaces of analytic functions. The latter has been my main research line since I started treating the topic in 2011, with its many ramifications, of which I have concentrated on 4: cyclic functions (and in particular, the aim of solving Brown-Shields conjecture), inner functions (and constructive descriptions of invariant subspaces), the distribution of prime numbers and the wandering subspace property.

Resumen del Currículum Vitae:

I am an Assistant Professor at U. Carlos III de Madrid, with 9 years of postdoctoral research at high level institutions (Warwick, U. Barcelona, ICMAT, UC3M), after having obtained my PhD in 2013 at U. Autònoma de Barcelona, with a degree in Mathematics by U. Complutense.
I have proved my independence:
 by constructing my own team of collaborators outside of my own departments leading to very fruitful collaborations;
 by winning all my positions in competitive processes, always at departments to which I had not been linked previously;
 by an extense international experience, including a very active participation in scientific events as well as research stays at Texas A&M University, Mittag-Leffler Institute, Indian Statistical Institute, ICMAT, and IMUS Sevilla, and soon in South Florida;
 by the fact that in recent years I have written more articles as only author or in collaboration with undergraduate students;
 and by obtaining accreditation as Prof. Titular on 24/12/2020.

Moreover, I have coauthored 21 published or submitted articles (17 JCR published, 1JCR accepted, 2 non JCR, 1 submitted) and I am currently working on 2 more preprints. Many of them have followed a coherent line, centred on the study of polynomial approximation applied to invariant subspace related questions, in complex analysis and operator theory (study of cyclicity, of inner functions, or of the wandering subspace property). A core idea of my research is to make abstract results on operator theory provide additional information, by constructing the approximants whose existence is known. I aim at advances towards the solution of Brown-Shields conjecture, generalizing Beurling's Theorem to other contexts, a better understanding of invariant subspaces of operators on Hilbert spaces and, since more recently, complex analysis approaches to the Riemann Hypothesis. The list of my publications includes Trans. AMS, J. Anal. Math., Rev. Mat. Iber., JMAA, JLMS, Constr. Approx., J. Approx. Th., and Anal. Math. Phys., and my work is increasingly cited. I have kept active both in teaching and research, as well as attended every request for additional service (as referee; organizing conferences; participating in the management of institutions; or in the design of the new degree in Applied Mathematics and Computer Science, by coordinating the block on Applied Maths). I think that I am thus gaining the trust of my peers
and I can handle the diversity of work that a research position requires. This has been shown recently by being appointed as codirector of the JAE Schools 2020 & 2021 at ICMAT. I have mentored 7 students in the Severo Ochoa JAE Intro programme, as well as directed 2 degree projects (one current) and 2 master s projects (one current). I have been organizer of 3 conferences and schools; and I have produced 120 other participations in events: 55 invited talks, 22 contributed talks, 2 posters, and attendance to 41 conferences and specialized courses.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno de Jóvenes investigadores

Área Temática: **Ciencias sociales**
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Título: Analysing political behaviour from a comparative and transnational perspective

Resumen de la Memoria:

Since the years of my PhD in Political Studies (Jan. 2014 - May 2017), my research interests lie within the quantitative analysis of political behaviour and its contextual factors. Throughout my career, I have focused in particular on extreme forms of electoral choice, such as Eurosceptic and protest voting in comparative perspective, exploring the extent to which supply side characteristics, e.g., parties ideological convergence and degree of anti-elite rhetoric trigger the effect of political disaffection and anti-EU sentiments in citizens . Such efforts have subsequently resulted in my PhD Thesis, which was shortlisted for the 2017 ECPR Blondel Prize by my home department at NASP (title: Voting Against? Toward a Comprehensive Framework for the Analysis of Protest Voting in Europe), as well as in three research articles published on well-established peer-reviewed journals, i.e., European Union Politics, Political Studies Review and Representation - Journal of Representative Democracy.

In early 2017, a few months before my PhD defense, I obtained my first postdoctoral appointment at the Autonomous University of Barcelona, where I kept developing my research agenda on extreme voting and collaborated implementing an online survey of parliamentary candidates in overseas constituencies within the framework of the project Transnational Political Incorporation (PI: Eva Østergaard-Nielsen). Such experience, which also marks the opening of a transnational front in my research agenda, has resulted in two additional publications in well-established Political Science journals, one on Parliamentary Affairs, written with Eva Østergaard-Nielsen, and the other as single author on PS: Political Science and Politics. Between 2018 and 2019 I wrote also two book reviews on similar topics, respectively appeared on Italian Political Science Review and Party Politics.

In May 2019, my international trajectory, as well as my research focus, extended beyond Europe. Indeed, I was enrolled as International Postdoctoral Researcher at Waseda University (Japan), where I could engage in extensive large-scale research on protest voting and political values in Western and Asian countries.

As a last step, in the spring of 2020, I was selected for my current postdoctoral position at the Catholic University of Louvain, where I am carrying on both my comparative study on protest voting in Western and Asian democracies and collaborative research on the political attitudes of migrant citizens and elites.

Resumen del Currículum Vitae:

I started my academic career as PhD Candidate of the Network for the Advancement of Social and Political Studies (NASP, Italy), where I developed a dissertation on the issue of protest voting and its determinants in comparative perspective.
From May 2017 to April 2018 I was contracted as a part-time Research Assistant at the Autonomous University of Barcelona within the framework of the project Transnational Political Incorporation (PI: Eva Østergaard-Nielsen).
From March 2018 to August 2018, I worked as Teaching Assistant at the Catholic University of Louvain, Belgium, where I was also appointed as Fixed-Term Lecturer of Political Science during the same year (from September 2018 to August 2019). From January to February 2019, I also had the opportunity to act as (Fixed-Term) Invited Faculty Lecturer of Sociology of Public Opinion and Introduction to Populism at the University of Milan.
In May 2019, I was granted a 1-year postdoctoral fellowship by the Japanese Society for the Promotion of Science (JSPS), that I carried on at Waseda University (Tokyo) within the framework of the Public Opinion Survey Methodology Research Group directed by Prof. Airo Hino (School of Political Science and Economics). The overall period of appointment lasted in this case from May 2019 to March 2020.
From April 2020 to August 2020, I was also contracted as Short-term Postdoctoral Researcher at the Catholic University of Louvain within the framework of the research project The European Social Survey in French-speaking Belgium and financed by the Belgian National Fund for Scientific Research (FNRS). In September 2020 I started an FSR Incoming Postdoctoral Fellowship (former FSR-COFUND) at the same Institution, where I am carrying on his comparative research agenda on electoral behaviour in established democracies under the supervision of Prof. Pierre Baudewyns. Between May and December 2021 I was also awarded several competitive grants, including a Louvain4Migration fund aimed at supporting the collection of original survey data on migrant political engagement, a 2-year Next Generation Europe (NGEU) fund at the Autonomous University of Barcelona and a 2-year Postdoctoral Grant of the Japanese Society for the Promotion of Science (JSPS).

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno General

Área Temática: **Ciencias sociales**
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Título: Human Dimensions of Wildlife

Resumen de la Memoria:

Humans both drive and help solve conservation challenges. However, too often, few opportunities to participate in conservation, voice concerns or engage in discourse about the ecosystem or livelihoods are provided to communities living with and depending on threatened species. Excluding them from conservation initiatives can stand in the way of successful, long-term actions. As part of my main line of research I am integrating and applying social sciences such as Human Dimensions of Wildlife (HDW), to inform conservation actions and strategies, facilitate the design of tailored behavioral change campaigns, and development of community-based conservation. My main line of research is divided in 3 core components in which I have worked along my career to advance the application of social sciences to wildlife conservation.

1.Integration of Social Sciences to Wildlife Conservation Research

I am applying HDW research frameworks to understand the different interest groups perspectives to find out how to address conservation challenges for improved actions for both human and wildlife. As such, the main research goal is to contribute to the development of more comprehensive frameworks and approaches to advance the meaning of coexistence, and refine the methodologies required to study it. Human-wildlife conflicts are typically complex phenomena comprising environmental and human dimensions. It has become widely recognized that engaging with the social, psychological, economic, and political dimensions of wildlife management and conservation is needed to develop robust and effective actions and policies. The HDW provide tools and analytical frameworks through which researchers and practitioners can draw from to explore and understand the social dimensions of human-wildlife conflicts to support wildlife conservation actions and build capacity locally to achieve human-wildlife coexistence.

2.Integration of Social Science to Community-based Conservation Research

The goal of community-based conservation is to both reduce threats that species face and respond to the needs and interests of local communities. Community-based conservation also places value on local knowledge about wildlife and the environment and emphasizes the role and capacity of local community members to manage conservation programs. This approach seeks solutions to achieve coexistence between human and wildlife. Through HDW research, we can better understand the ways that people interact with wildlife. Knowing how people feel about wildlife informs the design of community engagement efforts.

3.Integration of Social Science to Illegal Wildlife Trade Research

Illegal wildlife trade (IWT) and unsustainable wildlife consumption are among the most pressing threats to biodiversity worldwide. Understanding consumer behavior and motivations provides an applied research foundation for the development of effective, long-term programs and campaigns designed to reduce IWT demand. I approach this research using an array of social science methods, such as in-depth and semi-structure interviews as well as structured questionnaires. In addition, I have been leading the implementation of multiple Specialized Questioning Techniques (SQTs) to overcome biases and sensitivities regarding admittance of illegal wildlife consumption.

Resumen del Currículum Vitae:

I obtained my PhD in Human Geography in 2011 at Memorial University of Newfoundland in Canada. Since the completion of my PhD, my research focus and interest has led me to join 3 different international research centers in Mexico, USA and Spain. In 2012, I worked as a professor/researcher in the department of Human Ecology at a National Center of Research (CINVESTAV-Mérida) in Mexico, advancing research projects related to the historical and cultural establishment of marine and terrestrial protected areas. In 2014, I worked for 6 years for the Institute for Conservation Research of the San Diego Zoo (ICR) whereas Associate Director, I was responsible to conduct social science research in support of conservation programs worldwide. I supervised multiple research programs focused on human-wildlife interaction, illegal wildlife trade worldwide, including Mexico, Peru, Bolivia, Kenya and Cambodia, Laos and Vietnam. While I still collaborate with the ICR as a Research Fellow, since September 2020 I started a new temporary position at the Instituto de Estudios Sociales Avanzados (IESA-CSIC) as a senior researcher. Within IESA I am leading a new and innovative line of social science research in Spain focused on integrating Human Dimensions of Wildlife (HDW) approaches to design and support conservation actions that seeks to advance the coexistence between human and wildlife. My research at IESA-CSIC is focusing on better understanding coexistence between human and wildlife to support new and ongoing conservation efforts (e.g., Iberian lynx, Delibes-Mateos et al. 2021). This new line of research, my extensive collaboration network, and my expertise in applying social sciences to conservation projects will fill a research gap within the institute and more generally in Southern Europe. For example, through my extensive network of collaborators, I am leading a new initiative for the IESA team to be part of a global collaborative research effort assessing human wildlife value orientation worldwide (titled Global Values), which will allow for the very first human-wildlife value assessment for Spain. I collaborated on and managed a wide range of applied social science research projects, tackling all aspects of the research from designing proposals and programs, securing funding (being PI or Co-PI in 4 and secured more than US$300,000 in the last 4 years and even more as participant), to collaborating with international and multidisciplinary teams, and publishing and disseminating research results. As a result, I have published 49 peer-reviewed articles in scientific journals including top-ranked ones (included in JCR 33 of which 28 in the first quartile). In these publications, I have frequently acted either as first author or as leading author (i.e., last position in 20 between articles and book chapters), and my publication record has increased in recent times (total number of citations from Scopus: 404 by 308 documents). Over the years I gained recognition as social science expert in human-wildlife conflict/coexistence related issues. I am board member of the Human Bear Conflict Expert Teams and a steering committee member of the Human-Wildlife Conflict Task Force of the International Union for Nature Conservation (IUCN). Finally, I have mentored several future HDW conservation leaders postdocs (4), PhD (1), masters (9) and undergraduate (1).

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021

Turno General

Área Temática: **Ciencias y tecnologías de materiales**

Nombre: OROPEZA PALACIO, FREDDY ENRIQUE

Referencia: RYC2021-034254-I

Correo Electrónico: freddy.oropeza@gmail.com

Título: Ciencia de materiales para la conversion de energia solar

Resumen de la Memoria:

After obtaining my PhD form the University of Oxford (2011), I have had positions in world-class institutions across Europe, such as the Ruhr-University Bochum (2011-2012), Imperial College London (2013-2016), Eindhoven University of Technology (2016-2019), and since 2019 at IMDEA Energy. In my career, I have developed 3 interrelated research lines described below.

(1) Spectroscopic elucidation of the electronic structure of solids: developed under professor Russell G. Egdell tutoring whilst doing my PhD at the University of Oxford, working on in-depth research of the electronic structure of visible light active TiO2-based photocatalysts. This involves comprehensive X-ray spectroscopic studies with X-ray photoelectron spectroscopy and X-ray absorption spectroscopy.

(2) high quality thin film growth, developed at the Materials Department at Imperial College London, aiming at the preparation of photoelectrodes for a more efficient storage of solar energy as solar fuels. At London I developed several methods for the preparation of epitaxial and polycrystalline thin films based on wet-chemistry and pulse laser deposition techniques.

(3) in-situ and operando X-ray spectroscopy, developed at the Eindhoven University of Technology in order to address the dynamic nature of materials property under specific environments and working conditions. This way, the correlations between electronic and functional properties are more valid since the materials are studied under conditions relevant to the corresponding functionality.

My work in these 3 research lines has significantly contributed to the knowledge and development of 3 fields of renewable energy conversion and storage: (i) visible-light photocatalysis (ii) charge dynamics in photoelectrochemical systems, and (iii) electrochemical oxygen evolution reaction (OER).

Resumen del Currículum Vitae:

Material scientist specialized in the analysis of surface chemistry and electronic structure of functional semiconductors with applications in green energy technologies. My research approach is the experimental description of electronic basis that govern the functionality of catalytic and photovoltaic semiconductors.

I obtained my PhD in Chemistry from the University of Oxford in 2011 under the supervision of Prof. Russel G. Egdell. At Oxford, I carried out a comprehensive study of the electronic structure of TiO2-based photocatalysts active under visible light, using experimental techniques such as X-ray photoelectron spectroscopy and UV-visible absorption spectroscopy. From 2011 to 2012, I moved to the Ruhr University Bochum as a research assistant in the Industrial Chemistry Laboratory, where I extended my studies on TiO2 to the surface modification aiming at increasing the efficiency of the separation of photogenerated electron-hole pairs, and therefore enhancing the overall the photocatalytic activity. I also gained experience in important characterization techniques such as EXFAS and Raman spectroscopy. Afterward, I had a 3-year post (2013-2016) in the Materials Department of the Imperial College London. In London, I dedicated my research to the synthesis of high-quality thin film photoactive materials, such as Bi2Ti2O7, CuWO4, and CuBi2O4, aiming at the preparation of photoelectrodes. I gained extensive experience in the synthesis of thin films by wet-chemistry methods and pulsed-laser deposition. I also gained hands-on experience in advanced X-ray diffraction techniques and surface analysis with low- energy ion scattering (LEIS). From 2016 until 2019, worked as a postdoc researcher in the Eindhoven University of Technology. There, I continued working on the design of thin film photoactive materials but extended the study towards a detailed evaluation of the electronic structure and electronic basis of functionality using near-ambient pressure XPS and XAS. Since October 2019, I have been working in the Photoactivated Processes Unit at IMDEA-Energy, first as Postdoctoral researcher and recently promoted to Senior associate researcher. In this institution, I have continued with my studies of OER catalysts and the development of advanced organic-inorganic hybrid photoelectrochemical system for water splitting and CO2 reduction. For these projects, I wrote a successful proposal for the 2020 call for Marie Skłodowska-Curie Individual Fellowships, which I am currently managing. My diverse research experience has provided me with a comprehensive research approach that includes: (1) oxide thin film synthesis with state-of-the-art control using pulsed laser deposition (PLD), as well as wet-chemistry methods; (2) materials characterization using advanced X-ray diffraction (XRD) techniques, low-energy ion scattering (LEIS), photoelectron spectroscopy (XPS), X-ray absorption spectroscopy (XAS); and (3) properties measurements with advanced (photo)electrochemical characterization. To date, I have published 50 scientific papers, in 10 of them I am the first author, and I am included as corresponding author in 8. I have also presented 16 communications at international conferences. Moreover, I have participated in 9 competitive projects both national and international including Plan-Nacional and H2020 ERC projects.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021

Turno General

Área Temática: **Ciencias y tecnologías de materiales**

Nombre: ARRIETA , MARINA PATRICIA

Referencia: RYC2021-034354-I

Correo Electrónico: marina.arrieta@gmail.com

Título: Multifunctional Polymeric Formulations for Food Related Applications in the frame of the Circular Economy concept

Resumen de la Memoria:

Marina Patricia Arrieta (MPA), Licenciada en Bioquímica por la Universidad Nacional de Córdoba (UNC, Argentina 2004), obtuvo un Máster en Tecnología de los Alimentos por la Universidad Católica de Córdoba (UCC, Argentina 2010) cuyo TFM fue desarrollado en la Universidad de Alicante (UA, Programa MAE-AECID 1 año). Inició su carrera profesional en el Laboratorio de Seguridad Alimentaria y Control de Materiales del CEPROCOR-Ministerio de Ciencia y Tecnología de Córdoba (Argentina, 2005-2011). En 2011 se trasladó nuevamente a España para desarrollar un 2º Máster en Ciencia y Tecnología de Polímeros (UNED) y el Doctorado Internacional en Ciencia, Tecnología y Gestión Alimentaria en la Universitat Politècnica de València (UPV 2011-2014, Santiago Grisolía). El trabajo experimental, centrado en el desarrollo de mezclas biopoliméricas y nanocompuestos con propiedades activas, se realizó en el Instituto de Tecnología de Materiales (ITM-UPV) bajo la supervisión del Prof. Juan López-Martínez en colaboración con el Prof. José María Kenny de la Universidad de Perugia (UNIPG, Italia). Fue galardonada con el premio extraordinario de Tesis Doctoral por la UPV en el área de Agroalimentación y Biotecnología (UPV 2015). Al finalizar el doctorado fue contratada por el Centro Europeo de Polímeros Nanoestructurados (ECNP, Italia 2015) y posteriormente se trasladó al Instituto de Ciencia y Tecnología de Polímeros del Consejo Superior de Investigaciones Científicas (ICTP-CSIC, España 2016-2018) donde obtuvo el primer puesto de un contrato PostDoc Juan de la Cierva-formación-MINECO. Trabajó en la síntesis de poliuretanos biodegradables multifunicionales (activos e inteligentes) y el desarrollo de bionanocomposites mediante electrospinning. En 2017 realizó una estancia en el Grupo de Envases de Alimentos de la Universidad de Santiago de Chile (LABEN-USACh 4 meses) como Investigador Principal (IP) de un proyecto de la Fundación Santander sobre la extracción de agentes activos de residuos agroindustriales y el desarrollo de nanocomposites activos para envases de alimentos. Realizó otra estancia de investigación en el Laboratorio of Polímeros y Materiales Compuestos de la Universidad de Mons (Bélgica, 1 mes) donde trabajó en el desarrollo de bionanocomposites con memoria de forma. De 2018 a 2020 trabajó en el Departamento de Química Orgánica de la Universidad Complutense de Madrid (UCM, España) primero con un contrato postdoctoral competitivo propio de la UCM y posteriormente disfrutó de un contrato Juan de la Cierva-Incorporación (MINECO, 2019-2020). Obtuvo un proyecto Santander-UCM (IP) sobre el uso de redes orgánicas covalentes funcionalizadas para el desarrollo de nanocompuestos activos. En la actualidad trabaja como Profesora Ayudante Doctor en el Departamento de Ingeniería Química Industrial y del Medio Ambiente de la Universidad Politécnica de Madrid (UPM). Se ha incorporado al Grupo de Caracterización de Polímeros (POLCA). Tiene experiencia en la síntesis, procesado (extrusión, inyección, electrohilado, formación de films y espumas, etc.) y caracterización de polímeros, así como en el uso de materiales renovables y la revalorización de residuos de la agroindustria para el desarrollo de (nano)compuestos sostenibles con propiedades activas (antioxidantes y antimicrobianas) y/o inteligentes (memoria de forma y/o auto-reparables), dentro de una economía circular.

