



## AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2022

Turno General

Área Temática: Biociencias y biotecnología  
Nombre: GARCIA GALIANO, DAVID  
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Título: CRISPR-KNDy  
Resumen de la Memoria:

In my scientific career, the main goal of my research was to explore the hormonal signals and neuronal mechanisms involved in the metabolic control of puberty and fertility using novel molecular and genetic tools. I have contributed to the characterization of the physiological roles of kisspeptins (Kp, products of Kiss1 gene) and NUCB2/nesfatin-1 in the neuroendocrine control of puberty and reproduction during my PhD studies in Tena-Sempere lab. In particular, we determined the physiological relevance of these novel systems in the regulation of the body energy status and metabolic cues, and the interactions between the Kiss1/Kiss1r system and other key regulators on GnRH/gonadotropin secretion in rodents. In my postdoctoral training in Carol Elias lab at the University of Michigan (UMich), I was focused on the characterization of the central sites of action of important metabolic cues, in particular leptin and insulin, and the intracellular signaling pathways underlying their role in neuroendocrine and autonomic regulation. Special focus of our research was the role of phosphatidylinositol 3-kinase (PI3K) signaling as a key molecular pathway of leptin action on reproduction. By using novel transgenic mice for specific deletion of p110a and/or p110b catalytic subunits in leptin receptor-expressing cells, we analyzed the functional implication of PI3K signaling pathway in mediating leptin effects on metabolism and neuroendocrine reproductive axis, as a key intermediate of dysfunctional metabolic status associated with fertility deficits. Moreover, using a novel transgenic mouse line for specific deletion of ERalpha in GHRH cells I provided novel evidence for the interconnection of two hypothalamic-pituitary axes at the time of pubertal transition, as well as a dual GHRH/Kiss1 phenotype was identified at the hypothalamic arcuate nucleus. These studies, during my pre-doctoral and post-doctoral periods, have allowed me to get acquainted with many techniques used in experimental neuroendocrinology, including techniques in molecular biology as well as in vivo studies with rodents, including the use of genetically modified mouse models. My reintegration (Marie Skłodowska-Curie Action, Horizon 2020 Program) in Tena-Sempere research team (IMIBIC), have allowed me to start exploring new facets of reproductive physiology, performing novel research by using of innovative tools in genome editing.

### Resumen del Currículum Vitae:

During my PhD studies in Tena-Sempere's lab I determined the physiological relevance of these novel systems in the regulation of the body energy status and metabolic cues, and the interactions between the Kiss1/Kiss1r system and other key regulators on GnRH/gonadotropin secretion in rodents. In my postdoctoral training in Carol Elias lab at the University of Michigan (UMich), I was focused on the characterization of the central sites of action of important metabolic cues, in particular leptin and insulin, and the intracellular signaling pathways underlying their role in neuroendocrine and autonomic regulation. Special focus of our research was the role of phosphatidylinositol 3-kinase (PI3K) signaling as a key molecular pathway of leptin action on reproduction. We analyzed the functional implication of PI3K signaling pathway in mediating leptin effects on metabolism and neuroendocrine reproductive axis, as a key intermediate of dysfunctional metabolic status associated with fertility deficits. Moreover, using a novel transgenic mouse line for specific deletion of ERalpha in GHRH cells I provided novel evidence for the interconnection of two hypothalamic-pituitary axes at the time of pubertal transition, as well as a dual GHRH/Kiss1 phenotype was identified at the hypothalamic arcuate nucleus. These studies, during my pre-doctoral and post-doctoral periods, have allowed me to get acquainted with many techniques used in experimental neuroendocrinology, including techniques in molecular biology as well as in vivo studies with rodents, including the use of genetically modified mouse models. I was promoted as research faculty at the Department of Molecular and Integrative Physiology and also provided assistance, as part of the Microscopic Imaging and Cell Physiology Core at the Michigan Diabetes Research Center of the UMich, to internal and external users for in situ hybridization services. Additionally, the training received by the Transgenic Animal Model Core at the University of Michigan for CRISPR/Cas9 application for in vivo modeling, and my reintegration (Marie Skłodowska-Curie Action, Horizon 2020 Program) in Tena-Sempere research team (IMIBIC), have allowed me to start exploring new facets of reproductive physiology, performing novel research by using of innovative tools in genome editing. For dissemination activities, I have imparted seminars at different universities for master, graduated and undergraduates, as in Wayne State University, UMich, Riberão Preto University of São Paulo and in IMIBIC. I also imparted an entry-level course of innovative tools in biomedical research (including CRISPR-Cas system) for medical students of São Paulo University at Riberão Preto. Also, I mentored two master and one graduate students at UMich, and one TFG student at University of Cordoba.



## AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2022

Turno General

Área Temática: Biociencias y biotecnología  
Nombre: CORDERO GUEDEZ, GERARDO ANTONIO  
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Título: Biología integrativa de organismos y la evolución del desarrollo embrionario  
Resumen de la Memoria:

Mi investigación se ha esforzado por avanzar en la comprensión básica de los patrones y procesos que subyacen a la biodiversidad en animales vertebrados, particularmente reptiles y mamíferos. Los resultados de estos esfuerzos han vinculado con éxito los procesos ontogenéticos (crecimiento, diferenciación de rasgos y expresión génica) a los patrones filogenéticos de variación fenotípica (macroevolución). Además, al medir el metabolismo (respiración y metabólica) en las etapas embrionaria y adulta, he hecho contribuciones clave para comprender cómo responden los organismos a los entornos cambiantes. Algunos de los hallazgos más importantes de este valioso trabajo se refieren a la capacidad de los organismos para emplear respuestas fisiológicas para proteger los procesos vitales de desarrollo durante la exposición a condiciones ambientales desfavorables. Al examinar etapas sensibles de la vida en organismos no modelo que a menudo no son accesibles para los investigadores, mis líneas de investigación 'eco-evo-devo' han generado nuevos conocimientos y estimulado nuevas hipótesis en los campos de la ecología, biología evolutiva y biología del desarrollo. La gran cantidad de datos genéticos generados en mis estudios se han debidamente puesto a la disponibilidad del público y comunidad científica internacional a través de bases de datos de libre acceso en la web.

Mi investigación actual en Portugal se centra en comprender cómo el desarrollo muscular defectuoso conduce a trastornos neuromusculares, utilizando el ratón de laboratorio como modelo. Como Investigador Junior (posición actual financiada por la Fundación Portuguesa para la Ciencia y la Tecnología), mi función principal es colaborar con colegas y estudiantes de la Facultad de Ciencias de la Universidad de Lisboa / Centro de Ecología, Evolución y Cambios Climáticos (cE3c). Mi investigación busca dilucidar cómo los patrones de expresión génica defectuosos en las células madre musculares causan distrofia muscular. Hacia este objetivo, dirijo los esfuerzos que se basan en la bioinformática y la bioestadística para aprovechar el asombroso poder informativo de las tecnologías de secuenciación de ARN single-cell de vanguardia. Como parte de esta investigación, estoy adquiriendo habilidades en técnicas de biología molecular, que se pueden aplicar ampliamente a estudios ecológicos y evolutivos. En este sentido, también estoy colaborando actualmente con colegas de cE3c en una investigación que aborda cómo evolucionó la expresión génica en poblaciones envejecidas experimentalmente del gusano modelo *C. elegans*. Como tal, mi trabajo actual contribuye a mejorar la salud humana. La experiencia de gestión y los complejos conocimientos técnicos adquiridos en los últimos años se orientarán a partir de ahora a exponer cómo la interrupción de las redes de comunicación génica intercelular contribuye a la aparición de trastornos neuromusculares y cardiovasculares. Así mismo, pretendo desarrollar nuevas líneas de investigación que buscan explorar como defectos del desarrollo embrionario que conllevan a enfermedades cardiovasculares en humanos se reflejan en la evolución estructural del corazón en animales vertebrados. Finalmente, examinare como los efectos de alteraciones climáticas se manifiestan en el micro-nivel génico y celular en animales que provienen de poblaciones naturales.