Resumen del Currículum Vitae:

Marina P. Arrieta tiene un Impacto Normalizado (IN): 3,14 (Materials Science: Polymers and Plastics 2016-2019, Scopus). A partir de 2012 ha publicado 71 artículos científicos JCR (77% Q1, más de 3000 citas), h-index 30 (Fuente: Scopus), 65% de ellos como primer, último y/o corresponding author, es co-inventora de 2 patentes (1 Europea y 1 Española), 13 capítulos de libros, 16 artículos/monografías docentes y 26 artículos de divulgación. Más de 70 presentaciones en congresos (15 orales), algunos invitada ej: BEST (Board of European Students of Technology) Valencia 2014, AIMPLAS 2016, Jornadas de la Escuela de Doctorado USACh Chile 2017, MAPAMA 2017, 1º South-West Europe Forest BioEconomy Forum Valladolid 2018, VII Creando Sinergias Alcoy 2019 y Escuela de Doctorado en Química Orgánica UCM 2019, 2020 y 2021.

Ha sido becaria Predoctoral MAE-AECID (2008-2009) y Santiago Grisolía (2011-2014), y Postdoctoral Juan de la Cierva-MINECO Formación (JdlC-form 2016-2017 ICTP-CSIC), Juan de la Cierva-MINECO Incorporación (JdlC-Inc 2018-2019 UCM) y del programa postdoctoral competitivo UCM (2018). Ha sido Investigador Principal (IP) de Proyectos financiado por: Fundación MAPFRE (2010), Programa PAID-UPV (2012), Fundación Santander-Universidades (2017), Santander-UCM (2019-2020) y SDGine (Marie Sklowodska Curie Action, cofund 2022-2024). Ha realizado estancias en diferentes laboratorios internacionales en la Unión Europea: cuando vivía en Argentina: en España (2 años, IP) y Portugal (1 mes Predoc); y después de mudarse a España: en Italia (3 meses Predoc + 7 meses PostDoc), en Bélgica (1 mes PostDoc) y en América Latina en Argentina (2 semanas PostDoc) y en Chile (4 meses PostDoc, IP).

Ha co-dirigido 2 Tesis Doctoral, 13 Trabajos Final Grado (TFG) y 6 Trabajos de Fin de Máster (TFM), ha sido tutor de 1 estudiante prácticas académicas externas (COIE-UPM) y supervisor de un estudiante de grado en formación (Beca de Colaboración UPM). En la actualidad co-dirige 3 Tesis Doctorales en colaboración con la UPV y otra en colaboración con Ecoembes, es supervisora de un investigador postdoctoral Margarita Salas. Ha participado en 29 proyectos de investigación; 10 Internacionales y 14 Nacionales y 5 con la Industria; de los cuales 6 como IP, financiados por la Unión Europea/FEDER, Marie Sklowodska Curie Action (PL), MINECO (MATs), MINECO (JdlC-Incorporación: 6.000€), las Fundaciones Santander (2 IP, 5.000€ + 12.000€) y MAPFRE (IP, 15.000€), MAEC-AECID, Comunidad de Madrid, UPV
(IP, 3.900€) y UCC. Ha participado en 6 Proyectos de Innovación Docente (1 como co-IP). Ha sido Evaluadora de Proyectos de Investigación Nacionales (MINECO, 2021) e Internacionales (CONICET-Argentina 2016-2021, CONICYT-Chile 2020 y 2021, Rovaltain Foundation-Francia 2021 y Dutch Research Council-The Netherlands 2021) y es evaluador activo de Proyectos Industriales (ACIE y EQA). Es Revisor habitual de Revistas JCR. Cuenta con experiencia docente universitaria en Argentina (UCC) y en España (UPV, ICAI-Universidad Pontificia de Comillas, UCM y UPM). Ha sido miembro del Tribunal de 18 Tesis Doctorales. Ha coordinado el número especial de Envases y Embalajes 2018 de la Revista de Plásticos Modernos (FPCITE, ICTP-CSIC). Es miembro del Equipo Editorial de la revista Polymers MDPI desde 2019. Ha editado 7 "Special Issues" (MDPI). Es miembro activo en tareas de divulgación de la Ciencia.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno de Jóvenes investigadores

Área Temática: **Ciencias y tecnologías medioambientales**
Nombre: SORI GOMEZ, ROGERT
Referencia: RYC2021-034044-I
Correo Electrónico: rogert.sori@uvigo.es
Título: TRANSPORTE DE HUMEDAD EN LA ATMOSFERA y su relación con extremos climáticos (extremos de precipitación y sequías)

Resumen de la Memoria:

My academic background consists of a BSc. in Meteorology (2005-2010) at the Higher Institute of Technology and Applied Sciences, La Habana, Cuba, a Master in Climate Sciences (2011-2012) and a PhD in Marine Science, (2015-2018) both at the University of Vigo (Uvigo), Spain, and several training courses. The main line of research in my postgraduate studies has been the identification of moisture sources for precipitation over large hydrological basins of the planet, and its relationship with extreme events such as droughts.
Regarding my working experience, from September 2010 to April 2015 I worked at the Provincial Meteorological Centre of Ciego de Avila, Cuba, where I gained experience as a young researcher and lead a group of climate research/services. From May 2015 to the present I work at the EPhysLab, a research excellence group of the Uvigo by the Xunta de Galicia. During the pre-doctoral stage at EPhysLab, I carried out research stays of up to 90 days at the National Center for Monitoring and Natural Disaster Alerts of Brazil, and at the Institute of Meteorology of Cuba.
After obtaining the PhD, I did a postdoctoral research stay from February to April 2019 at the Universidade de Tras os Montes e Alto Douro, Portugal, and from October 2019 to the present a postdoctoral researcher of the University of Vigo at the Instituto Dom Luis of the University of Lisbon, Portugal. During my scientific career, I have published 28 manuscripts in JCR Q1 and Q2 journals, 13 in non-JCR journals, 1 academic book and two book chapters. I also contribute as an undergraduate and postgraduate lecturer at the Uvigo, participated in various research projects, and mentored a Thesis. Besides, I have participated in 31 Congresses and Conferences. Finally, my current research interest aims to deep into the knowledge of the world hydrological cycle in major world river basins and socioeconomical and environmental regions in the context of climate change and its socioeconomic and ecological implications.

Resumen del Currículum Vitae:

I studied a BSc. in Meteorology (2005-2010, academic award from the Academy of Sciences of Cuba) at the Higher Institute of Technology and Applied Sciences (Instec), La Habana, Cuba, and subsequently a Master in Climate Sciences at the Univ. of Vigo (UVigo), Spain (2011-2012, funded with a Spanish Government competitive MAEC-AECID fellowship). I worked from 2010 to 2015 at the Provincial Meteorological Centre of Ciego de Avila, Cuba; where I led the Applied Meteorology group between 2014 and 2015. In this period, I supervised climatic services and hydrometeorological research. In 2015 I started my PhD at UVigo with another competitive predoctoral fellowship by the Xunta de Galicia. I was incorporated as PDI to the Environmental Physics Laboratory (EPhysLab), a "research excellence group" by Xunta-Galicia; the group is also a CSIC Associated Unit. I defended my PhD dissertation cum laude in Nov 2018, achieving the extraordinary award. During the PhD, I did research stays of up to 90 days at top research centers such as the National Center for Monitoring & Natural Disaster Alerts in Brazil, and the Institute of Meteorology of Cuba. During this period my research line was consolidated on the hydrological cycle, investigating the oceanic and continental moisture sources that contribute to the precipitation over major tropical river basins. These studies have contributed to the understanding of the hydrological cycle of large river basins of the planet, such as the Amazon, Niger, Ganges or the Congo, vital for studies over these world's largest forested areas and home to unparalleled biodiversity.

My postdoctoral career started under the participation in international research projects until October 2019 when I gained a postdoc fellowship by the Xunta de Galicia. This allowed me to realize a research stay up to the present (27 months) in the Climate change, atmosphere-land-ocean processes and extremes Group at the Instituto Dom Luis (IDL) of the Lisbon University, a top research center in Europe. In this group I opened a new line of research based on the study of oceanic and continental atmospheric moisture transport, deepening in their crucial role in the occurrence of extreme events, such as floods or droughts, in the whole river basins on the Planet. However, I also have been collaborating in other studies on the sources of humidity for tropical cyclones, climate change impacts on crops and pests, the occurrence of forest fires, climate-health relationships, etc.

In a summary, I have published 41 manuscripts of which 28 are indexed in the JCR (Q1 & Q2, 8 as the first author), an academic book, and two book chapters for the AGU Editorial. Also count the participation in national and international conferences and congresses (31), actively participated in 8 competitive projects (1 International by the EU, 7 Nationals of Spain and Cuba). Finally, my current and future research delve into fundamental aspects of the hydrological cycle, addressing key questions such as whether climate change implies an increase in oceanic versus terrestrial precipitation, whether meteorological mechanisms are transporting increasing amounts of moisture and whether this is consistent with basic thermodynamic principles linked to climate change, and the ecological and socioeconomic impacts of moisture transport and precipitation changes over continents.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021

Turno General

Área Temática: **Ciencias y tecnologías medioambientales**

Nombre: ROBINSON , NATHAN

Referencia: RYC2021-034381-I

Correo Electrónico: nathanjackrobinson@gmail.com

Título: Novel camera technologies for studying marine megafauna

Resumen de la Memoria:

My research uses innovations in camera technology to study a diverse range of marine megafauna including sea turtles, sharks, and giant squid. By revealing insights into the behavior, distribution, and population status of these keystone species, my research has guided conservation management plans and improved our knowledge of marine ecosystem functioning. In addition, my strategy of incorporating camera technology into my research has provided me a unique opportunity to conduct educational outreach at a global scale.

I have a diverse research background in marine biology, having worked in a variety of ecosystems. My Masters thesis focused on the physiology of deep-sea crustaceans, while my Ph.D thesis focused on the spatial ecology of sea turtles. During a post-doctoral fellowship with Purdue University (USA) and position as Director of the Cape Eleuthera Institute (The Bahamas), I also initiated and supervised several research projects focusing on many other marine species including sharks, cephalopods, crocodiles, and coral reefs. During these experiences, I published on a range of topics (e.g. movement ecology, population biology, epibiosis, taxonomy) and used several different research techniques (e.g. satellite telemetry, mark-recapture tagging, stable isotope analyses, genetic tools, statistical models).

Currently, my research is based around two major long-term projects. (1) Studying the behavior of sea turtles and marine mammals using animal-borne cameras. After receiving funding from NOAA (USA), I successfully completed a three-year study of the behavior and movements of green turtles in The Bahamas using animal-borne cameras. I have also recently received additional funding from CreaTechnology and the National Center for Supercomputing Applications (USA) to develop machine learning tools to interpret and analyse our database of animal-borne camera footage. This project is part of a collaboration between Illinois University (USA), the Universitat de València (Spain), and the Fundación Oceanogràfic (Spain). (2) Uncovering the distribution and behavior of pelagic deep-sea megafauna. Through the use on an unobtrusive deep-sea camera, I filmed the first footage of a giant squid in US waters in collaboration with Duke University (USA) and the Ocean Research and Conservation Association (USA). The media coverage of this event was so impactful that it was featured in over 400 international news sources. Following the success of this project, I raised 140.000 □ to construct a series of upgraded, unobtrusive deep-sea cameras and was awarded positions on research expeditions in the Atlantic and Southern Oceans with National Geographic (USA) and Netflix (UK) respectively. In the coming years, I aim to use these cameras to conduct various locations worldwide including the northwest Mediterranean.

Resumen del Currículum Vitae:

I am a Marine Biologist who broadly focuses on the ecology and conservation of large marine species, including sea turtles, sharks, and giant squid. Recently, I also have begun to specialize in using novel camera technologies including animal-borne cameras, 3D photogrammetry, and deep-sea camera traps. Using these techniques, I have uncovered valuable ecological insights while simultaneously generating engaging footage that I have incorporated in several viral outreach campaigns.

In 2009, I graduated with a Masters of Marine Biology from Southampton University (UK) and a Departmental award for the Highest Achieving Graduate Student. Subsequently, I completed a Ph.D in Biological Sciences at Purdue University (USA) where I was awarded the Bilsland Dissertation Fellowship. After graduating, I remained at Purdue University to complete a 26-month post-doctoral fellowship through a grant I received from the Goldring Family Foundation (USA). Next, I accepted a job as the Director of the Cape Eleuthera Institute (The Bahamas). In this position, I managed a budget of ~300.000 □ and coordinated the research activities of over 10 M.Sc and Ph.D candidates. More recently, I am working as a freelancer with contracts from international research and media companies including National Atmospheric and Oceanographic Adminstration (USA), OceanX (USA), the Oceanografic (Spain), Netflix (UK), and Passion Pictures (UK).

During my career, I have authored 52 peer-reviewed scientific articles including 44 in SCI journals and 30 in Q1 journals. Of these 52 publications, I am first or second author of 33 (63 %). I am the author of 2 book chapters. According to GoogleScholar, my publications have been cited over 641 times and my annual number of citations has consistently increased each year. I have supervised 9 MSc students and am currently supervising another 2. I have made over 15 first-author presentations at international scientific symposia and co-authored over 30 additional presentations. I have conducted invited lectures at 6 international universities.

I have raised over 550.000 □ in research funding from a mix of private and public funding institutions. I have served as the PI on a deep-sea expedition aboard the R/V Alucia that was funded by OceanX (USA). I have participated in several expeditions including missions aboard the RRS James Cooke for the National Environmental Research Council (UK), the R/V Point Sur for the National Oceanographic and Atmospheric Administration (USA), the R/V OceanXplorer for OceanX (USA), and the F/V Argos Froyanes for Netflix (UK).

I am a regular reviewer, having conducted more than 40 reviews for over 20 different scientific SCI journals. I am also a Review Editor for Endangered Species Research (Q1) and Frontiers In Marine Science (Q1) as well as an Associate Editor for Herpetological Biology and Conservation (Q2).

My research has been covered in 400 news sources including El País (Spain), The New York Times (USA), and National Geographic (UK). Several videos of my work have received over 100 million views on YouTube. I also regularly participate in science communication podcasts, including Speak Up For Blue (Canada), Project For Wildlife (USA), and OceanX Live (USA). I have authored 6 popular science articles in magazines including The Conversation (UK) and National Geographic □ Ocean Views (UK).

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021

Turno General

Área Temática: **Ciencias y tecnologías medioambientales**

Nombre: POKORNY MONTERO, CRISTINA ISABEL

Referencia: RYC2021-034942-I

Correo Electrónico: lisozima@yahoo.com

Título: Botanical Phylogenomics

Resumen de la Memoria:

While pursuing my B.Sc. in Biological Sciences, which I earned in July 2001 (UAM), I started my scientific career by undertaking botanical surveys. I typified alpine rock crops and wetlands in the Pyrenees Natl. Park, with IPE- CSIC; I recorded functional traits across Scandinavian populations, with NTNU (Norway); and I studied urban environments, with Trento□s Museum of Science (Italy). This last project molded into my MSc in Evolutionary Biology and Biodiversity (March 2004, UAM).

In 2005, I got funding from Fulbright-Ramón Areces to study in the USA and, in 2006, I joined the Graduate School at Duke University. I successfully defended my Ph.D. in Biology in May 2012, when I also earned a Certificate on Geospatial Analysis (Nicholas School of the Environment). Additionally, I joined the 1KP Initiative (2011), trained on programming and genomics (Germany & CZ), and learned to implement targeted capture sequencing (Chicago Botanic Garden, USA).

For my first postdoc (2013□15), I joined Dr. Sanmartín at RJB-CSIC. In 2015, I joined RBGK (UK) as a Garfield Weston Phylogenomics Research Fellow, where I worked under the umbrella of the □Global Tree Seed Bank□ and the □Plant and Fungal Trees of Life□ projects. For my third postdoc (2019□21), I joined Dr. Huerta-Cepas□ team at CBGP UPM-INIA-CSIC, as a Severo Ochoa Research Fellow. Since December 2021, I work with Dr. Pellicer at IBB CSIC-BCN□s City Council.

Given the current biodiversity crisis we are facing, stemming of anthropogenic climate change, it is vital that we improve our understanding of the mechanisms driving the origin and maintenance of biodiversity across spatiotemporal scales. Efforts have been made to characterize plant community composition and distribution, mostly with regards to abiotic factors (temperature, precipitation, geographic barriers). However, questions pertaining the role biotic factors, both intrinsic (plant genome architecture, endophytes) and extrinsic (plant phylodiversity, associated microbial communities), play with regards to survival are yet to be addressed. Additionally, it is also of paramount importance that we close the gap between micro- and macro-evolutionary approaches.

To tackle these challenges, I implement high-throughput sequencing (HTS) approaches (targeted capture sequencing, TCS) and large- scale phylogenetic analyses (phylogenomics on HPC architectures). To date I have designed TCS kits for plants, fungi, and Bacteria plus Archaea. I have also optimized molecular lab protocols (plant & microbial DNA & RNA purification, TCS, short- & long-read high-throughput sequencing, HTS), maximizing quality and quantity while minimizing costs. I have also put forth analytical tools for phylogenetic inference (Bayesian nested time estimation, phylo-informative MSA trimming), as well as devised HPC phylogenomic workflows to integrate natural history collections into biodiversity research (Herbariomics). In this manner, I have bridged evolutionary levels across spatiotemporal scales and unraveled biogeographic patterns in plants. These skills have made me a coveted asset by both nascent and well- established research teams, whom I have consolidated and propelled, respectively, and who are now part of my vast network of natl. & intl. collaborators. My vision is to establish my own open and diverse team as a global referent for Botanical Phylogenomic research.

Resumen del Currículum Vitae:

Given the current biodiversity crisis we are facing, stemming of anthropogenic climate change, it is vital that we improve our understanding of the mechanisms driving the origin and maintenance of biodiversity across spatiotemporal scales. I am a botanist and I implement high-throughput sequencing (HTS) approaches (targeted capture sequencing, TCS) and large-scale phylogenetic analyses (phylogenomics on HPC architectures) to bridge evolutionary scales and to unravel biogeographic patterns in land plants.

The molecular and computational tools I develop have been used by academics, herbarium curators, conservation managers, and food & agroforestry officers worldwide. Together with industry, I have devised TCS kits for plants, fungi, and Bacteria plus Archaea.

Beyond these achievements, I have optimized molecular lab protocols, maximizing throughput and quality while minimizing costs. I have also put forth analytical tools for phylogenetic inference, as well as devised HPC phylogenomic workflows to integrate natural history collections into biodiversity research.

My contributions have spurred transformative change in the Systematic Botany field, e.g., we are well on our way to completing the angiosperm tree of life. I have been able to clarify patterns and processes occurring at the mesoscale, in difficult to access regions, by incorporating molecular data from historical collections, and thus evincing the role of climate-driven extinction in shaping disjunct geographic distributions, e.g., the African Rand Flora. I have also tackled the emblematic rapid radiations typical of tropical islands, explaining New Guinea□s notable floristic richness in terms of repeated migration and in situ diversification.

My contributions have been published in 45 peer-reviewed papers, half of them led by me, with 30 published in Q1 journals. The ~3.6K citations they amass result in a h-index of 23 and are a testament to their relevance. These products show my compromise to the scientific endeavour, evidence the multidisciplinary & collaborative manner of my work, and reflect my natl. (~11 yrs.) and intl. trajectory (~10 yrs.). I have also communicated my work at scientific events (~20 invited talks) and at science dissemination activitiesand through social and mass media: radio, podcasts, blogs, and the press. My research career has been backed by competitive fellowships (FPU, Fulbright comm.-Ramón Areces fdn., Duke Grad School, Garfield Weston fdn.) and research contracts. I have participated in 28 research projects, including collective agreements and international consortia, and serving as PI in seven.

I balance my research with teaching and the training of budding scientists to share the technical and scientific skills I have acquired, and which I continue honing taking specialized courses. I have taught ~2K hours of both undergrad- and grad-level courses and workshops. I have co-supervised ten students□three undergrad placements, one MSc internship and five theses, and a PhD student (ongoing).

I have served as: (a) project and personnel evaluator for natl. and intl. research funding agencies; (b) PhD thesis committee member; (c) secretary at faculty meetings; (d) chair at Symposia and academic societies; (e) coordinator in workshops, weekly seminar series, and field campaigns; and (f) peer reviewer and associate editor at Front. Plant Sci.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021

Turno General

Área Temática: **Ciencias y tecnologías medioambientales**

Nombre: JIMENEZ MORILLO, NICASIO TOMAS

Referencia: RYC2021-031253-I

Correo Electrónico: nicasiotjm@gmail.com

Título: Biogeochemistry of organic matter in complex matrices

Resumen de la Memoria:

My research career has been focused on the biogeochemistry of fire-affected organic matter preserved in complex environmental matrices. During my PhD (2014-2017) at the University of Seville, I implemented a multidisciplinary approach that allowed a remarkable mastery in biogeochemistry and advanced mass spectrometry techniques (Py-GC/MS/IRMS, FTICR/MS). The outcomes of this PhD thesis have contributed to determine biomarkers surrogated to soil hydrophobicity in the burnt area from Doñana National Park (Spain). During this period, I spent 12 months in different prestigious foreign research institutions, increasing my international experience and supplementing my technical know-how. This thesis obtained the maximum academic distinction and the European PhD mention. In 2018, it was recognized as the Best Thesis in Soil Science by the Spanish Society of Soil Science.

Due to my expertise in molecular and isotopic analytical techniques, in 2018 I was granted a 2-year postdoctoral fellowship at University of Évora (UÉvora), associated with the projects Por3O (PTDC/AGRPRO/2003/2014) funded by FCT and MedOOmics (Arimnet2/0001/2015) funded by European Commission. I generated for the first-time forecast models of geo-climate parameters in European agricultural products using Py-GC/IRMS. This research, published in 4 SCI journals (Q1), opened the door to important insights into new analytical tools for the authenticity of olive oil under climate change scenarios.

In 2020, I successfully obtained a 3-year research project (300k€) funded by FCT, aimed at developing new post-fire erosion risk models based on molecular biomarkers. This project has allowed me to establish and lead a new research line on wildfire biogeochemistry at the University of Évora. Thanks to my contribution in biogeochemistry and wildfire, I am among the top 1% of the world's experts in the scientific area of wildfire. In 2020, I have been designated President of FUEGORED network (>300 researchers). In addition, I obtained a EUROPLANET 2024 RI TA project from the H2020 program, to assess the molecular composition of organic matter preserved in saline sediments. I also obtained a R&D contract (10k€) from Consorcio Santiago de Compostela (Spain) for assessing the source of organic matter in rock matrices using Py-GC/MS. Recently, I have obtained a highly competitive individual postdoctoral contract (Individual Call to Scientific Employment Stimulus - 4th Edition) awarded by FCT-Portugal, as well as an exploratory R&D cooperation project (25k€) funded by €Associação Oceano Atlântico€ (Portugal).

My scientific and teaching track record comprises 60 peer-reviewed publications: i) 32 articles in SCI journals (97% in Q1); ii) 23 articles in non-SCI journals; and iii) 5 book chapters. I have >100 contributions to congresses, including 5as invited lecturer; 8 travel awards and 4 best communication awards. I am editorial board member of the Spanish Journal of Soil and Science, and guest-editor of 4 special issues (Applied Science, IJPEGH, SOIL and Front. For. Glob. Change). I have >100 lecturing hours (USeville and UÉvora) and experience in supervising students, with 2 completed MSc theses and 1 ongoing PhD thesis.

Resumen del Currículum Vitae:

EDUCATION AND POSITIONS
03/2022- : CEEC postdoctoral researcher, MED-UÉvora, Portugal
11/2019- : Postdoctoral research contract, MED-UÉvora, Portugal
01/2018-10/2019: Postdoctoral research fellowship, MED-UÉvora, Portugal
06/2017-09/2017: PhD research stay, MNCN-CSIC, Spain
06/2016-09/2016: PhD research stay, University of Lausanne, Switzerland
05/2015-08/2015: PhD research stay, Old Dominion University, U.S.A.
02/2014-07/2017: Predoctoral fellow, IRNAS-CSIC, Spain
04/2010-07/2012: Internal student, University of Seville, Spain
10/2006-07/2012: Undergraduate student, University of Seville, Spain

INDIVIDUAL FELLOWSHIPS AND R+D PROJECTS
- Principal investigator of 4 R+D projects (FCT-Portugal, EUROPLANET H2020-EC, Associação Oceano Atlântico, Consorcio Santiago de Compostela). Total amount: 354,670 euros
- 2 highly competitive individual fellowships (FCT-Portugal, MINEICO-Spain)
- Participant as team member in 6 projects (Interreg_POCTEP European Commission, 7th frammework Programme, European Union, 2 MINEICO, 2 FCT-Portugal)
- 5 non-competitive research contracts

SCIENTIFIC PRODUCTION
- 60 peer-reviewed publications (32 in SCI journals, 5 book-chapters, 23 non-SCI journals)
- 32 articles in SCI journals (97% in Q1, 60% in D1, 50% as main author or corresponding)
- 1 scientific-technical reports
- 104 contributions to international and national conferences (5 as invited speaker)
- Member of 9 organizing committees

PRIZES AND AWARDS
- 2021: Outstanding Student Oral Presentation Award, 20th EANA

- 2019: Outstanding Student Poster and PICO (OSPP) Award, EGU
- 2018: PhD Extraordinary award for the best PhD thesis in Soil Science, Spanish Society of Soil Science (SECS)
- 2016: Outstanding Student Poster Presentation Award, 21st Pyro
- 2016: Best presentation award, XVI COLACRO
- 2016: Travel award, 16th SECyTA
- 2014: Outstanding Student Oral Presentation Award, 5th FUEGORED
- 2014: Travel award, 17th IIHSS
- 2013: Travel award, 26th IMOG

TEACHING/MENTORING
- 1 PhD thesis (ongoing)
- 2 MSc theses
- 1 Bachelor thesis
- > 100 lecturing hours (University of Seville, University of Évora)
- ERASMUS-MUNDUS ARCHMAT Professor (since 2019)
- Co-organizer and instructor in CSIC formation courses (2016, 2017)
- Jury member of 1 PhD thesis and 2 MSc theses
- Co-organizer of 3 research courses in EGU general assembly (2015, 2016)

MEMBERSHIP OF SCIENTIFIC SOCIETIES, NETWORKS
- Since 2017: Spanish Society of Soil Science (SECS)
- Since 2016: Spanish Society of Chromatography and Related Techniques (SECyTA)
- Since 2014: International Humic Substance Society (IHSS)
- Since 2014: European Geosciences Union (EGU)
- Since 2014: International Network of Forest Fire (FUEGORED)
- Since 2013: European Association of Organic Geochemistry (EAOG)

OTHER MERITS
- President of International Network of Forest Fire (FUEGORED)
- Reviewer of > 55 articles in SCI journals
- Editorial board of Span. J. Soil Sci.
- Guest-editor of 4 special issues (Applied Science, IJPEGH, SOIL, Front. For. Glob. Change)
- Organizer and leader of several sampling campaigns in fire-affected environments
- Co-editor of 1 book Organic Geochemistry I-II: Trends for the 21st Century
- Vocal member of the Institute for the Advanced Studies and Research (University of Évora)
- Active participation in outreach activities, including media appearances (newspapers, radio)

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021

Turno General

Área Temática: **Ciencias y tecnologías medioambientales**

Nombre: BUENO GONZALEZ, CARLOS GUILLERMO

Referencia: RYC2021-032533-I

Correo Electrónico: cgbuenog@gmail.com

Título: Ecology of biotic interactions in plants

Resumen de la Memoria:

My research aims at understanding the role of plant biotic interactions, i.e. plant-microbes, plant-animal and plant-plant shaping plant communities at different scales in relation to environmental gradients. My research vision is focused on studying the key stabilizing interactions in communities that allow us to enhance the stability and resilience of ecosystems facing pressing global changes.

I did my PhD at the Pyrenean Institute of Ecology (CSIC), defending in 2011. In this period, I obtained a university expert degree on advanced methods in applied statistics (2008/09, UNED). In my PhD, I studied the impact of wild boar disturbances on alpine grassland ecosystems, particularly on the landscape, vegetation, soil (including earthworms and seed banks) and the ecological and pastoral values of these grasslands.

In 2011, I moved to the University of Alberta in Canada to study the combined effect of climate change and herbivores on alpine ecosystems, obtaining two competitive grants (AXA research Fund and Killam postdoctoral fellowships). From 2012 to 2014, I attended the graduate teaching-and-learning university program, ensuring a strong formation on academic teaching and communication. In 2014, I co-founded The Herbivory Network (HN >200 researchers) to expand these research aims to Arctic and alpine areas globally. I organized 4 HN meetings and elaborated 3 sampling protocols and 7 network papers.

In 2015, I started as a postdoc at the University of Tartu, Estonia, joining a world-leading group on plant and mycorrhizal ecology, where my interests expanded to belowground biotic interactions. I focused on 3 main aspects, 1) expanding the definition of mycorrhizal symbiosis, particularly beyond nutritional functions, 2) the measurement of plant mycorrhizal traits and their distribution at community, ecosystem and continental scales and 3) integrating mycorrhizal symbiosis into plant ecology using functional traits. Given the results and interest received in my research (30 publications on this topic, and the invitation to the editorial board of New Phytologist) I have been promoted to research fellow (2017-2021) and Associate Professor (2022-). During this period, I have formed my independent research group with 3 PhD students and 1 MSc (defended in 2019). Since 2017, I am an active part of the leading team of the South American Mycorrhizal Research Network.

In the last months, I have started an initiative to describe and analyse the mycorrhizal traits of the South American Flora, and a pilot study to analyse the role of deep roots and associated microbes in the resilience of ecosystems. The Ramon y Cajal contract will help to establish my lab and goals in the long term.

In 2014, I co-founded the Herbivory Network, a research network (> 200 researchers) aimed at studying the role of herbivory in Arctic and Alpine ecosystems under climate change. Since 2017, I contributed to the foundation and expansion of the South American Mycorrhizal Research Network (>200 researchers), where I am currently leading the description of the plant mycorrhizal traits of the South American Flora (> 80 local and international researchers involved).

I have presented my research at more than 40 conferences, and was invited to 14 conference talks/seminars (including 1 keynote). I have led the blog What we are reading?" with commentaries and interviews

Resumen del Currículum Vitae:

I have published 6 book chapters, and 63 SCI journals articles (38 in Q1 journals), including top journals such as Nature (journal cover Sept. 2021), Nature Communications, Ecology Letters and New Phytologist among others. I am the first or last author in 25 of my Publications, accumulating 1,540 citations in google scholar, with an h-index of 24.

The relevance of my publications is organized in the following topics:

I.-Mycorrhizal symbiosis. My contribution in mycorrhizal symbiosis expands the definition of mycorrhizal symbiosis concept including non-trophic mutualistic exchanges, especially in arbuscular mycorrhizal (AM) fungi (Ref 3). This has direct implications on how to measure and estimate the plant mycorrhizal traits, either at the community level (Ref 1) or larger scales (Refs 5 & 8). These achievements are impacting the way we conceive and measure mycorrhizal symbiosis in ecology, and how we organize and compile the information in mycorrhizal databases.

II. Integration of plant traits. We integrated, fine-root traits with aboveground traits globally (Ref 2) and estimated the overlap in their functional traits, finding a surprisingly low overlap. This indicates that other elements and organisms, such as symbionts, need to be accounted for. This latter topic is one of my current research lines.

III. Herbivory. Since the foundation of the Herbivory Network (2014), I have been deeply involved in the coordination of global experiments, the development of field protocols and conceptualizing the effects of herbivores on northern ecosystems. One of our works on the effects of trampling on arctic soils (Ref 4), indicates a major role of herbivores, in ameliorating or accelerating ecosystem degradation through cascading effects to other organisms (i.e. soil biota and plants).

IV. animal disturbances. This has been the topic of my PhD (Refs 9 & 10). I contributed to defining the degradation threshold of the boar disturbance in alpine grasslands, depending on the characteristics of the disturbance. This is critical information for the conservation of this sensitive ecosystem.

I have obtained more than 290K as principal investigator (PI in 6 projects) and participated in more than 16 projects with total funding of over 10 mill euros, funded by European, Spanish, Aragonian, Canadian, Chilean and Estonian governments, including also private funds. Currently, I am responsible (and co-writer) of a work package of the Center of Excellence EcolChange, a European Union funded research project with > 4.4 mill euros for 7 years (2016-2023), and I am leading an independent project aimed at the role of deep roots (>1m deep) and microbial-associated biota on ecosystem functioning (Incentive grant, 2021-2022).

I have supervised 4 bachelor students (2012-2014), 1 MSc student (2019) on the importance of mycorrhizal symbiosis in plant invasions, and I am supervising 3 PhD students on the role of mycorrhizal symbiosis in ecosystem dynamics and functioning under global changes.

Since January 2020, I am part of the advisory Editorial Board of New Phytologist, and I have been a reviewing editor (2012-2014) for Applications in Plant Science. I have reviewed 123 papers from 38 different SCI journals. I have reviewed research grants for international panels: European Science Foundation (Research Foundation Flanders, Belgium) and the Latvian Council of Science.examiner/reviewer for 4 PhD and 1 Master theses.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021

Turno General

Área Temática: **Ciencias y tecnologías medioambientales**

Nombre: PETETIN , HERVE

Referencia: RYC2021-034511-I

Correo Electrónico: herve.petetin@bsc.es

Título: Air quality and artificial intelligence

Resumen de la Memoria:

After 11 years of experience in academic research, I am an atmospheric scientist with main expertise on air quality (AQ) and machine learning (ML).

During my PhD (2010-2014) at LISA (Créteil, France), in close collaboration with AIRPARIF (Paris, France), the local agency in charge of monitoring and forecasting air pollution, I developed novel approaches for (1) characterizing the aerosol pollution affecting the Paris region, (2) unraveling its major local and remote sources and (3) quantifying the most important deficiencies limiting our modeling capabilities. My research shed a new light on the dominant contribution of organic and inorganic aerosols regional background to the aerosol pollution levels locally observed in Paris, and on the importance of agricultural and wood burning sources.

During 2014-2018, as a postdoctoral fellow in the French branch of the IAGOS European Research Infrastructure at LAERO-OMP (Toulouse, France) that operates worldwide in-situ measurements on-board commercial aircraft, I co-coordinated the scientific exploitation of this unique dataset of ozone and carbon monoxide in-situ tropospheric vertical profiles. My research allowed to (1) characterize the variability and trends of these two trace gases in the European troposphere, (2) describe for the first time with unprecedented representativeness their vertical distribution at northern mid-latitudes both at the surface and at the interface with free troposphere, and (3) assess the crucial role of worldwide biomass burning sources to strong CO plumes traveling at hemispheric scale in the free troposphere. I have been a contributing author to the TOAR-I IGAC international assessment activity on tropospheric O3 gathering a panel of 200 experts on O3 from over 35 countries.

Interested in opening new avenues in my research, I followed an intensive on-line training in machine learning (ML). This allowed me to obtain in 2018 a Marie Sklodowska-Curie Actions postdoctoral grant at the BSC (Barcelona, Spain) where I launched and now lead a new innovative research line at the cross-section between AQ and ML, currently focusing on (1) improving physics-based AQ forecast with statistical and ML methods and (2) building innovative ML-based capabilities for monitoring and diagnosing surface air pollution from space, in line with several on-going projects (e.g. AQ-WATCH H2020 European project, MITIGATE RETOS Spanish national project in which I act as Principal Investigator, MITERD Spanish O3 plan, EARLY-ADAPT ERC, TOAR-II IGAC activity). I played a seminal role in the quantification of the impact of the COVID-19 lockdown on air quality through a pioneer study in which I developed an innovative ML-based approach that has then been used by many authors in the world and opened a series of collaborations with ISGlobal, CSIC, ECMWF and the CAMS community.

I am now consolidating my research line at the BSC's Earth Sciences department and my collaborations at national and international level.

Resumen del Currículum Vitae:

I was born in Caen (France, 1986). After obtaining an engineer diploma from Ecole Centrale de Lille, (France, 2008) and a MSc in Mechanics and Fluid Dynamics from University of Science and Technology Lille 1 (France, 2009), I specialized myself in atmospheric physics and chemistry through a MSc from University of Paris Est Créteil (France, 2010) and a PhD from University of Paris Diderot (France, 2014), and over the recent years in machine learning (ML).

Along my 11-year research career in France (at LISA, AIRPARIF and LAERO-OMP) and Spain (at BSC), I have studied the sources and fate of aerosols and trace gases in the troposphere from diversified although complementary points of view, over a broad range of scales, using a variety of observations (e.g. surface/airborne in-situ, remote sensing) and models (e.g. chemistry-transport, Lagrangian, meteorological and ML modeling). Among my main achievements, (1) I developed novel approaches for characterizing the fine aerosol pollution and evaluating AQ models, (2) I unraveled numerous aspects of the variability and trends of ozone and carbon monoxide in the troposphere, (3) I launched and now lead a new innovative research line at BSC at the cross-section between AQ and ML whose aim is to enhance AQ forecasts and build new capabilities for monitoring and diagnosing AQ from space based on ML methods, (4) I played a seminal role in quantifying the impact of the COVID-19 lockdown on AQ and associated health effects.

Besides 24 national/international conferences, I disseminated my work through 26 peer-reviewed publications in Q1 scientific journals, including 9/5 as first/second author (h-index of 17/15, 1062/815 citations, Google Scholar/Scopus), plus two additional publications in review (as first and second author, respectively) and 2 conference proceedings. I have successfully applied for competitive funding (e.g. personal MSCA postdoctoral grant, 70k; Spanish national project as PI, 118k; AQ-WATCH H2020 project, 2386k) and participated in numerous projects (3 national projects, 2 European projects, 2 Copernicus contracts, 1 ERC, 3 private contracts) and international assessment activities (TOAR-I/II IGAC initiatives). I have actively supervised 4 young investigators (1 PhD and 1 MSc in the past, and currently 2 pre-doctoral fellows). My objective is now to consolidate my research line on AQ and ML, a strategic research topic with strong funding opportunities at national (e.g. 2025 Digital Spain, Spain's recovery and resilience plan) and European scales (e.g. Green Deal, Destination Digital Strategy, Destination Earth).