### Resumen del Currículum Vitae:

Después de obtener un doctorado (mención Ecología y Biología Evolutiva) en 2015 en los Estados Unidos, recibí premios de postdoc altamente competitivos y de cargo de investigador en etapa inicial en institutos de investigación reconocidos de Europa. En mi formación académica avanzada y experiencia como investigador en etapa inicial, obtuve valiosas habilidades en la gestión financiera y la ejecución oportuna de proyectos de investigación, la mayoría de los cuales culminaron en la publicación de artículos en revistas internacionales. He publicado 28 artículos de investigación originales (de "peer review") en revistas importantes en mi campo de investigación: Como estudiante de pregrado = 2; como de posgrado = 12; como postdoc = 14. Como primer autor (correspondiente), dirigí y supervisé la finalización exitosa de 23 de estos estudios que he han traspasado barreras disciplinarias de la anatomía, biología del desarrollo, ecología, genética y fisiología. Mis aportes publicados también incluyen siete relatos de historia natural, un capítulo de libro, una reseña de libro, dos comentarios de divulgación científica y cuatro revisiones de la literatura científica primaria. Los resultados de mis investigaciones también han sido ampliamente divulgados en los congresos internacionales más reconocidos en los campos de ecología, biología evolutiva y biología del desarrollo. A través de mis trabajos se ha logrado la transferencia de software para la visualización de fenotipos complejos. Así mismo, he participado en varios talleres internacionales sobre técnicas avanzadas de biología computacional y bioestadística.

Hasta ahora, mi investigación ha sido apoyada por programas privados y públicos de financiación de la investigación en Francia, Alemania, Portugal, Suecia y los Estados Unidos. Por ejemplo, mi investigación doctoral sobre patrones de expresión génica a gran escala fue financiada por una subvención altamente competitiva para la mejora de la tesis doctoral de la Fundación Nacional de Ciencias de los Estados Unidos. Además, como estudiante de doctorado y becario postdoctoral, tuve la oportunidad de supervisar varias tesis de licenciatura y masters. Después de haber sido galardonado con la prestigiosa beca Alexander von Humboldt en Alemania, participé en la tutoría de varios estudiantes de doctorado y lideré una reunión financiada por la Fundación Volkswagen para fomentar la colaboración y la síntesis de ideas entre especialistas internacionales en la biología integrativa del sistema musculoesquelético. Mis intereses científicos en el desarrollo embrionario muscular han sido respaldados por una subvención de la Asociación Francesa para la Distrofia Muscular. Actualmente, me desempeño como Investigador Junior (financiado por la Fundación para la Ciencia y Tecnología de Portugal) de la Facultad de Ciencias de la Universidad de Lisboa, donde continuo a desarrollar líneas de investigación sobre desórdenes neuromusculares congénitos. Junto a mis actividades de investigación también aprovecho de participar como instructor de laboratorio para el programa de masters en Evolutionary and Developmental Biology, en el cual imparto clases de análisis de expresión génica.



## AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2022 Turno General

Área Temática: Ciencias físicas  
Nombre: PEREIRO PEREIRO, IAGO  
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Título: Microfluidics for bioanalytical and biomedical applications  
Resumen de la Memoria:

Trajectory: I combine microfabrication techniques, micro-scale hydrodynamics and reaction kinetics to tackle existing problems in biomedicine and the life sciences. Two fruitful areas of research include:  
Microfluidic fluidized beds of paramagnetic beads, where I could prove that fluidization phenomena at the microscale is possible by leveraging opposing drag and magnetic forces and geometrical constraints in microfluidic chambers. I further demonstrated applications of such fluidized beds to detect single digit numbers of bacteria in liquid food, preconcentrate beta amyloids from spinal fluid or capture tumoral DNA for in situ amplification and mutation analysis.  
Microfluidic probes that create microscale laminar flows on surfaces to accurately control shear stress conditions, kinetics and sequential liquid exchange. I have shown that it is possible to adapt such probes for standard laboratory labware, and thus overcome molecular diffusion to largely enhance the kinetics of surface immunoassays, with large gains in information per assay and time to result. Other applications include hematology and single-cell manipulation.  
My current research focuses on the formation and growth of human model systems, such as organoids, in microfluidic devices with controlled hydrodynamic conditions and the mass transport of nutrients.  
I also aim to positively influence my fields of research by providing perspectives and tutorial reviews on diverse topics: biopatterning, flow-based assays, bubbles in microfluidics.  
Proposed line of research: In contrast to traditional 2D cell cultures, 3D cell culture can better mimic the cell environment, cell-cell interactions and tumor characteristics. In particular, human model systems such as organoids could soon partly replace animal testing by better predicting human responses. However, such 3D model systems are complex and currently not sufficiently reproducible for most practical purposes. I aim to leverage my know-how in microfluidic probe technologies and human model systems to create technology to better address problems faced by current 3D cell culture development and analysis. Specifically, I propose work in two areas: (1) the application of local cues to spheroids and organoids during their development by localizing liquids containing morphogens at the micrometer scale at precise locations of their surface. This could enable the engineering of reproducible organoids at higher throughput and possibly enabling new classes of organoids that are today not possible. (2) Create new classes of microfluidic probes to extract individual or groups of cells from 3D cell culture structures at desired locations, hydrodynamically locating fluids at the single-cell level. Thus, whole spheroids or organoids could be deconstructed layer by layer by removing single cells, which could then be individualized in droplets sent to separate wells of a wellplate. This would enable a new paradigm of organoid analysis that could accurately reconstruct information such as changes in RNA expression with information both in time and in space.