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno de personas con discapacidad

Área Temática: **Ciencias y tecnologías químicas**
Nombre: ****** ******
Referencia: RYC2021-032093-I
Correo Electrónico: rporcar@uji.es
Título: Advanced polymeric materials in Green Chemistry

Resumen de la Memoria:

Dr. Raúl Porcar possesses a high multidisciplinary profile, contributing with high-impact works in fields involving the use of advanced polymeric materials for application in areas like catalytic/biocatalytic transformations, responsive materials, Flow Chemistry and Green Chemistry, and having being involved in very diverse fundamental and applied research projects.
After completing a Bachelor's Degree in Chemistry at Jaume I University in Castellón (UJI) in 2006, Dr. Raul Porcar did a Master's Degree in Sustainable Chemistry in the Group of Sustainable Chemistry and Supramolecular Chemistry, directed by the prestigious Professor Santiago V. Luis in the Inorganic and Organic Chemistry Department (UJI). In 2007, he was awarded with a FPU fellowship, joining a PhD program in this research group working on catalytic processes based on supported catalysts and neoteric solvents. In 2011, he obtained his PhD (Cum Laude) and continued up to now at UJI as a professor and researcher. In this period, he had the opportunity to lead and develop his own research line on advanced polymeric materials and neoteric solvents for catalytic/biocatalytic transformations and flow processes.
The applicant's scientific career focuses on contributions in the fields of Advanced Polymeric Materials, Bio-Catalytic Transformations, Flow Chemistry and Sustainable Chemistry, with high-impact work and results, as a professor/researcher (Universitat Jaume I of Castellón (UJI) 2007-20). He has contributed with 29 research articles (high impact journals, Q1) and 1 book chapter; it has received 419 citations (14.45 citations/articles) with a h-index of 13; and has presented 69 contributions in national/international conferences. He has participated in 18 R&D projects (3 as IP, 2009, 2014, 2019), he has participated in 1 R&D project of a private entity (2018); he has been awarded with 3 awards (Teaching/Research Activities Recognition UJI 2016; Best Oral Communication Award, JOEB 2018; V Edition UNED-Santander 2021 research awards); and he has organized 2 R&D activities. In addition, he has established collaborations with Dr. R. Fernández-Lafuente (CSIC, Madrid), Dr. V. Gotor (Oviedo University), Dr. J. Sánchez (Montpellier University, France), Dr. P. Lozano (Murcia University) and Dr. I. Alfonso (CSIC, Barcelona).
Finally, underline that despite the applicant having a 35% degree of disability, he has demonstrated excellent and exceptional career progression, and the ability to be an independent research leader.

Resumen del Currículum Vitae:

After completing a Bachelor's Degree in Chemistry at Jaume I University in Castellón (UJI) in 2006, Dr. Raul Porcar did a Master's Degree in Sustainable Chemistry in the Group of Sustainable Chemistry and Supramolecular Chemistry, directed by the prestigious Professor Santiago V. Luis in the Inorganic and Organic Chemistry Department (UJI). In 2007, he was awarded with a FPU fellowship, joining a PhD program in this research group working on catalytic processes based on supported catalysts and neoteric solvents. In 2011, he obtained his PhD (Cum Laude) and continued up to now at UJI as a professor and researcher. In this period, he had the opportunity to lead and develop his own research line on advanced polymeric materials and neoteric solvents for catalytic/biocatalytic transformations and flow processes.
The applicant's scientific career focuses on contributions in the fields of Advanced Polymeric Materials, Bio-Catalytic Transformations, Flow Chemistry and Sustainable Chemistry, with high-impact work and results, as a professor/researcher (Universitat Jaume I of Castellón (UJI) 2007-20). He has contributed with 29 research articles (high impact journals, Q1) and 1 book chapter; it has received 419 citations (14.45 citations/articles) with a h-index of 13; and has presented 69 contributions in national/international conferences. He has participated in 18 R&D projects (3 as IP, 2009, 2014, 2019), he has participated in 1 R&D project of a private entity (2018); he has been awarded with 3 awards (Teaching/Research Activities Recognition UJI 2016; Best Oral Communication Award, JOEB 2018; V Edition UNED-Santander 2021 research awards); and he has organized 2 R&D activities. In addition, he has established collaborations with Dr. R. Fernández-Lafuente (CSIC, Madrid), Dr. V. Gotor (Oviedo University), Dr. J. Sánchez (Montpellier University, France), Dr. P. Lozano (Murcia University) and Dr. I. Alfonso (CSIC, Barcelona).
In his teaching career he has collaborated in the Supervision and Tutoring of 6 doctoral projects, 8 Master's projects and 8 Bachelor's projects, furthermore he has directed 1 Master's project (TFM) and 1 Bachelor's project (TFG), and has carried out> 500h of teaching (Chemistry Degree, Agrifood Engineering Degree, Environmental Sciences Degree, Master in Sustainable Chemistry, Master in Chemical Science and Technology, Master in Agri-environmental and Agri-food Sciences, Master in Teacher Training in Education). He has been accredited as Assistant Professor, Contracted Professor and Professor at the Private University (ANECA, 2017) and Professor at the University (ANECA, 2020). He has obtained the i3 Certification (Incentive Program, Incorporation and Intensification of Research Activity, Ministry of Science and Innovation 2019). In 2020, he has obtained a position of Assistant Professor Doctor, Faculty of Sciences, UNED (2020, Madrid).
Finally, underline that despite the applicant having a 35% degree of disability, he has demonstrated excellent and exceptional career progression, and the ability to be an independent research leader.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno de Jóvenes investigadores

Área Temática: **Ciencias y tecnologías químicas**
Nombre: QUESADA MORENO, MARIA DEL MAR
Referencia: RYC2021-034288-I
Correo Electrónico: mmarquesadamoreno@gmail.com

Título: Multifunctional Magnetic Materials based on Coordination Compounds

Resumen de la Memoria:

The research activity of the candidate has been focused on the use of a very wide range of different spectroscopic techniques that complement each other (including chirality sensitive ones) together with computational chemistry as tools to extract structural information of relevant chemical phenomena/processes at the molecular level. This multidisciplinary background has culminated in the use of all her complementary knowledge to prepare multifunctional magnetic materials with important technological applications. Her research career can be divided into three multidisciplinary stages:

1) During her PhD period at the University of Jaen (UJA, 2013-2017) she used the chirality sensitive VCD (Vibrational Circular Dichroism) technique, and the non-chiral sensitive IR and Raman ones, supported by quantum chemical calculations to i) disentangle the conformational and/or configurational preferences of some molecules with biological or atmospheric interest, and ii) explore chiral recognition processes and to determine the absolute configuration of some 1H-indazole derivatives with spontaneous resolution of chirality in the solid phase. She contributed to the chirality field of solid materials by reporting the first successful methodology for the determination of enantiomeric excess in chiral solid samples by VCD spectroscopy. In addition, she unveiled the conformational landscapes of two terpenes in the gas phase using microwave spectroscopy, one of them linked with atmospheric pollution. The results of her PhD received the prestigious Extraordinary Doctorate Award.

2) During her postdoctoral period at Deutsches Elektronen-Synchrotron (DESY, Hamburg, 2018-2020) she used a combination of chiral sensitive microwave spectroscopy and computational chemistry to i) disentangle the chiral composition of complex mixtures, like essential oils, further exploring the application of rotational spectroscopy as an analytical tool, and ii) significantly advance the current understanding of the role of non-covalent interactions and chirality in molecular recognition/aggregation by systematically exploring model molecular complexes. These spectroscopic results at the molecular level in the gas phase are useful for benchmarking theory to help extrapolations to much larger molecular systems.

3) During her postdoctoral period at the University of Granada (UGR, 2020-present) the candidate employs her background acquired during her PhD and first postdoctoral periods (chirality-computation-spectroscopy) together with her recent high-level training and transferable skills in molecular magnetism, coordination chemistry and luminescence gained at UGR to synthetize molecular magnetic materials with interesting magnetic properties or association of magnetic, chiral and/or luminescent properties, which can have important technological applications. She received local funding (UGR) to start developing a new research line related to this topic. Her major achievements have been the synthesis of new water and air stable Co(II) and Dy(III) complexes that behave as Single Molecule Magnets (SMMs) and show a magnetic memory effect below 10 K, which is quite high for water/air-stable SMMs.

Resumen del Currículum Vitae:

The candidate started her PhD funded by a pre-doctoral grant (UJA, 2013-2017). She defended her thesis in 2017, with international mention, cum laude mark, and Extraordinary Doctorate Award. Her PhD research was focused on two main ideas: (1) the conformational and/or the configurational analysis of some molecules with biological or atmospheric interest, by using the chirality sensitive VCD (Vibrational Circular Dichroism) technique, and the non-chiral sensitive IR and Raman ones, supported by quantum chemical calculations; and (2) the study of chiral recognition processes and the determination of the absolute configuration of some 1H-indazole derivatives in the solid phase. She did two research stays during her PhD to learn about microwave spectroscopy, a different technique to those she used previously, in Université Lille 1 (France, 2014) and in the Max Planck Institute of the Structure and Dynamics of Matter (DESY, Hamburg, 2015). In these stays, she unveiled the conformational landscapes of two terpenes in the gas phase (front cover ChemPhysChem, Chem.Eur.J 2018).
After her PhD, she earned a postdoctoral grant from Alfonso Martín Escudero Foundation to work in DESY group (Hamburg, 2018-2020), where she expanded her knowledge about chiral sensitive broadband rotational spectroscopy. As a result, she has published 1 paper in Angew.Chem.Int.Ed., 2 in Chem.Eur.J. (one as a hot paper), 4 papers in PCCP (1 under review), and 4 are in preparation. In these works she has used rotational spectroscopy to analyze: the chiral composition of essential oils and the structures of large complexes where dispersion interactions play a key role.
Two years ago, she earned the postdoctoral fellowship Juan de la Cierva formación to work at the University of Granada (UGR), where she has applied her experience in chirality sensitive techniques and quantum-chemical calculations on chiral and luminescent single molecule magnets, at the same time that she has acquired theoretical and experimental skills in the molecular magnetism, coordination chemistry and luminescence fields. Later she earned a competitive 3-year postdoctoral grant co-funded by Junta de Andalucía-FEDER. During this last period she has started a new research line, in which chirality, computation and inorganic chemistry are closely related. She mentored one master's student and currently she co-supervises another master's student and an international PhD student, whose works are framed in this research line (1 paper under review in Inorg.Chem.Front. and 5 in preparation).
Her research has led to 25 JCR articles (1st/2nd author in 22) and 47 contributions in scientific congresses [40 international ones, 20 oral communications (1 invited one)]. 16 of these 25 papers have been successful thanks to international and national collaborations. She has also participated in 10 research projects [2 international, 1 national, 4 regional], being the Principal Investigator of 1 local project. She is an editorial board member of Chemical Papers, Journal of Chemistry and Open Chemistry.
She has also expertise in teaching undergraduate students and dissemination activities.The candidate has been international scientific evaluator for a doctoral thesis and she has participated in an innovative teaching project and a teaching publication. She obtained the Spanish accreditation to be Profesor Contratado Doctor.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno de Jóvenes investigadores

Área Temática: **Ciencias y tecnologías químicas**
Nombre: PRIETO LOPEZ, CRISTINA
Referencia: RYC2021-034417-I
Correo Electrónico: cristinaprietolopez@hotmail.com

Título: Development of the next generation of encapsulates by emerging and scalable technologies of application interest in food and pharma applications

Resumen de la Memoria:

Dr. Prieto has gathered more than 11 years of experience in both public research agencies and industrial R&D organizations. She performed her PhD in Chemical Engineering (2012-2017) at the Complutense University of Madrid with an UCM predoctoral grant. During her postdoctoral career, she worked as Project Leader at the R&D department of Bioinicia S.L. and as a postdoctoral researcher and Lab Manager at the Novel Materials and Nanotechnology laboratory of the Institute of Agrochemistry and Food Technology (IATA) from the Spanish Council for Scientific Research (CSIC). Until now, she has participated in 16 European and National research projects, 7 of them as Principal Investigator. She has performed 8.5 months of research stays (Nova University of Lisbon, University of Minho, International Iberian Nanotechnology Laboratory, La Sapienza University of Rome and Sheffield Hallam University).

Dr. Prieto has focused her entire research career in the field of encapsulation technology of application interest in food, pharmacy, biomedicine, cosmetics, agriculture, and food packaging. She has developed novel encapsulation technologies based on supercritical fluids and electrohydrodynamic processing technology, and she has demonstrated the viability of their scale-up to respond to the demand of the food and pharmaceutical industries. Additionally, she has developed novel functional ingredients, fortified food products and novel drug delivery systems based on novel and challenging active compounds and innovative biopolymers to enhance their bioactivity and bioavailability. Moreover, she has developed innovative biodegradable and compostable food packaging solutions with active properties and antimicrobial filtering materials, among others. Many of these developments have been transferred and are already being commercialized. The candidate will lead research activities for the development of the next generation of encapsulates of innovative and challenging active ingredients with enhanced stability, bioactivity and bioavailability through formulation design with novel biopolymers, nanomaterials and other additives and their encapsulation using emerging and scalable technologies.

Resumen del Currículum Vitae:

- Chemical Engineering at the University of Santiago de Compostela in 2010
- Master's Degree in Process Engineering at the Complutense University of Madrid (UCM) in 2011
- European PhD in Chemical Engineering at the UCM in 2017, with an UCM predoctoral scholarship

- 11 years of experience working in research organizations:
  - -Project Leader in the R&D department at Bioinicia S.L. 2017
  - -Postdoctoral Researcher and Laboratory Manager at the Institute of Agrochemistry and Food Technology (IATA-CSIC) from December 2017 to March 2021
  - -Project Leader in the R&D department at Bioinicia S.L. 2021
  - -Postdoctoral Researcher and Laboratory Manager at the IATA-CSIC since May 2021

- 8.5 months of international research stays:
  - -3.5 months at the IBET and ITQB research centers belonging to the Nova University of Lisbon (Portugal) with an UCM mobility grant
  - -1 month at the University of Minho (Portugal)
  - -1 month at the International Iberian Nanotechnology Laboratory (Portugal)
  - -2 months at the University of Rome La Sapienza (Italy)
  - -1 month at the Sheffield Hallam University (UK).

- With an h-index of 10 (Scopus) she has authored:
  - -36 peer-reviewed scientific papers (+2 accepted for publication) being in 9 of them first author, and in 8 of them corresponding author, being 80% of them in the first quartile (Q1) of their fields
  - -3 licensed patents (+1 pending filing)
  - -1 book
  - -8 book chapters
  - -41 communications in international conferences (CRS and ACS), 4 of them as invited speaker
  - -417 citations (108 citations/year in the last 3 years)

- She has collaborated in 16 European and National research projects, 2 of them as Principal Investigator (PI) at IATA-CSIC, and 5 as PI at Bioinicia S.L., and in 6 non-competitive research projects with private entities. A project as PI was granted by the CELLS ALBA SYNCHROTRON (rated A+).
- Member of a CYTED thematic network, the SUSPLAST network and 3 scientific societies (CRS, RSEQ and FLUCOMP).
- Reviewer for many journals
- Member of the reviewer board of Nanomaterials (MDPI), Journal of Applied Sciences (MDPI) and Frontiers in Sustainable Food Processing (Frontiers).
- Guest Editor in 2 Special Issues of the Nanomaterials journal (MDPI).
- Part of the Organizing Committee and Scientific Committee of several congresses.
- Accredited as Profesor Ayudante Doctor (ANECA).
- Co-supervisor 4 Ph.D. students

Member of the tutorial committee of 2 Ph.D. students from the Technological Institute of Tepic (MX).
Supervisor of more than 38 visiting students at the IATA-CSIC.
Jury of the Doctoral Thesis of Dr. Miguel Viguera.

Awards:

- -Extraordinary Doctoral Thesis Award
- -The Flucomp Best Thesis Award
- -Emprender es Posible at the V Edition of the UCM Universitary Entrepreneuship Award
- -V CÁTEDRA AGROBANK AWARD
- -The Business Award Aitex 2021 against COVID19
- -2018 European Innovation Radar Award
- -3 awards for the quality of her scientific communications

Her main research line focuses on the development of encapsulation micro and nanotechnologies for bioactive compounds using biopolymers of application interest in the food, nutraceutical, pharmaceutical, cosmetic and agricultural sectors.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno General

Área Temática: **Ciencias y tecnologías químicas**
Nombre: GEER RAMOS, ANA MARIA
Referencia: RYC2021-033807-I
Correo Electrónico: anageer@unizar.es
Título: Catalytic and stoichiometric functionalization of small molecules with molecular complexes

Resumen de la Memoria:

During her research career, Dr. Geer has worked on a wide variety of research topics at the frontier of organometallic chemistry with the main objective of contributing to the advance of the knowledge in both, fundamental and catalytic levels.

One of her main areas of expertise concerns the organometallic chemistry of noble metals, always looking for unusual bonding and/or reactivity modes as well as catalytic applications. For example, she prepared:

- the first mononuclear imido rhodium complexes with a multiple Rh-N bond, placing the group to the status of Bergman, Peters, or Mindiola, who succeeded with iridium, cobalt, or nickel, respectively,
- novel hydrido phosphanido rhodium complexes, being excellent catalysts in hydrophosphanation of olefins because a novel mechanism arising from the key role of the hydride ligand,
- rhodium(I)/iridium(I) complexes in unusual tetrahedral environments, which are suitable catalysts for dimerization of alkynes, and
- a highly reactive platinum(III) radical cation seeking to gain insights into methane functionalization

Her curiosity and desire to learn moved her to the Main group chemistry, acquiring significant knowledge in the most modern concepts of their chemistry. In this context, she developed catalytic systems for amine-borane dehydrocoupling with Group 1 salts bearing pincer ligands and Group 2 complexes with aminopyridinato ligands as well. It is worth mentioning, that working with magnesium complexes is extremely challenging as they are tremendously air- and moisture-sensitive as well as amenable to disproportionation equilibria. Notwithstanding, several articles emerged from this matter.

Inspired by the current focus on the use of catalysts based on non-toxic Earth-abundant first-row transition metal complexes, she was immersed into this chemistry, acquiring the necessary skills to flawlessly navigate in the paramagnetic world in which these metal complexes live. Two remarkable accomplishments are: the full CO scission to afford uncommon squaraine species and the catalytic synthesis of a new family of organophosphorus compounds, which are vital molecules underpinning a range of critical areas such as catalysis, agrochemicals, and medicine. Both reactions are promoted by low-coordinated iron complexes. Besides, she also found suitable catalyst complexes of cobalt(II) for hydrophosphination of alkenes and manganese(II) for cyclotrimerization of isocyanates.

The use of electrochemistry to drastically improve the overall environmental footprint of a required chemical transformation has been another topic of her interest. With this aim, she has prepared trinuclear copper complexes with a bridging oxo moiety, cobalt-based compounds, and iridium complexes supported on carbon materials, all of them being efficient electrocatalysts for OER.

At this time, and aligned with current trends in chemistry, she is starting to develop a highly multidisciplinary and extremely ambitious research line at ISQCH (CSIC-UZ) focused on reactivity studies and catalytic applications of first-row transition metal complexes in reactions related to C-H heterofunctionalization, small molecule activation, and electrocatalytic energy transformations.

Resumen del Currículum Vitae:

Ana M. Geer studied chemistry at the University of Zaragoza (UZ) and obtained a PhD degree in January 2015 (Summa cum laude and European Doctorate Degree) under the supervision of Dr. C. Tejel and Prof. M. A. Ciriano. For these studies, she was awarded competitive fellowships from the regional government (Gobierno de Aragón) for PhD studies (four years) and from CAI to spend three months in the Laboratoire de Chimie de la Coordination (LCC) in Toulouse (France) within the group of Prof. S. Sabo-Etienne. In this stage, her research focused on the synthesis of group 9 transition metals (Rh and Ir) and anionic ligands, which provided fac-M(L3) scaffolds suitable for activation of small molecules and catalysis (UZ), as well as related ruthenium complexes for carbon dioxide reduction at LCC.