### Resumen del Currículum Vitae:

I graduated in Mining Engineering (specialized in materials) and a master's in Applied Physics at the University of Vigo, before continuing with a master's degree in Nanosciences at Paris Saclay in France. I then did my PhD studies at the Institut Curie in Paris, under the guidance of Jean-Louis Viovy, one of the pioneers of microfluidics for biological and biomedical applications. Our laboratory was eventually transferred to the new Institut Pierre-Gilles de Gennes for microfluidics, where I also stayed for one year postdoc. Afterwards I was a postdoc at IBM Research in Zürich for more than four years in the group of Emmanuel Delamarche, continuing my work on lab-on-a-chip and microfluidic systems for biomedicine. Since January 2022 I am a staff research scientist at the Roche Institute for Translational Bioengineering, a new institute head by Matthias Lütolf at the interface between academia and industry, aiming to translate cutting-edge technology in human model systems for drug discovery.

Output: My work has been published in >20 peer reviewed articles, one book chapter and presented in >15 international congresses. This research has led to 7 patent applications, 4 already granted. Specifically, I have worked on patent creation and the translation of my technology with 3 multinational corporations: IBM, BioRad and Roche.

Collaborations: Internationally, I closely collaborated with the SciLifeLab in Stockholm (Sweden) and the University of Pardubice (Czechia), resulting in 3 peer-reviewed publications. During my time at the Curie Institute (France), national collaborations resulting in publications include with Université Paris-Sud, Université Paris Descartes, ESPCI and Institut Pasteur. During my time at IBM (Switzerland) I created intellectual property with BioRad's research center in France, published joint work with ETH Zürich, and co-directed students from EPFL.

Leadership: During my time at IBM, I was the scientific lead of an IBM-Biorad joint development agreement, attended business decision meetings with upper management and coordinated the research between research sites in France and Switzerland. I participated in three 7th Framework Programme projects as a researcher, with active part in international meetings and work package reporting. As a postdoc I had a large degree of autonomy, allowing me to guide the direction of my work and proposing new projects. I was corresponding author of 2 peer-reviewed publications. At Roche's Institute for Translational Bioengineering, I supervise and coordinate the establishment of new lab spaces and a clean room, and I am part of the hiring of the new management team.

Responsibility: As a researcher, I have been responsible for academic and industrial research lines, including supervising 6 students. I was part of project planning at both IBM and Roche, including with external consulting companies.



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Turno General

Área Temática: Ciencias físicas  
Nombre: FUENTES MARTÍN, JAVIER  
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Título: Formal and phenomenological aspects of Effective Field Theories  
Resumen de la Memoria:

My research area is High-Energy Physics phenomenology, an area in which I have been active for nine years. During this time, I have become an expert in flavor physics, especially in the context of model building and new physics phenomenology, and in Effective Field Theories, where I contributed with foundational theory work on path-integral techniques and the release of three open-source computer tools: DsixTools, SuperTracer, and Matchete (under development).

In the future, I plan to continue and strengthen these research activities. The coming years await multiple experimental results, especially in flavor physics, which will require proper theoretical guidance to exploit its implications. The main objective of my future line of research will be to provide the necessary foundations for such guidance via an efficient use of Effective Field Theories, the most adequate framework for describing new-physics effects in the presence of a mass gap.