In April 2015, she joined the group of Prof. Kays at the University of Nottingham (UK) as a postdoctoral Fellow. In this three years stay (up to March 2018), she started a new avenue being fully immersed in the chemistry of first-row transition metals (base metals) -as well as in main group elements- with the aim of preparing suitable catalysts for P-C bond formation (hydrophosphination) and dehydrocoupling reactions of phosphanes and amino-boranes. During this time, she had the opportunity to supervise PhD students, manage multiple research projects and develop her own ideas, which resulted in important contributions to the research group.

In order to complete her formation in current challenges facing society, such as the design of new catalysts for fuel cells and chemical energy conversion, she moved to the University of Virginia (USA) to participate in a high-collaborative project under the MAXNET Energy Project -involving 8 Max Planck institutes and the Universities of Cardiff and Virginia- as research assistant in the group of Prof. Gunnoe. Through these two years (April 2018-March 2020), she was mainly involved in the design and synthesis of suitable transition metal complexes (copper, cobalt, and iridium) as electrocatalysts in the oxygen evolution reaction (OER), supervising students and as the principal coordinator (at the organization level) of the mentioned project.

The solid chemistry background and leadership abilities acquired during these three different stages provided her the opportunity of starting a new research line in the Instituto de Síntesis Química y Catálisis Homogénea (CSIC-UZ) as a Juan de la Cierva Incorporation fellow (since May 2020) within the group of Dr. C. Tejel. This line, defined as a priority by the Institute, focuses on the design, synthesis, and electrocatalytic applications of base metals with redox-active ligands.

On the whole, most of her research work has been published in multidisciplinary journals; including general [Nat. Commun. (1)] and chemistry [J. Am. Chem. Soc. (1), Angew. Chem. Int. Ed. (3), Chem. Commun. (2), Chemistry Eur. J. (4)] sciences, whereas the rest were mainly reported in highly ranked (> Top-15) specialized journals. She has also been invited/selected for oral talks in international and national conferences on organometallic chemistry and catalysis. Besides, she has supervised a wide range of PhD students on very different topics and has participated in several multidisciplinary research projects.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno General

Área Temática: **Ciencias y tecnologías químicas**
Nombre: COSTAS RODRIGUEZ, MARTA
Referencia: RYC2021-033874-I
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Título: High-precision isotopic, elemental and spatial resolved analysis

Resumen de la Memoria:

SUMMARY OF MY RESEARCH CAREER: I completed my PhD at the University of Vigo in June 2011, which was awarded with the Extraordinary Doctorate Award of the University of Vigo (Sciences scope). After obtaining my PhD degree, I had an IP5 contract obtained by competitive concurrence for teaching at University of Vigo. In October 2012, I joined to the Atomic and Mass Spectrometry research group at Ghent University (UGhent) in Belgium, leading to a postdoctoral stage of 112 months funded through 3 International competitive calls and a postdoctoral contract via an Excellence of Science (EoS) project. Since September 2021, I am assistant professor (10%) and postdoctoral researcher (90%) at UGhent and Royal Institute of Cultural Heritage (KIK-IRPA, Belgium). During my postdoc stage, I acquired leadership skills and team work abilities with the co-direction of 7 Master dissertations and 2 Doctoral Thesis. I was granted for teaching at University of Oviedo as visitor professor for 1.5 months. I have published 64 articles in international peer-review journals (included in JCR) and 4 book chapters and my research has been presented in 75 conferences, including a Plenary lecture and 3 invited lectures given as first author. I am co-promotor of a Concerted research actions GOA project (BOF.GOA.2022.0002.04) financed by the Special Research Found (BOF)-UGhent. I have actively participated in a European project, UGhent and FWO (Research Foundation of Flanders) projects and 2 in cooperation with the University of Oviedo. I have been invited to publish 2 articles in special issues dedicated to young scientists and I was awarded with the JAAS Emerging Investigator Lectureship 2019 given by Journal of Analytical Atomic Spectrometry. To date, I am member of the advisory board of this journal and review editor of the journal Frontiers in Nutrition.

SUMMARY OF MY MAIN RESEARCH LINES: The main research lines pursued during my career are the development of methods for high precision isotopic, elemental and spatial resolved analysis as well as real-life applications in biomedicine, geochemistry and arqueology. Particularly, I am a recognised worldwide researcher in multi-collector inductively coupled plasma-mass spectrometry (MC-CP-MS). Natural isotope ratio variations showed potential as biomarkers for diagnosis of diseases that otherwise can only be established at a later stage or via a more invasive approach. With this aim, I have developed methods for high-precision isotopic analysis at ultra-trace levels of the target elements, methods to overcome spectral interferences, and instrumental advances have been fine-tuned for purpose. Due to the lack of isotopic reference materials, validation of the methods has been performed via inter- and intra- laboratory exercises. High-precision isotopic analysis offers a novel way to obtain a more profound insight into the role of essential elements in human health and disease. The use of laser ablation (LA) coupled to (MC)-ICP-MS was advantageous for solid samples; while LA-ICP-MS was explored in biological samples (liver tissue), LA-MC-ICP-MS was used for geological and cosmological (micro-meteorite) samples. As a result, an active collaboration with numerous institutions, articles in analytical, multidisciplinary, medical and geological journals have been published.

Resumen del Currículum Vitae:

I defended my PhD in the University of Vigo (Dept. of Analytical and Food Chemistry) in July 2011, being the work carried out awarded with the Extraordinary Doctorate Award (Sciences scope) of the University of Vigo. After obtaining my PhD degree, research on the development of novel, miniaturized and automatized methods was accompanied by teaching (via an IP5 contract) in the University of Vigo.
From October 2012 to August 2021, I was a postdoctoral researcher funded through competitive international calls, first with a postdoctoral fellowship from the Special Research Fund (BOF)-Ghent University, and since October 2014 with two postdoctoral fellowships from the Flemish Research Foundation (FWO) Flanders (Junior and Senior modalities) in the Atomic and Mass Spectrometry A&MS research group at Ghent University (UGhent, Belgium). From January to August 2021, I had a postdoctoral contract financed via an Excellence of Science (EoS) project in the A&MS research group. Research interests were/are the method development for elemental and high-precision isotopic analysis and bioimaging, as well as real-life applications, particularly in biomedicine, geochemistry and arqueology. This research, still active, is carried out in cooperation with various departments of the Ghent University Hospital and institutions such as University of Oviedo (Spain), Mayo Clinic (ARZ, United States), Research Institute of the National Center for Global Health and Medicine (Japan) and Fundação Oswaldo Cruz (Brazil), among others. I worked on a European research project (ReMIND, 15HLT02).
In September 2021, I started as assistant professor (10%) and postdoctoral researcher (90%) at UGhent and Royal Institute of Cultural heritage (KIK-IRPA, Belgium) with a position called FED-tWIN (Federal research program for sustainable cooperation between Federal Scientific Institutions and Belgium universities). I am currently developing joint research between both institutions focused on isotopic analysis in arqueology. I am co-promotor of a Concerted research actions GOA project (BOF.GOA.2022.0002.04) funded with 1.8 million by the BOF-UGhent.
I have supervised 7 master dissertations (co-promotor) in the UGhent, with 2 of them in collaboration with University of Oviedo (Spain) and I am co-promotor of 2 Doctoral Thesis. I was granted as visitor professor for teaching in the University of Oviedo. As a result of my research, I am (co)-author of 64 peer review publications included in the JCR (49 in Q1), 4 book chapters and I have presented some 75 communications in National and International Conferences, including 1 Plenary lecture, 3 invited lectures given as first author, 20 oral presentations and posters.
I was invited to publish in special issues dedicated to Young Analytical Scientists (J. Anal. At. Spectrom. 32, 2017, 1805) and Young Investigators in Analytical and Bioanalytical Science (Anal. Bioanal. Chem. 411, 2019, 4963). Two works presented in conferences were awarded as best poster by Sociedad Española de Química Analítica. In 2019, I was awarded with the JAAS Emerging Investigator Lectureship 2019 given by Journal of Analytical Atomic Spectrometry. To date, I am member of the advisory board of this journal and Review Editor of the journal Frontiers in Nutrition. I reviewed some 80 publications and I participated as jury member of 5 PhD dissertations.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno General

Área Temática: **Ciencias y tecnologías químicas**
Nombre: GONZALEZ SANTANA, ANDRES
Referencia: RYC2021-031704-I
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Título: Glycochemistry, CAZymology and Molecular Recognition

Resumen de la Memoria:

Carbohydrates are the most abundant biomolecules on Earth and play central roles in a number of biological processes including protein folding, fertilization, inflammation and cancer metastasis, making their scientific study of vital importance to both academia and the pharmaceutical industry. My research background is highly multidisciplinary. During my Ph.D. studies I strongly trained in organic chemistry of sugars and the study of enzyme inhibition. In my first postdoctoral stay in Canada, I was devoted to the desing of pH-sensitive GCase inhibitors for Gaucher and Parkinson's deseases, and also I was introduced to enzyme engineering with the aim of unlocking non-natural reactivity with biotechnological applications. Later, as a senior postdoc in Spain I improved my skills in NMR with a focus on the molecular recognition of carbohydrates by aromatic platforms, with interest in carbohydrate recognition and in glycosylation catalysis. This multidisciplinary background has given me a vast understanding of (bio)synthetic pathways, enzymatic activities, macromolecular interactions and inhibitory mechanisms. This knowledge, ranging primarily from synthetic methodology, through protein/ligand interaction to transition-state inhibitor development and kinetic analysis, all within a broad carbohydrate chemistry spectrum, has proven extremely valuable to reach my current scientific maturity. All these research skills developed during this period are of unparalleled practical use to my independent career, and will help advance the scientific community□s burgeoning interests in the mechanistic study of the chemical and biochemical reactions of carbohydrates.

My current scientific interests encompass the design and synthesis of glycosides and glycomimetics, the study of catalysis and reaction mechanisms, either chemical or performed by Carbohydrate Active Enzymes (CAZymes), and the application of this knowledge in the discovery of new molecules with therapeutic potential that are related to hot (bio)chemical processes involving carbohydrates. In particular, the newly discovered arginine-rhamnosylation performed by the one-of-a-kind bacterial glycosyltransferase EarP poses a very attractive target to employ a chemical biology approach. The understanding of this odd reaction mechanism, in which a guanidine group of the bacterial ribosome elongation factor is post-translationally modified by glycosylation through a non-conventional N-glycosidic bond could result in selective, transition-state mimicking inhibitors or EarP with narrow-spectrum antibiotic capacity, a much-needed pharmacological tool to fight deathly world-wide drug-resistant bacterial infections. Throughout my career, I have participated in 9 national and international research projects, which has resulted so far in 38 peer-reviewed publications (featuring 4 JACS, 2 ACIE, 1 Nat. Comm. And 2 Chem. Sci.), 2 national patents and 1 international invention disclosure. During this time, I have been able to secure several competitive national and international contracts and fellowships, such as the European Marie Sklodowska-Curie and the EMBO long-term fellowship or the Spanish Juan de la Cierva □ incorporación. Finally, I am actively involved in a network of national (CIB-CSIC, CIC Biogune, Univ. la Rioja) and international (Cambridge Univ., Univ. Graz) glycochemistry collaborations.

Resumen del Currículum Vitae:

I graduated in Organic Chemistry from the Univ. of La Laguna (2005) where I got the best academic record award. After obtaining a DEA in Organic Chemistry from the Complutense University (2007), I joined the group of Prof. Ernesto Suárez (IPNA-CSIC) with an I3P-CSIC fellowship to complete my doctoral thesis (2012, cum laude). The research conducted during this time focused on the development of new methodologies for the synthesis of bioactive molecules derived from carbohydrates.

In 2013 I was awarded a highly competitive EMBO long-term postdoctoral fellowship that partially funded my postdoctoral stay at UBC in Vancouver, Canada. During this time in the Withers□ lab, I developed a family of pH-sensitive pharmacological chaperones for the treatment of Gaucher and Parkinson's diseases. In addition, I worked on other glycochemistry projects that ranged from mechanistic studies of glycosidase enzymes to their transformation into biocatalysts with technological and industrial applications. Also, I was the coordinator for a drug-candidate humanized-mouse pre-clinical trial, as well as PI of a didactic innovation project, both funded by the Canadian Glycomics Network.

In 2016 I moved back to Madrid to work as a senior postdoc in Dr. Asensio's lab (IQOG-CSIC), where I focused on dynamic combinatorial chemistry for the optimization of nucleic acid ligands, and later on the role CH/pi and cation/pi interactions play in glycochemistry and catalysis. My research was funded by a Juan de la Cierva □ Incorporación contract (2016), and by a Marie Sklodowska-Curie postdoctoral contract (2018). These studies have yielded new antibiotic derivatives active against resistant strains, as well as the first-ever isolation and characterization of a beta glycosyl triflate through low-temp NMR.

Throughout my career, I successfully ensured my own funding, including a competitive national Ph.D. fellowship, and three highly sought-after postdoctoral fellowships, two of which were European calls. I have participated in a total of 9 national and international research projects. The results of my work have implications not only in fundamental aspects of Glycochemistry and Enzymology, but also in the application of this knowledge in areas including biomedicine and biotechnology. Thus, I have contributed 38 indexed peer-reviewed publications (16 as first author, 6 as corresponding author, 65% Q1, 24% D1 in multidisciplinary chemistry, including 4 J. Am. Chem. Soc., 2 Angew. Chem. Int. Ed., 1 Nat. Commun. and 2 Chem. Sci.), and two national and one international patents. My publications in specialized journals, which prove my well-rounded background combining Organic Synthesis, Enzymology, Biophysics and Molecular Recognition, are receiving an increasing number of citations, with a current h-index of 12. In addition, I have mentored 1 international TFG, 2 TFMs and I am currently co-directing the doctoral thesis of Laura Díaz Casado (Univ. Complutense). I have also participated in more than 20 national and international conferences, and have actively worked in numerous outreach activities. Finally, I am a registered evaluator for the AEI (MICINN) and the European Commission, as well as a topic editor for the journal Antibiotics, and a reviewer for multiple other scientific journals. Since 2022, I have moved back to Tenerife to start forming my own research group.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021

Turno General

Área Temática: **Cultura: filología, literatura y arte**

Nombre: SALVO GARCIA, IRENE

Referencia: RYC2021-031847-I

Correo Electrónico: irenesalvog@yahoo.es

Título: Textual philology, history of literature and language

Resumen de la Memoria:

My research pertains to textual philology. I follow both a diachronic and a synchronic perspective, based on the history of literature and language, mainly in Spanish, but also Latin and French. My main interests are the reception of Latin texts from the classical period, Late Antiquity, and the Middle Ages (13th-16th c.), and the writing of history in Spain and in France from the 13th to 15th centuries. In the latter axis, the study of texts ordered by Alfonso X, King of Castile and Leon (1221-1284), deserve special attention. The reception of a Latin author in the Middle Ages covers several themes: the commentary tradition, anterior uses of the authors in Christian sources, the fragments of the Latin works that form a corpus of proverbial quotes, the etymological explanations, and the creation of neologisms in Romance languages, the complex relations between Ancient history and the pagan (mythological) matter. The study of medieval historiography implies to delimit a corpus of potential sources and to demarcate the compilers original imprint. The compilatory method, its main guidelines and its change along the process, all of this must be described, as well as the textual transmission of the compilation. A historiographic work also impacts the canon of texts that are read and translated in its context of creation and reception. The Alfonsine corpus plays a fundamental role in my research, as a work field. Thanks to collaborations, I was able to develop other lines of research: the representation of the power and the knowledge of women in medieval historiography, the relations between text and images in medieval codices, the reception of Boccaccio in Spain (14th and 15th centuries), and the elaboration of poetical theories in the medieval Catalan literature.

I believe that my works have contributed to a better knowledge of the Alfonsine production as well as of the rich, versatile reception of classical texts in the Middle Ages and to its intimate and sometimes surprising relationship with the vision of the pagan past in vernacular Christian historiography. I could summarize the strongest qualities of my research activity in three points: 1) My deep knowledge of several textual traditions in different languages, covering a large period of time and the methodology I progressively set up during my Ph.D. thesis, which allow me to study all the features noted above at a European level, from two comparative points of view: Latin-Romance, Castilian-French. I take advantage from multilingualism in my research: Spanish, French, English and from interdisciplinarity: between literature and history, close to linguistics and traductology, between the classical period and the Middle Ages. 2) The novelty and liability of the results of my research, which is testified by its impact among specialists of various literatures, who granted me competitive contracts (CNRS in a department of medieval French literature, Juan de la Cierva-Inc. in Spanish philology, Marie Curie (with maximal grade) supervised by a Latin scholar, and Atracción de talento-modalidad 1 in Spanish again). 3) My commitment to university and my independence: since my Ph.D. defence I have been developing lines of research quite far from my original formation, and I am now in position to lead my own research team and supervise Ph.D. and postdoc students.

Resumen del Currículum Vitae:

My research and teaching activity started in 2004 with an assistant position (lectrice) at ENS de Lyon. My undergraduate degree is in Spanish philology: literature and linguistics. My Ph.D. was supported by ENS and UAM. It deals with the reception of Ovid in the General estoria of Alfonso X, the most emblematic work in European Medieval historiography. The GE was very little-known, and it remained mainly unedited in 2007, when my thesis started. So were most commentaries to Ovid s texts. Thus I had to set up my own methodology to overcome these bibliographical difficulties. Since then, my goal has been to shed light on the composition processes of the texts, their sources, their context of creation, and their materiality. Explaining the reception of a classical author in the Middle Ages encompasses at least twelve centuries of productions: biblical matter, historiography, mythography, commentaries, most of which being unedited. My Ph.D. works offer critics a description of the translation and compilation methods of Ovid, and they identify the texts in interaction with the poet in Castile. By the end of my Ph.D. (2012), my knowledge had increased a lot, and my methodology was robust and productive. I understood that in order to fully comprehend what had happened in Castile, it was necessary to compare parallel traditions in other languages. I studied the sources of the Ovide moralisé (CNRS, 2013-5) for the new critical edition of the poem (SATF, 2018). The next step was a comparative study of the French and the Spanish traditions in the project ROMAINE (Marie Curie, 2017-9). Besides, I carried on my work as a Hispanist about Alfonso X s work and the history of language. Since 2015 (JdC-I.), I participate in various projects (dir. I. Fernández-Ordóñez) in the group of History and dialectology of Spanish (UAM). The perspective I followed in my postdoctoral research was considered innovative by experts in Spanish, French and Romance philology, and Latin. Its impact in all three circles can be testified: publications in prestigious international journals (Le Moyen Âge, Médiévales, Medium Aevum); invitations in BNE, Sorbonne, Wuppertal, King s College of London, Bristol, Lausanne, Lisbon, the Swedish institute of classical studies in Rome; direction of research and training programs in Lyon; coordination of special issues of journals and a book; collaboration to international projects (ANR-DFG, ERC); supervision of Ph.D. and postdoc students; member of Ph.D. committees, scientific committees; member of editorial boards (Troianalexandrina, CEHM, Atalaya); referee (La Corónica, SVMMA, AEM, RPM, C. del testo, C. et mediaevalia, BHS, JMIS). The reception of classical authors in Spain (13th 16th c.), and their comparison to other European traditions converge in my current project, Canon Hispánico. The main goal is to study and edit translations and commentaries of classical authors kept in Spain, and to make an online catalogue. CAHIS relies on my ideas, it aims to make up for the lack of knowledge of the Spanish production in the international critique. Besides the research itself, directing my own team is a new opportunity. My hope is to consolidate my career in Spain, where I have already obtained the accreditation I3 and the accreditation as Profesora Contratada doctora (besides being an expert at AEI).

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno de Jóvenes investigadores

Área Temática: **Economía**
Nombre: PERRUCHAS , FRANCOIS
Referencia: RYC2021-032691-I
Correo Electrónico: francois@fperruchas.eu

Título: socio-economic processes involved in environmental sustainability

Resumen de la Memoria:

The candidate has a PhD from the Polytechnic University of Valencia (Spain) with a specialization in Economy of Science and Innovation. He has long-term experience as team member of large-scale research projects such as the Research Infrastructure for Science and Innovation Policy Studies (RISIS 2) funded by the European Commission under Horizon 2020, and several projects sponsored by the National R&D plan of the Spanish Ministry of Innovation and Science (i.e., JUST GREEN-INN, Mapament, EXTRA). He is also the principal investigator (PI) of a research project funded by a Eu-SPRI Early Career Circulation Award.

The candidate s main research is on the socio-economic processes involved in environmental sustainability, in particular the determinants and the effects of green technology development, generation and diffusion of green specific know-how. He has a significant track record of high-quality publications in this topic and others related to Science, Technology and Innovation (STI) studies.

Over the last 6 years he has developed a wide network of collaboration in France, Italy, Austria and Germany through participation in international research projects and attendance of international conferences. He was also involved in the organization of an international conference, EurKind GCW 2016, on innovation, employment and the environment, and was member of the scientific committee of the Eu-SPRI Early Research Career 2020. He has actively engaged the academic community by presenting regularly at major international conferences and peer-reviewed articles for major scientific journals.

The candidate is also committed with Open Science values, working on an infrastructure to bring high quality datasets and methods required in the field of STI studies, and providing both the datasets he produces and research outputs to the community through open repositories or dedicated websites.

Resumen del Currículum Vitae:

François Perruchas has a PhD from the Polytechnic University of Valencia (Spain) with a specialization in Economy of Science and Innovation, and a Master s degree in Innovation and Technology Management from the UTC (Université de Technologie de Compiègne, France). His main research is on the socio-economic processes involved in environmental sustainability, in particular the determinants and the effects of green technology development, generation and diffusion of green specific know-how. He has a significant track record of high-quality publications in this topic and others related to Science, Technology and Innovation (STI) studies. He has long-term experience as team member of large-scale research projects such as the Research Infrastructure for Science and Innovation Policy Studies (RISIS 2) funded by the European Commission under Horizon 2020, and several projects sponsored by the National R&D plan of the Spanish Ministry of Innovation and Science. He is actively engaging the academic community by presenting regularly at major international conferences and peer-reviewed articles for major scientific journals. He is also committed with Open Science values, working on an infrastructure to bring high quality datasets and methods required in the field of STI studies, and providing both the datasets he produces and research outputs to the community through open repositories or dedicated websites.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021

Turno General

Área Temática: **Estudios del pasado: historia y arqueología**

Nombre: CARVALHO DE MELO CARREIRO, JOAO VICENTE

Referencia: RYC2021-033242-I

Correo Electrónico: jvc.melo@gmail.com

Título: Diplomacy, Missions and Mobility in the Iberian Empires

Resumen de la Memoria:

My research lines revolve around early modern gloablisation and transculturality, a field where I developed a broad knowledge and strong experience in topics such as the ethnographic, diplomatic and religious elements of cross-cultural encounters promoted by the Iberian empires. My career is characterized by more than 10 years of international experience in prestigious academic institutions in Portugal, Spain and the United Kingdom, and leadership as a Principal Investigator in a MCSA project and a JIN project.

During my PhD research at Swansea University (UK) I examined the intercultural diplomatic practices of the Portuguese Estado da Índia in the eighteenth century. After completing my PhD, I was awarded a MCSA Career Integration Grant (2013-2017) which allowed me to study, at the Universitat Pompeu Fabra and the University of Liverpool (UK), the contacts between the Estado da Índia and the Mughal Empire based on two complementary research lines: cross-cultural diplomacy and missionary agencies. Focusing on the diplomatic activities developed by the Jesuit mission at the Mughal court, I explored the articulation between the ethnographic knowledge produced by the missionaries and their role in the implementation of the imperial strategies of the Iberian monarchies.

As a researcher of the ERC-funded project TIDE at the University of Liverpool and the University of Oxford (2016-2020), I consolidated my research work on cross-cultural diplomacy and developed research on early modern mobility and transculturality. During this period, I have consolidated my expertise on cross-cultural diplomacy and missionary agencies by carrying out a comparative study of the Jesuit and English diplomatic activities at the Mughal court

Also under the TIDE project, throughout the last five years, I have explored the connections between the different experiences of mobility, migration and transculturality in early modern Europe and within the Iberian colonial systems. Also related to this research line, I have investigated the political agency of early modern female migrants in Europe and mixed-race women in the Portuguese empire.

Since 2020 that I am the Principal Investigator of a JIN project at Universidad Pablo de Olavide. My current research examines the interpersonal relations and networks developed by Spanish migrants across the Portuguese empire, exploring the influence of these individuals in the connecting the two Iberian colonial systems during the years of the Union of Crowns (c. 1580-1640).

I have published my research findings in edited books and prestigious high-impact journals such as the Journal of Early Modern History (Q1) or the Journal of the Economic and Social History of the Orient (Q2). I am the author of one monograph on Jesuit and English experiences at the Mughal court (Palgrave Macmillan, 2022), as well as of a critical edition of Antoni de Montserrat□s writings on the Mughal court (Brill, 2022). I am one of the co-authors of Keywords of Identity, Race, and Human Mobility in Early Modern England (Amsterdam University Press, 2021), a collection of essays on early modern European and English debates on migration, race, religion, politics, and colonial expansion. I am also one of the two co-authors of a forthcoming monograph on the Jesuit□Muslim relations in Asia which will be published by Brill by the end of 2022.

Resumen del Currículum Vitae:

I hold a PhD in History (Swansea University), a MA in Cultural History (Goldsmiths, University of London) and BA in Sociology (University Institute of Lisbon). I have been a postdoctoral fellow at Universitat Pompeu Fabra (2013-2016), the University of Liverpool (2016-2019) and the University of Oxford (2019-2020). Between 2016 and 2020, I was a postdoctoral researcher (and since 2020 an honorary researcher associate) of the European Research Council-funded project TIDE-Travel, Transculturality, and Identity in England, c. 1550 1700. Since October 2020, that I am the Principal Investigator of a JIN project awarded by the Spanish Ministry of Science and Innovation, which I am currently undertaking at Universidad Pablo de Olavide. I have obtained highly competitive international research grants such as the FCT doctoral research fellowship, the MCSA Career Integration Grant or a JIN grant. I also the recipient of the University of Liverpool□s Research Development Initiative Fund.

In addition, I have contributed and collaborated with other projects funded by the Portuguese Fundação para a Ciência e Tecnologia (FCT), the Spanish Ministry of Economy and Competitiveness (MINECO) or the United Kingdom-India Education and Research Initiative (UKIERI).

I am the author of five books: one singled-authored monograph (Palgrave Macmillan, 2022), one forthcoming two-authored monograph (Brill, 2022), a forthcoming critical edition of primary sources (Brill, 2022), and two co-authored volumes (Amsterdam University Press, 2021; GEPE, 2008). I am also the author of 14 book chapters, and 6 articles published in prestigious leading international journals (Q1: 1, Q2: 3; Q4: 1).

I have participated in more than 20 international congresses and seminars. I have been a guest speaker at seminars organised by the Fundação Oriente, CHAM, MIAS, University Pablo de Olavide, the University of Oxford or the University of Valladolid. During the last 6 years, I have been in the scientific and organising committee of two international conferences, and coordinated seminar series at the universities of Liverpool, Oxford and Pablo de Olavide.

Throughout my career, I have developed several editorial activities. I am member of the editorial board of the journal Illes i Imperis, and I have worked as reviewer for journals such as the Journal of Early Modern History, Illes i Imperis, or Ler História, as well as publishing houses such as Brill and Palgrave Macmillan.

I have been involved in different teaching activities at both undergraduate and postgraduate levels at Swansea University, Universitat Pompeu Fabra, the University of Liverpool, the University of Oxford and Universidad Pablo de Olavide.

I have contributed to the development of educational tools, discussion material, activity packs and digital resources on early modern migration and transculturality destined to teachers, students, and community groups in the United Kingdmom. I also participated in the design and implementation of a a professional development programme for secondary school teachers. Besides, I also collaborated in the elaboration of a policy advisory report on the teaching of migration and empire in British schools which was presented at the British Parliament in July 2019.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno General

Área Temática: **Mente, lenguaje y pensamiento**
Nombre: MAFFEZIOLI , PAOLO
Referencia: RYC2021-033091-I
Correo Electrónico: paolo.maffezioli@gmail.com
Título: Proof theory, intuitionism and mereology

Resumen de la Memoria:

My research lies mainly in logic, especially proof theory for modal logic, as well as in philosophy, with special emphasis on intuitionism and mereology. In logic, I contributed to the development of Gentzen systems for several modal and non-classical logics that were still lacking satisfactory proof-theoretic methods. I also studied extensively the interpolation theorem and its applications to first-order theories. My main achievements in these areas include a proof-theoretic analysis of the Church-Fitch paradox of knowability, a modular systematization of non-normal modal logics, an extension of Graig s interpolation theory to several mathematical theories. In philosophy, my interests focus mainly on intuitionism and have always been driven by the desire to apply it outside mathematics and logic. I have developed, for example, an intuitionistic approach to the theory of individual and collective preference relations, which are traditionally studied on the background of classical logic and mathematics. I have also been working on a novel framework for mereology as based on intuitionistic logic using order-theoretic notions from intuitionistic mathematics such as Brouwer's notions of apartness. I am also interested in the use of quantitative methods in the history of logic and analytic philosophy. In this field I conducted some data-driven analysis to investigate the role of logic in the developments of analytic philosophy as well as the use of game-theoretic methods in philosophy of science. My research output (18 articles and 1 monograph) has appeared in leading international journals such as Studia Logica, Synthese and Logic Journal of the IGPL and, as of today, it has more than one hundred citations. My research has been supported by several research grants from national and international funding bodies, including a cofund Marie Sklodowska-Curie fellowship, an Alexander von Humdoldt scholarship for postdoctoral researchers and a Juan de la Cierva-Incorporacion fellowship.

Resumen del Currículum Vitae:

I graduated in philosophy from the University of Bologna (Italy) in 2008 and I obtained a doctorate in philosophy from the University of Firenze (Italy) in 2012. Before taking up a position at the University of Torino, where I am currently appointed, I held previous postdoctoral positions at the Vienna University of Technology (Austria), the University of Groningen (the Netherlands), the University of Torino (Italy), the Ruhr-University Bochum (Germany), the University of Barcelona (Spain) and the University of Verona (Italy).

Regarding the scientific contributions, my main achievements in logic include a proof-theoretic analysis of the Church-Fitch paradox of knowability, a modular systematization of non-normal modal logics, an extension of Graig s interpolation theory to several mathematical theories. In philosophy, I studied extensively the logical aspects of classical and non-classical mereology and developed a novel mereological theory based on intuitionistic logic. I also contributed to develop an intuitionistic approach to the economic theory of individual and collective preference relations. Recently, I started to do research in history of logic and analytic philosophy using quantitative methods. Over the years I created solid and long-lasting international collaborations across many countries and involving world-renowned scholars.

Regarding other contributions, I have been successful in attracting competitive research grants from national and international funding bodies. In 2015-2017 I was awarded a co-funded Marie Sklodowska-Curie fellowship at the University of Torino, and in 2017-2018 I was the recipient of an Alexander von Humboldt fellowship for postdoctoral researchers from the Alexander von Humboldt Foundation at the Ruhr University-Bochum. Finally, in 2018 I was granted from the Spanish Ministry of Economy and Competitiveness (MINECO) a Juan de la Cierva-incorporación fellowship at the University of Barcelona, where I worked in the research group in non-classical logics led by Ramon Jansana. I have been visiting scholar of many institutions in Europe and in the U.S. During these stays, I initiated numerous collaborations with scholars such as Sara Negri and Achille C. Varzi. As recorded in my publication list, all research visits, including the short ones, have been productive and have led to a collaboration with the hosts, showing my ability to adapt to different research groups and to work with people with a different scientific background.

Finally, regarding contributions to training, I am a passionate teacher, always strongly committed to high quality, research-led teaching activities. I was responsible for several graduate and undergraduate logic courses both in Italy and Spain. I was fully in charge of all courses taught from the design of the syllabus to lectures and practicalities regarding assessment and grading.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno de Jóvenes investigadores

Área Temática: **Mente, lenguaje y pensamiento**
Nombre: GARCIA-CARRIL PUY, NEMESIO
Referencia: RYC2021-032014-I
Correo Electrónico: grannemesius@hotmail.com

Título: Filosofía de la música, estética y ontología

Resumen de la Memoria:

I am an aesthetician, philosopher of art and professional musician. My main lines of research are the philosophy of music, metaontology, ontology and aesthetics of contemporary art. My main contributions are, first, a new ontological theory of musical works: the nested types theory (awarded by the American Society for Aesthetics with the John Fisher Prize). Second, I have derived consequences from the nested types theory for three debates: (i) the authenticity of interpretations, performances and versions of a musical work (awarded by the European Society for Aesthetics with the Fabian Dorsch Prize); (ii) the ethical status of musical appropriation and plagiarism; (iii) the modal discourse about musical works. Third, in the metaontology of art, I have shown that one of the mainstream views (i.e. the determination thesis) is ungrounded, and I have proposed a new methodology for experimental studies in musical ontology. And fourth, concerning the aesthetics of contemporary art, I have studied the ontological grounds of computer music and I have co-edited a book about contemporary theories of art: Teorías Contemporáneas del Arte y la Literatura (Tecnos, 2022).

I have 11 JCR/SJR papers (9 of which Q1), and 6 book chapters in SPI (5 of them Q1), all of them as the main and unique author. An important part of my research (5 papers) has been published by the Journal of Aesthetics and Art Criticism, the journal with the greatest impact in aesthetics. I have delivered 43 talks in academic meetings (19 by invitation, 24 by peer-review) and 4 for divulgation of academic research. I have written the introductory aesthetic analysis for the booklets of 3 musical albums.

Since January 2021, I am a postdoc researcher at the University of Murcia with a Juan de la Cierva-Formación fellowship. Previously, I held postdoc positions at the Complutense University of Madrid (2020) and the University of Granada (2019), where I did my PhD studies (2014-2018). Funded by the Spanish Ministry of Education, I have been a visiting researcher at the Open University London (2016) and Manchester University (2018). I have obtained the following scholarships and competitive funding for projects as PI: FPU (Ministry of Education); Contrato Puente (University of Granada); Juan de la Cierva Formación (Ministry of Science); Jimenez La Espada (Fundación Séneca). I have been part of the working team of 3 national research projects and 1 regional.

Resumen del Currículum Vitae:

I am an aesthetician, philosopher of art and professional musician. My main lines of research are the philosophy of music, metaontology, ontology and aesthetics of contemporary art. My main contributions are, first, a new ontological theory of musical works: the nested types theory (awarded by the American Society for Aesthetics with the John Fisher Prize). Second, I have derived consequences from the nested types theory for three debates: (i) the authenticity of interpretations, performances and versions of a musical work (awarded by the European Society for Aesthetics with the Fabian Dorsch Prize); (ii) the ethical status of musical appropriation and plagiarism; (iii) the modal talk about of musical works. Third, in the metaontology of art, I have shown that one of the mainstream views (i.e. the determination thesis) is ungrounded, and I have proposed a new methodology for experimental studies in musical ontology. And four, concerning the aesthetics of contemporary art, my main outcome is a book (Teorías Contemporáneas del Arte y la Literatura), co-edited with Leopoldo La Rubia (University of Granada) and Francisco Larubia Prado (Georgetown University). I have 11 JCR/SJR papers (9 of which Q1), and 6 book chapters in SPI (5 of them Q1). An important part of my research (5 papers) has been published by the Journal of Aesthetics and Art Criticism, the journal with the greatest impact in. I have delivered 43 talks in academic meetings (19 by invitation, 24 by peer-review) and 4 for divulgation of academic research. I have reviewed articles for the different Q1 JCR journals, and I am also evaluator of research projects for Agencia Estatal de Investigacion. I have been a visiting researcher at the Open University London and Manchester University, and obtained scholarships and competitive funding from the Spanish Ministry of Education, University of Granada, Spanish Ministry of Science and Fundación Séneca. I have been part of the working team of 3 national and 1 regional research projects. I have 178 hours of teaching experience, and I have supervised a graduate thesis. As a musician, I have recorded 7 albums, premiered more than 20 works and awarded 2 international prizes. In 2022, I will be a visiting researcher at the Centre for Aesthetic, Moral and Political Philosophy of Leeds University.
Total citations: 20; H index: 2. Source: Google Scholar (04/02/2022)
a) Journal papers:
(1) Journal of Aesthetics and Art Criticism (x5 papers). JCR (2020): Q1 (Philosophy: 11/317),; SJR (2020): Q1 (Philosophy: 64/657), IF 0.553; JCR (2019): Q1 (Philosophy: 13/318); SJR (2019): Q1 (Philosophy: 75/664), IF 0.507.
(2) Disputatio. JCR: Q1 (Philosophy: 48/317); SJR: Q1 (Philosophy: 77/657), IF 0.490.
(3) Philosophical Quarterly. JCR: Q1 (Philosophy: 18/317); SJR: Q1 (Philosophy: 19/657), IF 1.095.
(4) Philosophical Psychology. SJR: Q1 (Philosophy: 47/657), IF 0.699.
(5) Synthese. JCR: Q1 (Philosophy: 8/317), IF: 2.908; SJR: Q1 (Philosophy: 35/657), IF 0.851.
(6) Philosophy and Society. JCR: Q3 (Philosophy: 212/317), IF 0.20.
(7) Transactions of the Charles S Peirce Society. SJR: Q2 (Philosophy: 131/544), IF 0.309.
b) Books and book chapters
(1) Tecnos (SPI Q1 Philosophy 1/23)
(2) Tirant Lo Blanch (SPI: Q1 General Ranking 1/103)
(3) Editorial Comares (SPI Q1 General Ranking 11/103)
(4) Editorial Universidad de Granada (SPI Q2 General Ranking 73/201)

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021

Turno de Jóvenes investigadores

Área Temática: **Producción industrial, ingeniería civil e ingenierías para la sociedad**

Nombre: LLORCA BOFI, JOSEP

Referencia: RYC2021-034393-I

Correo Electrónico: JOSEPLLB@GMAIL.COM

Título: ACÚSTICA ARQUTECTÓNICA Y URBANA

Resumen de la Memoria:

Research line: sensory evaluation of sound in urban and architectural design for sustainable cities studies.

I am an architect and doctor in architectural acoustics from the Universitat Politecnica de Catalunya (Spain), in 2015 and 2018, respectively, where I was assistant professor teaching architectural visual simulation. In order to complete my doctoral thesis, I was awarded one FPU (Formación de Profeorado Universitario) grant to collaborate with the AR&M research group at UPC, together with Prof. Ernesto Redondo and Prof. Jesús Alba. At RWTH Aachen University (Germany), I learned about architectural acoustics in Prof. Michael Vorländer s group during my post-doctoral research. From 2021, I am a Junior Principal Investigator at the Institute for Hearing Technology and Acoustics, at RWTH Aachen University, leading the Person-focused Analysis of Architectural Design research group. The group studies the implications of the architectural design to the people s perceptions, especially in situational contexts where sound matters, by means of audio-visual simulations and sensory profiling approaches. My research experience taught me that using technological approach presents a big potential to unveil the characteristics of the built environment, and its impact into people s daily-life activities. For this reason, I would like to continue my research focusing on the sensory evaluation of sound in urban and architectural design for sustainable cities studies.

Resumen del Currículum Vitae:

Academic career:
2015, Architecture degree. Barcelona School of Architecture, UPC, Spain.
2011. Collaboration fellowship (Spanish Ministry of Education, Science and Sports) with Architectural Design Department, UPC, Spain.
2015, First student promotion 2009 in Architecture, Barcelona School of Architecture, UPC, Spain.
2016, Master in Advanced Studies in Architecture, UPC, Spain.
2017, FPU fellowship (Formación de Profesorado Universitario), in UPC, Spain
2018, International predoctoral stay (6 months) at RWTH Aachen Unviersity, Germany.
2018, PhD in architectural acoustics. Barcelona School of Architecture, UPC, Spain.
2018, Extraordinary Doctoral Award UPC
2018, Postdoctoral researcher at RWTH Aachen University, Germany
2021, Junior Principal Investigator, research group leader at RWTH Aachen University, Germany

Scientific contributions:
8 Peer-reviewed journal papers.
2 peer-reviewed book chapters.
6 peer-reviewed conference papers.
15 non peer-reviewed conference papers.
Research group leader at RWTH Aachen University.

Contributions to society.
Invited plenary talk. BAUSim 2022, Weimar University. September 2022.
Visiting Assistant professor. Tongji University, China. June 2017- July 2017
Visiting Assistant Professor. Université Euro-Méditerranéenne de Fès. June 2016 July 2016.
Invited d talk. Erronkak, Jakiunde. Jakiunde, Zientzia, Arte eta Letren Akademia. October 2018.
Invited talk. Erronkak, Jakiunde. Jakiunde, Zientzia, Arte eta Letren Akademia. October 2017.

Contributions to the training of young resesarchers.
Jonas Heck, M.Sc. PhD student at JPI, RWTH Aachen University. Co-supervision with prof. Michael Vorlander.
Alfonso Melero, Arch. PhD student at Barcelona School of Architecture, UPC. Co-supervision with priof. Ernest Redondo.
2 master thesis in current elaboration
4 bachelor thesis in current elaboration
Teaching courses in UPC and RWTH Aachen University.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno de Jóvenes investigadores

Área Temática: **Producción industrial, ingeniería civil e ingenierías para la sociedad**
Nombre: CARRERAS BLASCO, LAURA
Referencia: RYC2021-032171-I
Correo Electrónico: laura.carreras@udg.edu
Título: Development of efficient testing methods and modelling approach for fatigue-driven delamination in 3D laminated composite structures

Resumen de la Memoria:

Dra. Laura Carreras is currently holding a postdoctoral Beatriu de Pinós grant since December 2021 at the Universitat de Girona (UdG), Spain, co-funded by the European Union through the COFUND programme of the MSCA within the H2020 Programme. Her task is aimed at developing simulation tools to estimate the long-term response of composite-strengthened concrete buildings and infrastructures. Over time, structural properties deteriorate under the influence of service loading. This leads to limited lifetimes, reduced safety and large economic loss. The high mechanical performance of composite materials makes them the perfect candidates for strengthening long-standing structures. However, the complex damage mechanisms cannot be predicted with accuracy. The candidate's research is devoted to the development of an integral methodology for the reliable life assessment of composite-retrofitted concrete systems using advanced computational methods.

From 2018 to 2021, she held a postdoc position at Aalborg University, Denmark. Her task was aimed at developing progressive damage models and simulation tools for static and fatigue-driven delamination of composite wind turbine blades. The methods and tools that she developed were implemented in Simcenter Samcef software package dedicated to mechanical virtual prototyping (Siemens Digital Industries Software) and are commercially available to users since version 2021.2.

During her Ph.D. (2015-2018) at the Department of Mechanical Engineering and Industrial Construction of the UdG, she developed an integral methodology for assessing the occurrence of fatigue-driven damage in laminated composite structures. She developed efficient testing methods and analysis tools using the finite element method. These methods were transferred to the company Aernnova Engineering Division S.A. for their assessment in the design certification process of components of the A350 AIRBUS aircraft. As a result of this, she has acquired experience in developing and implementing constitutive models for laminated composite materials in aeronautical and wind energy applications.

She executed her Bachelor's final project and Master of Science thesis at the Department of Physics of the UdG. The field of the research was the Physics of the Superconducting Materials. More precisely, the optimization of X-ray diffraction techniques for the analysis of the products of the decomposition of metal organic compounds and the simulation of the transport of the reactive gas during decomposition.

Her future research career prospects include the generation of a new research line across disciplines: the use of structural batteries embedded in concrete structures to serve as multifunctional reinforcement that supplies energy power and load carrying capacity. She has recently submitted two project proposals as the principal investigator that are currently under evaluation. The proposed research targets an optimal use of materials and energy. The projects build up on two emerging technologies to enable structures with multifunctional smart features such as self-powering, renewable energies storage, flexible energy consumption, extended lifetime, structural health monitoring, increased safety, and large economic and material saving.

Resumen del Currículum Vitae:

Dra. Laura Carreras has currently published 14 scientific papers in international journals (6 as corresponding author), 3 book chapters (1 as the main author), 2 popular science books, 2 public scientific-technical reports as main author and 2 open-source online data repositories. She participated in 19 international conferences and 1 national conference. She was appointed Keynote Speaker in the 7th ECCOMAS Conference the Mechanical Response of Composites in 2019. In 2016, she co-organized a 1-day workshop dedicated to bonded joints at the University of Girona.

She received the Extraordinary Doctorate Award for her Ph.D. thesis in Technology from the University of Girona, graded "cum laude". Her Master Thesis and Final Degree Project were qualified as "Hons". In 2014, she was awarded the best project of the first Start-up Weekend organized by the Chair for Young Entrepreneur of the University of Girona.

She was awarded a BP2020 grant (Beatriu de Pinós COFUND programme of the MSCA within the H2020 Programme) and a REQ2021 grant (Ayudas para la Recualificación del Sistema Universitario Español 2021-2023).

She acts regularly as reviewer of 5 Q1 journals (JCR). She was member of the committee responsible for judging 2 doctoral theses. She has collaborated in 5 related research projects (1 as principal investigator and 1 as work package leader) and 2 contracts with private companies.

During her research career, she has been a member of 3 different research groups consisting of researchers with different nationalities and disciplines. She has taught and undertaken supervisory work in Physics, and Materials Science and Technology at the University of Girona in Spain, and Mechanics of Materials and Structures, Fracture Mechanics, and Numerical Modelling at Aalborg University in Denmark.

- JCR articles: 14 (12 Q1, 2 Q2), 43% as corresponding author
- Scientific book chapters: 3 (1 as main author)
- Public scientific-technical reports: 2 (2 as main author)
- Popular Science books: 2
- Conferences: 20 (19 international and 1 national)
- International conference keynote lectures: 1

- h-index (December 2021): 7 (WOS), 8 (Scopus), 8 (Google Scholar)
- Total of cites (December 2021): 112 (100 without self citations, WOS), 127 (Scopus), 156 (Google Scholar)
- Average citations per year in the last 5 years: 16.6 (WOS), 23.8 (Scopus), 30.6 (Google Scholar)
- Research stays: 1 pre-doctoral (3.5 months), 1 post-doctoral (3 years)
- Research group memberships: 3
- Participation to 5 research projects (1 as PI and 1 as WP leader) and 2 contracts with private companies
- Submitted project proposals as PI under evaluation: 2 (MSCA2021 and TED2021)
- Organized workshops: 1
- Led PhD thesis: 1 (in course)
- Led Master thesis: 3
- Led Final Degree Projects: 3
- Awarded postdoctoral grants: 2 (BP2020 and REQ2021)
- Extraordinary Doctorate Award for Ph.D. thesis by the University of Girona
- Best project of the first Start-up Weekend organized by the Chair for Young Entrepreneur of the University of Girona
- IP transfer: Cohesive element for static and fatigue interlaminar failure implemented in Simcenter Samcef version 2021.2 (Siemens Digital Industries Software)

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021

Turno de Jóvenes investigadores

Área Temática: **Tecnologías de la información y de las comunicaciones**

Nombre: RODRIGUEZ VAQUEIRO, YOLANDA

Referencia: RYC2021-033593-I

Correo Electrónico: yrvaqueiro@gmail.com

Título: Development and implementation of electromagnetic-based advanced sensing and communication systems

Resumen de la Memoria:

My research is focused on the understanding, modeling, and solution of complex engineering problems, with special emphasis on the design of sensing and imaging systems for security and other applications using electromagnetic waves. My research areas of interest are advanced signal processing techniques applied to imaging, electromagnetic sensing system simulations, antenna and array design, radar and microwave hardware design and integration, and Unmanned Aerial Vehicles (UAV). My research is based on

- Electromagnetic sensing system computation: development and use of various numerical methods that solve Maxwell's equations in different forms, including Integral Equation Methods, Differential Equation Methods, and Asymptotic Methods

- Hardware design and integration: specification of multiple radar components and integration of different electronic and mechanical subsystems. Design and fabrication of reflector antennas for communication and imaging systems, and printed antenna design and manufacturing. Design of radar payloads on board UAVs.

- Physics-based signal processing, imaging and optimization: mathematical and signal processing algorithms for the solution of inverse problems in diverse areas such as communications, remote sensing, and geophysics. These problems require the inversion of a physical model in order to recover some unknown model parameters by using a set of measured signals. This involves working on the solution of linearized ill-posed problems using different approaches as Synthetic Aperture Radar (SAR), model based inversion methods and solutions based on Compressive Sensing.

In particular, during my research career I have collaborated in multiple projects related with the design and fabrication of advanced electromagnetic sensing systems at millimeter and submillimeter frequencies. I have also worked on the design of reflector and reflectarray antennas for satellite communications. I have participated and contributed in all the tasks of the projects, although my biggest involvement is in processing all kinds of electromagnetic data from this developed systems in order to extract information of interest as radar images or antenna patterns.

More recently, I have been involved in the design and integration of radar and antenna measurement payloads onboard UAV.

I will continue developing this lines of investigation if awarded with the grant.

Resumen del Currículum Vitae:

Yolanda Rodríguez Vaqueiro is a Postdoctoral Researcher at University of Vigo, (Spain).
Yolanda obtained B.S. and M.S. degrees in Electrical Engineering from University of Vigo (Spain) in December 2009, where she was also granted as Junior Researcher

In 2011 she obtained a Research Assistant grant from the ALERT (Awareness and Localization of Explosive Related Threats) Center of Excellence at Northeastern University (Boston, MA, USA). In May 2015 she completed her Ph.D. in Electrical Engineering from Northeastern University, after defending her thesis: "Compressive Sensing for Electromagnetic Imaging Using a Nesterov-Based Algorithm". Her work during the Ph.D. studies was recognized with the "Research-Impact Award" by the Electrical and Computer Engineering Department of Northeastern University.

In 2015 she returned to University of Vigo as a Postdoctoral Researcher. In 2017 she was awarded with the grant "Juan de la Cierva" from the Spanish "Ministerio de Ciencia e Innovación".

Dr. Rodriguez-Vaqueiro has participated in 16 international and national competitive research projects in Spain and USA. She has authored or coauthored 49 publications, including 21 journal papers, most of them in the first quartile and with average impact factor over 2. She has also participated in two patents.

During the course of her career she obtained several awards: the "Best Paper award" in the 2012 IEEE Homeland Security Conference, "Honorable Mention in the Student Paper Competition" in the 2013 IEEE APS/URSI Conference, "Best Paper Award" in the 2014 European Conference on Antennas and Propagation, "Burke/Yannas Award" to the most original research study in the field of bioengineering in the 2015 American Burn Association (ABA) Meeting, and "Research Impact Award" by the Electrical and Computer Engineering Department of Northeastern University in May 2015. In 2019 a team leaded by her was awarded with the Idea of the Year prize in the Galileo Masters competition, organised by the European GNSS Agency (GSA).

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021
Turno de Jóvenes investigadores

Área Temática: **Tecnologías de la información y de las comunicaciones**
Nombre: FELIU PEREZ, JOSUE
Referencia: RYC2021-030862-I
Correo Electrónico: josue110@gmail.com

Título: Microarchitecture optimizations to improve performance and energy-efficiency of future general-purpose processors

Resumen de la Memoria:

I pursued my PhD in computer architecture at Universitat Politècnica de València (UPV), funded by a 4-year FPU grant. I graduated, with cum laude qualification, in 2017. After that, I enjoyed a 2-year postdoc funded by the Generalitat Valenciana. Nowadays, I am a postdoc researcher at Universidad de Murcia with a Juan de la Cierva Formación grant.

I have conducted research activities with impact in two main areas: resource-aware scheduling and core microarchitecture. The successful research I conducted on resource-aware scheduling while pursuing my PhD started an important research line in the group that was progressively incorporated into several funded projects and became the main line in a national one (TIN2014-62246-EXP). I have participated in 9 research projects (2 European) funded with public funds (PI in one of them) and in 1 project funded by a private company. I was also the principal investigator of a project funded by the UPV, which extends the research line of my PhD dissertation.

Internationally, I have 18 months of experience working at Ghent University (Belgium), 12 as postdoc and 6 as predoc. My stays established a fruitful relation between both research groups and led to multiple relevant publications (e.g., HPCA16, TPDS17, HPCA20). I have ongoing collaborations with researchers from Ghent University, Uppsala University (Sweden), and Georgia Tech (USA).

I have co-advised 4 bachelor and 3 master research-oriented theses that lead to relevant publications. Three of the students decided to pursue a PhD (I am co-advising one).

I have achieved an outstanding record of high-quality publications for a young researcher that includes 3 papers in flagship venues GGS Class 1/A+1 (two as first author and two without my PhD advisors), 5 papers in GGS Class 2/A conferences, 8 papers in the IEEE TPDS and IEEE TC journals, the top and traditional journals in the field (4 Q1 and 4 Q2 according to JCR), and 4 papers in JCR-indexed journals (1 Q1, 1 Q2, and 2 Q4). According to Google Scholar, my work has 192 citations and an h-index of 8.

The quality of my research work has been recognized with multiple awards, including the IEEE TCSC Outstanding PhD Dissertation, the Premios de Investigación Sociedad Científica Informática de España Fundación BBVA, and the Outstanding PhD Dissertation from UPV. I have also received 3 HiPEAC paper awards and our recent paper published at the MICRO21 conference will be highlighted an Honorable Mention in the IEEE Micro Special Issue on Top Picks from the 2021, meaning that it is one of the best 24s paper in computer architecture in the year.

Furthermore, I am regularly invited to participate in the extended PC of flagship conferences in computer architecture (ISCA, MICRO, and HPCA), I have been a member of the PC of the HiPC21 conference, and I was a member of the organizing committee of the HiPEAC19, ISCA20, and ISCA21 conferences.

With my still short postdoc experience, all these facts demonstrate the international visibility, recognition, and independence (from my PhD advisors) of my research work.

Resumen del Currículum Vitae:

In 2013, I was awarded a 4-year FPU grant from the most competitive PhD program in Spain. I pursued my PhD in computer architecture in the Parallel Architectures Group, led by José Duato, at Universitat Politècnica de València (UPV). My PhD dissertation focused on resource-aware scheduling. The quality of the research work during my PhD led to several important publications, including 1 in a flagship venue (HPCA16), 3 in highly relevant GGS Class 2/A conferences, and 4 in the traditional journals (IEEE TPDS and IEEE TC).

After I obtained my PhD, I concatenated two postdoc grants from competitive calls. First, I was a postdoc researcher at UPV (2018 2019) with an APOSTD (Generalitat Valenciana). Since 2020, I am a postdoc researcher at Universidad de Murcia (UM) with a Juan de la Cierva Formación contract. As a postdoc, my main research line moved towards core microarchitecture seeking to improve the performance and energy-efficiency of future microprocessors.

I have participated in 9 research projects funded by competitive calls, including 2 from the European Union (an ERC Consolidator grant awarded to Alberto Ros and a FP6-IST project granted to Jose Duato). I was the principal investigator of a project funded by the UPV (9.000).

Despite I have mainly performed basic research, I have also worked to explore the potential of our techniques from an industrial perspective. In 2019, I participated in a project with Huawei to analyze resource-aware scheduling in cloud platforms. Huawei also funds a second project (200.790) at UPV to adapt one of my scheduling proposals to their mobile platforms. I was to be the PI but I could not be due to legal impediments within the UM related to my postdoc contract.

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Internationally, I have spent 18 months as visiting researcher at Ghent University (Belgium) 12 as postdoc and 6 as predoc. I have ongoing collaborations with researchers from Ghent University, Uppsala University (Sweden), and Georgia Tech (USA) which led to relevant publications, including 2 in flagship venues (HPCA20 and MICRO21). The MICRO paper will receive an Honorable Mention in the IEEE Micro Special Issue on Top Picks from the 2021 (top-24 paper in computer architecture).

Throughout my research career, I have published 12 articles in JCR journals (8 TC/TPDS) 5 Q1 (4 as first author) and 5 Q2 and 11 articles in international conferences 3 GGS Class 1/A+ (2 as first author and 2 without my PhD advisors) and 5 GGS Class 2/A. According to Google Scholar, my work has 192 citations and an h-index of 8.

My research work has been recognized by multiple awards: the IEEE TCSC Outstanding PhD Dissertation, the Premios de Investigación Sociedad Científica Informática de España Fundación BBVA, and the Outstanding PhD Dissertation from UPV. In addition, I also received 3 HiPEAC paper awards.

Nowadays, I am regularly invited to participate in the extended PC of flagship conferences in computer architecture ISCA, MICRO, and HPCA. I also participated in the PC of the HiPC21 conference and in the Organizing Committee of the HiPEAC19, ISCA20, and ISCA21 conferences.

Finally, I have advised 4 Bachelor (1 additional ongoing) and 3 Master research-oriented theses, some of them leading to publications in relevant journals (e.g., TPDS20, TC22). I am co-advising the PhD dissertation of one of these students.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021

Turno General

Área Temática: **Tecnologías de la información y de las comunicaciones**

Nombre: FIDALGO MARTINS, HUGO

Referencia: RYC2021-035009-I

Correo Electrónico: fidalgomartins.hugo@gmail.com

Título: Coherent distributed fiber sensing techniques and applications

Resumen de la Memoria:

H.F.M. obtained his PhD in Physics under a jointly-awarded PhD program in the University of Porto, Porto, Portugal and the University of Alcala, Madrid, Spain, in 2014. The topic of the doctoral dissertation was the use of Raman effect to assist distributed and remote fiber sensing.
His research career has been mainly focused on distributed optical fiber sensing, mainly the use of phase-sensitive optical time domain reflectometry for distributed vibration/intrusions and temperature/strain detection along large structures/perimeters. Dr. H.F.M. is currently a Post-Doctoral researcher (Juan de la Cierva Incorporacion) at Instituto de Ótica CSIC, Madrid, Spain. Dr. H.F.M. is an author or coauthor of 53/57 papers in international refereed journal/conference contributions, with >2000 citations (google scholar), co-director of 2 PhD thesis and 1 end of year thesis (TFG), co-author in 4 patents extended to PCT, and participated in >25 R&D projects (both in research and industry), 4 of which as PI. Dr. H.F.M. has received several important scientific recognitions, including the award of best PhD Thesis in Optics and Photonics of 2014 in Portugal by the Sociedade Portuguesa de Óptica e Fotónica (Portuguese Society of Optics and Photonics).

Technology Transfer:
After finishing his PhD Dr. H.F.M. joined FOCUS SL, a Technology-Based Company specialized in fiber optic distributed sensing applications. Initially with a Marie Curie Post-doctoral position and later as technical director of FOCUS, technology transfer has been an important part of his work and its success is particularly demonstrated by the industrialization of CP-фOTDR technology (patent WO2017093588).
Having been involved in the basic research, patent and scientific publications (jointly with UAH and CSIC) of CP-фOTDR technology, this technology was successfully demonstrated and implemented in FOCUS under his direct management. The patent is currently under commercial exploitation by two companies: ARAGON PHOTONICS LABS S.L.; OMNISENS S.A, after FOCUS was successfully sold. Currently working in CSIC, technology transfer continues to be an important topic of Dr. Hugo F. Martins, having managed (as PI) a ~50 000 industrial project to support the industrialization of this technology, while participating in other industrial projects.

International Networking:
Having performed his studies mainly in Portugal, Dr. H.F.M. is currently employed in Spain, and during his research career has participated in several international scientific conferences.
Mostly in the context of a Marie Curie Post-doctoral grant, he has also attended several training courses and scientific meetings in stat-of-the-art R&D institutions of different countries in Europe, having the chance of visiting laboratories and networking with international researchers.
Along his career, international research cooperation has also been a priority, having performed several stays in institutions of different countries (Spain/Switzerland/UK/USA) always achieving relevant results. All stays have resulted in at least the publication of scientific articles in the first quartile (Q1), but in two cases also resulting in three patents which have been extended to PCT EPFL and UAH, and recently culminated in the supervision of a work published in Nature Communications in collaboration with Caltech (California, USA).

Resumen del Currículum Vitae:

Citations (Google Scholar // Scopus):
-Total citations: 2230 Citations // 1772 Citations
-Citations Last 5 years: 1845 Citations (Average of 369/year), with 537 Citations on 2021 // 1497 Citations (Average of 299.4/year), with 480 Citations on 2021
-h index: 24 // 21
Publications:
-International scientific journals with peer review: 53 Articles, 43 in the first quartile (Q1). First author in 12 articles, and last author in 7 articles, with emphasis on the recent publication on Nature Communications.
-Scientific conferences: >50
Co-Inventor in 4 patents, 3 with PCT extension
R&D Projects:
-Competitive research projects: Participated in >10 projects, including several large European projects (total budget 4.097M, 3.880M and ~1.477M) European projects; 1 as principal investigator (PI);
The competitive research projects that I have participated in, sum up to > 15 000 000 euros (total values of the projects, funding all the members of the consorciums), with > 3 000 000 euros directly managed by the institutions I participated in.
I have managed a competitive project (Juan de la Cierva-incorporación) of 76 156 as principal investigator.
-Non-competitive (Industrial) contracts: Participated in 14, 3 as principal investigator (PI);
The Industrial contracts that I have participated in as researcher, sum up to >500 000 euros, with >50k/yr in industrial contracts directly managed as principal investigator.
Co-supervisor of 2 PhD Thesis, 1 TFM (Trabajo Fin de Máster) and 1 TFG (Trabajo Fin Grado)
Reviewer for several international scientific journals
Scientific Prizes:
-Co-Author of paper receiving Best Poster award in national conference OPTOEL 2019 (500)
-Co-Author of paper receiving Best Student paper award in 26th International Conference on Optical Fiber Sensors, OFS 2018 (150)
-PhD awarded Prémio Tese de Doutoramento 2015 (best PhD Thesis in Optics and Photonics of 2014/2015 in Portugal) by Sociedade Portuguesa de Óptica e Fotónica (Portuguese Society of Optics and Photonics

-PhD Thesis awarded Premio Extraordinario de Doctorado by UAH
-Co-Author of paper receiving Best Student paper award in international conference APOS 2016
-Best poster of the sesion in EWOFS 2016 (500)
-1 Patent awarded Accésit en el Premio a la Mejor Patente Nacional (UAH) (500)

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021

Turno General

Área Temática: **Tecnologías de la información y de las comunicaciones**

Nombre: PARRA ARNAU, JAVIER

Referencia: RYC2021-034256-I

Correo Electrónico: xparnau@gmail.com

Título: Privacy protection and data transparency in the information society

Resumen de la Memoria:

My research leverages mature concepts and techniques amply utilized in information theory, statistics and convex optimization, to tackle the increasingly controversial problem of privacy in our information society. Throughout my career, I have investigated this problem from a perspective that is mathematically systematic and adheres to the principles of engineering optimization. I have focused on three main application scenarios: personalized information systems, statistical databases and online advertising.

In the scenario of personalized information system, my research work has contributed to the development of a better understanding of privacy, pioneered the systematic modeling of privacy systems as optimization problems, and bridged the gap between the communities of information privacy and those of information theory and stochastic estimation. In database anonymization, my work has advanced research towards the conciliation of privacy and functionality, making anonymization algorithms more utility-preserving and faster, and establishing intriguing, unprecedented connections between the fields of information privacy and video compression. In online advertising, I have conceived and developed transparency and protection tools for end-users, reported privacy threats and misuse in ad platforms, and developed solutions to mitigate those issues.

I have conducted my research at top research institutions and centers in Europe, including INRIA, Karlsruhe Institute of Technology (KIT), NEC Labs and Dresden University Technology, and have been awarded prestigious, highly competitive postdoctoral fellowships in Spain, France and Germany, including CAPPRIS, JdC-F, JdC-I, Alexander von Humboldt and "la Caixa" Junior Leader.

Currently, I am leading a research team spanning KIT, as co-PI of an international project, and UPC, as co-PI of a "Proyectos I+D+i 2020 - Retos Investigación" project, PI of a "la Caixa" project, and co-PI of a technology-transfer contract. In this sense, I have extensive experience as PI in projects funded by the EU, BMBF, MESRI, Spanish Ministry of Science and Innovation and "la Caixa" Foundation, and by the industry (Google, Mosaic Factor), and have participated in research contracts with Huawei, Microsoft Research, CaixaBank and Dinube Mobile Payments & Loyalty. Including fellowships, competitive projects and research contracts, I have raised over 1.22M€ in total and led projects as PI for 1.55M€.

I have over 55 publications (866 citations, h-index:18) and received 6 awards for the quality of my research, including best-paper awards at international conferences and prizes by the AEPD, APDCAT and COIT.

I am currently co-supervising 5 PhD students, 2 at KIT and 3 at UPC, and have supervised 1 PhD thesis (Oct. 2020) and 15 MS and 16 BS students in France, Germany and Spain.

I participate regularly as a TPC member at conferences (>35) like ARES and TrustCom, having had chair roles at ICCCN'19 (core A) and ATC'16, and organizational roles at ICICS, among others, and at KIT (seminars). Furthermore, I have editor roles at IEEE Access, PLOS ONE, Entropy, MDPI Information and Heliyon, and have organized 3 special issues at JCR journals.

Resumen del Currículum Vitae:

I am a "la Caixa" Junior Leader fellow. Through 4 different research projects and contracts, I lead a research team that spans KIT (where I am a research affiliate) and UPC (where I am based) and is composed of 5 PhD students and 3 faculty members holding a PhD.

I obtained my Ph.D. degree in Telematics Eng. with European Doctorate mention from the Universitat Politècnica de Catalunya (UPC) in Dec. 2013. Since then, I have been awarded some of the most competitive postdoctoral fellowships in Spain, France and Germany, including JdC-F, JdC-I, CAPPRIS, Alexander von Humboldt and "la Caixa" Junior Leader (success rate: 4.5%), and worked at the most prestigious public and private European research institutions (INRIA Grenoble and Saclay centers, Karlsruhe Inst. Tech. (KIT), Dresden Univ. Tech.) and labs (NEC Labs, Privatics, CRISES, KIT Chair of IT-Security) in my field, for a total of 37 months abroad.

My research results have been published and presented at prestigious, high-impact factor journals (e.g., IEEE TKDE, Information Fusion, Information Sciences) and conferences, including 27 JCR papers (1 ranked 1st, 6 D1, 12 Q1, 12 Q2, 2 Q3, 1 Q4) "plus 3 undergoing revisions" (18 of them as first and/or corresponding author; 7 open access), 2 book chapters, 22 works presented at conferences and workshops "plus 2 undergoing revisions", 4 participations in international workshops as invited speaker, 2 non-JCR journal papers, and 1 white paper.

Currently, I am the co-PI of 3 competitive research projects on database anonymization, one at an international level at KIT, funded by the German BMBF and French MESRI (3 years, 419K€); and another two at a national level, namely, a project funded at the call "Proyectos I+D+i 2020 - Retos Investigación" (3 years, 215K€), and a project funded by "la Caixa" Foundation and the EU H2020 R+I program (3 years, 305K€), for a total budget of 940K€. Previously, I was the co-PI of a project funded by the EU ICT PSP, 7th call, with a budget of 340K€, and the technical manager of an EU FP7-ICT project.

With regard to technology transfer, I have led and participated in international, privately-funded projects and industry contracts with Google (PI), Huawei, Microsoft Research, NEC, CaixaBank, Dinube and Mosaic Factor (co-PI, 36K€). Furthermore, I have patented one invention exploited by CaixaBank. Including fellowships, competitive projects and technology-transfer contracts, I have raised 1.22M€ as PI in total.

My work has been awarded with 2 best-paper awards at international conferences; received prizes from the Catalan and Spanish Data Protection Agencies; and my doctoral thesis received the Best PhD Thesis Award on Inform., Commun. Tech. in Banking, from the Spanish Official Telecom. Eng. Assoc. (COIT) and Banco Sabadell, and the recognition Highlighted PhD Students Research Work in the 2012 Forum PhD Research ICT. In addition, I have obtained the I3 and associate-professor accreditations.

I have an experience of 6 years (over 15 courses) of official lecturing at the level of BS and MS in Germany and Spain, and I have supervised 16 BS and 15 MS theses in 5 universities in France, Germany and Spain. At the PhD level, I hired 3 students in 2020 (2 at KIT and 1 at UPC), and I am supervising 2 more students at UPC; 5 PhD students in total. The first PhD thesis I supervised was defended in 2020.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021

Turno General

Área Temática: **Tecnologías de la información y de las comunicaciones**

Nombre: DING , YUEMIN

Referencia: RYC2021-031012-I

Correo Electrónico: yueminding@tecnun.es

Título: IoT-driven real-time communication and demand response in smart grid

Resumen de la Memoria:

Dr. Ding's research focused on IoT-driven real-time communication and user-side demand response in the smart grid. He has published 14 JCR Q1 journals in related areas, was granted four patents from the U.S., Korea, and China, and obtained two research projects as the primary Principal Investigator (PI). He was also heavily involved in research projects sponsored by the national government and leading industry in Korea, Australia, China, and Norway. Dr. Ding has supervised/co-supervised 12 theses at the Master/Ph.D. level.

Dr. Ding's academic achievements are summarized here-in-after. In the IoT-driven smart grid communication, he focused on the real-time communication schemes for neighborhood area networks (NAN) and user area networks (UAN). In NAN, he firstly suggested a scale-free topology generation approach to provide benchmark test networks for the performance evaluation of real-time schemes. After that, a constrained broadcast scheme was introduced to minimize the communication latency in neighborhood areas for urgent demand response. This was followed by a container-driven digital twin system for smart meters, the dominant components in NAN. Dr. Ding also developed an experimental system of the IEC 61850 standard for communication in smart substations. In UAN, he presented a contention-free scheduling scheme to guarantee the latency requirements and improve the energy efficiency for industrial applications of IEEE 802.15.4. Dr. Ding also led the development of the Smart Energy Profile 2.0 (SEP 2.0) communication stack for demand response in homes/buildings. He also implemented communication networks following WirelessHART/ISA100.11a standards to support real-time energy monitoring and control in the industrial environment. In IoT-driven demand response, Dr. Ding suggested a demand response model and energy management scheme based on the state-task network for industrial facilities to reduce the energy cost of industry customers. After that, he designed online demand response schemes based on multi-agent deep reinforcement learning and developed a demonstration system for industrial demand response. In addition, he developed the energy performance modeling for an in-use office building in Norway.

In the future, Dr. Ding will continue his research career on IoT-driven real-time communication and user-side demand response in the smart grid. The emphasis will be digital twin-driven demand response for buildings and the development of high-resolution micro-PMU (Phasor Measurement Unit) to support real-time fault detection in the distribution network of the smart grid.

Resumen del Currículum Vitae:

Dr. Yuemin Ding obtained a Bachelor in Communication Engineering from Harbin Institute of Technology, China, in 2009, and conducted a Master leading to Ph.D. program in Electronic Systems Engineering in Hanyang University, Korea, from 2009 to 2014. His research focused on IoT-driven real-time communication and user-side demand response in the smart grid. He received sponsorship from the Hanyang University, the Gyeonggi Regional Research Center in Korea, the Chinese Scholarship Council, the Brain Korean 21 Plus Program, and the National Scholarship of China.

In 2015, Dr. Ding joined the Tianjin University of Technology (TUT) as an Associate Professor. At TUT, Dr. Ding built his research group and continued working on real-time communication and demand response. As the Principal Investigator (PI), he received a Young-Talent Grant from the National Natural Science Foundation of China (NSFC) and a consolidated grant from the Tianjin Science and Technology Commission (to note, Tianjin is a principal municipality with a population of 15 million). He also received funding from the State Grid of China, Tianjin Branch. Due to his excellent performance, Dr. Ding was selected into the "131 Outstanding Talent Program" in Tianjin and an "Innovation Award" from the State Grid of China in Tianjin. In 2017, he was invited and sponsored by Prof. Glen Tian and Prof. Gerard Ledwich to Queensland University of Technology, Australia, to research real-time communication and control for distributed energy storages in smart grid. In 2019, Dr. Ding joined the Norwegian University of Science and Technology (NTNU) as a postdoctoral fellow. At NTNU, he worked on energy performance modeling based on physical principles to facilitate user-side demand response in the smart grid.

Dr. Ding joined the Tecnun School of Engineering of the University of Navarra, Spain, in November 2021. He will continue his research in IoT-driven real-time communication and demand response in the smart grid.

AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2021

Turno General

Área Temática: **Tecnologías de la información y de las comunicaciones**

Nombre: JUAREZ MIRO, MARC

Referencia: RYC2021-031534-I

Correo Electrónico: marcjuarez89@gmail.com

Título: The Security and Privacy Risks of Widespread Machine Learning

Resumen de la Memoria:

The increasing popularity of machine learning (ML) and its new applications has raised security and privacy concerns. One such concern is that ML techniques enable new capabilities to undermine the security and privacy of IT systems. My research trajectory is motivated by the need to protect the security and privacy of IT stakeholders. To appropriately respond to the threats that ML poses, my research has followed three main courses of action: i) identifying novel attacks that are enabled by ML techniques, ii) developing the methodology to assess the scope of these attacks, and iii) designing and implementing countermeasures against them.

I first became acquainted with this line of work as a research assistant in the IIIA-CSIC. IIIA provided a vibrant research culture that inspired me to view the privacy problems that I tackled within the ARES project from an AI perspective. As a result of that research, I published three papers on the topic of private web search and implemented an intelligent agent to protect the user□s privacy while preserving search engine personalization.

When I moved to COSIC (KU Leuven) I continued applying ML to various security and privacy problems, including web tracking, traffic analysis, and profiling. Specifically, my Ph.D. thesis studies applications of ML applied to website fingerprinting (WF). WF is an ML-based attack that allows network eavesdroppers to infer information about the user□s web habits despite encryption and anonymization of the network traffic. My work characterizes the threat that ML-based techniques pose for users of privacy-enhancing technologies, such as the Tor anonymous communication network and the DNS over HTTPS protocol. The highlights of my contributions are the following: to design the first deep learning-based WF attack, which remains the most accurate classifier in the literature; to advance the evaluation methodology of ML for WF, showing that existing attacks are not as effective as was previously thought; and the development and implementation of efficient countermeasures against the attacks. To this day, I continue to collaborate with my colleagues at COSIC on problems related to machine learning, privacy, and security.

In 2019, I accepted a position as a postdoctoral scholar at the University of Southern California (USC), to expand my view on how AI affects our society. It became clear to me that emerging applications of ML were not restricted to security and privacy and that the current trend of using ML to replace human decision-making in areas with societal impacts, such as education and healthcare, is ethically challenging. At USC, my research is still related to security and privacy. I am the principal investigator of two research projects that study approaches to measure and audit social biases in ML models from a privacy and security perspective. My work at USC has led to three manuscripts that are currently under review in the most prestigious venue in the field (FAccT).

In my future research, I plan to continue identifying and minimizing the threats of ML applications to security and privacy, the design of private methods that provide transparency into the decisions of ML algorithms, and the development of private, fairness-aware ML algorithms. Progress on achieving these objectives will contribute to more secure and private uses of ML.

Resumen del Currículum Vitae:

Marc Juárez Miró holds a double degree in Computer Engineering and Mathematics from the Universitat Autònoma de Barcelona (UAB). While still an undergraduate student, Marc worked as a research assistant in the Institut d□Investigació en Intel·ligència Artificial (IIIA-CSIC) for the CONSOLIDER "ARES" project, a project on advanced privacy and security research. In 2013, he obtained an ERASMUS grant to study at the University of Leuven (KU Leuven), Belgium.

Marc obtained his Ph.D. from the KU Leuven in 2019 with "summa cum laude" honors and the congratulations of the committee of examiners. His research at the KU Leuven was funded by an FWO Ph.D. fellowship, a highly-competitive personal fellowship granted by the Belgian government for fundamental research. At the KU Leuven, Marc worked in the COSIC research group, where he applied machine learning techniques to a wide range of security and privacy problems. In particular, his dissertation studies the application of machine learning techniques to the development of attacks against privacy-enhancing technologies. Marc's work has contributed to advancing our understanding of the threat that these techniques pose to users. This work has had a real-world impact, contributing to the implementation of defenses in popular privacy-enhancing technologies, such as Tor, the whistleblower's service SecureDrop, and Cloudflare's DNS over HTTPS services. The dissertation also had a significant impact on the field. One of the publications stemming from the dissertation is now one of the most cited works in the area (>200 citations), another won the 2016 ESORICS Best Paper award, and his dissertation is a runner-up for the 2020 SIGSAC Doctoral Dissertation Award.

Currently, Marc is a postdoctoral scholar at the University of Southern California (USC) in Los Angeles, where he studies applications of machine learning for high-stakes decision-making in areas such as education and employment. At USC, Marc has led a collaboration with researchers from Carnegie Mellon University on identifying privacy attacks of machine learning models. Their methods can also be used by investigative journalists to audit for the underrepresentation of a demographic group in the training set without the collaboration of the model holder. Marc has also received a $75K gift from Amazon to fund a project. His role is as co-principal investigator. The project bridges the gap between algorithmic fairness and privacy in the context of federated learning. The goal is to provide rigorous privacy guarantees of the sensitive attributes required to measure and ensure a notion of fairness in the outcomes.

In total, Marc has published 19 articles in top venues (CORE A*) of the field of privacy and security (CCS, NDSS, PETS) and currently has three manuscripts under review in the top conference on algorithmic bias (FAccT conference). Marc is the lead author in 10 of these works. His h-index is 12, based on 2043 citations as of 07/02/2022.

In addition to research, Marc contributed to the teaching of Privacy and Big Data courses offered by the KU Leuven and USC, and proposed and supervised a dozen of master theses. He has contributed to teaching as an adjunct professor at the UOC, where he leads the exercise sessions and elaborates the textbook materials for the Privacy and Data Science courses. Finally, he is also active in several organizations related to his research and serves as a PC Member of several venues in his field.