Despite the usefulness of the Effective Field Theory approach, to interpret the data in terms of new physics models, it becomes mandatory to establish a streamlined connection between those models and their Effective Field Theories. However, in practice, this connection is performed rather inefficiently at present, requiring a significant amount of tedious and repetitive work and hindering the theoretical interpretation of the data. My future line of research will aim to simplify this procedure.

The fulfillment of this goal requires a multifaceted strategy involving computational, theoretical, and phenomenological developments. Reflecting on this, I will pursue three (closely connected) objectives:

- I. Theoretical development of path-integral techniques, whose aim is to establish new theoretical methods that will extend the scope of future Effective Field Theory analyses.
- II. Computational advancements for efficient Effective Field Theory analyses, whose goal is to design a general software package that will automate the connection between new-physics models and their Effective Field Theory phenomenology.
- III. Charting new physics directions with the Effective Field Theory approach, using the developments from the previous objectives to map out the space of possible beyond-the-Standard Model directions in view of future (and current) experimental data

### Resumen del Currículum Vitae:

After graduating in Physics with honors at the University of Granada, I did my MSc and PhD in Theoretical Physics at the University of Valencia. During my PhD, I did research stays at National Tsing Hua University (Taiwan), Los Alamos National Laboratory (USA), and the University of Zurich (Switzerland). After my PhD, I worked as a postdoctoral researcher at the University of Zurich (Switzerland) for three years and at the Johannes Gutenberg University (Germany) for one year and a half.

I have obtained outstanding results in my research area, as illustrated by my global bibliometric data: I am the author of 30 articles published in ISI journals (and two more in the peer-review process). According to INSPIRE (the reference database in my field), 10 of these articles count with more than 100 citations, and another 5 with more than 50 citations. The same database shows that my publications have received 2.302 citations, resulting in an h-index of 23. The high impact of my research is further demonstrated by the number of invitations to present my work in the last few years: 28 invited plenary talks at international conferences/workshops and 15 invited seminars in universities/institutions from all over the world. These also include special theory talks to the ATLAS Collaboration to present the results of my research and inspire future experimental searches. I have also collaborated with members of CMS and ATLAS collaborations, establishing existing and ongoing experimental searches based on my work. I have shown that I can attract funding, as demonstrated by the approval of my project "Effective Field Theories: formal aspects, and phenomenology at the Large Hadron Collider (LHC) and in flavor factories" in the Junta de Andalucía call for projects of excellence 2021, with total funding of 164.864 for three years. I have also been mentioned in a news article in The Guardian reflecting on my work.

I have taught nine courses at bachelor and master/doctorate levels in different countries, amounting to 235 teaching hours. I am currently supervising the master's thesis of Ana Martín Galán. I have also mentored three PhD students during my stay at the University of Zurich: Claudia Cornella, Julie Pagès, and Nudzeim Selimovic.

I have been a program committee member of the Zurich Phenomenology Workshop 2018 and organizer of the topical program Flavor at the Crossroads (Mainz, 19-29 April 2022), as well as the workshops: Higgs and Effective Field Theory - HEFT 2022 (Granada, 15-17 June 2022), and the 2nd Workshop on Tools for Low-Energy SMEFT Phenomenology - SMEFT-Tools 2022 (Zurich, 14-16 September 2022). I have also been an organizer of the theoretical particle physics seminar series at the University of Zurich (Fall 2019) and Johannes Gutenberg University (Fall 2020 and 2021, and Spring 2021).

I have done review work for the following scientific journals: Journal of High Energy Physics (JHEP), The European Physical Journal C (EPJC), Physics Letters B (PLB), Physical Review D (PRD), and Journal of Physics G: Nuclear and Particle Physics. I have been expert evaluator for the Generic Call 2020 of the French National Research Agency (ANR). I have been chair of the PhD thesis tribunal of Kevin Monsálvez Pozo and a substitute member of the PhD thesis tribunal of Ana Peñuelas Martínez and Fernando Cornet Gómez, all at the University of Valencia.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2022  
Turno General

Área Temática: Ciencias sociales  
Nombre: GONÇALVES GRANJA, RAFAELA  
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Título: Technological surveillance of criminalized populations: The case of electronic monitoring  
Resumen de la Memoria:

I have a PhD in Sociology (2015) and I am an auxiliary researcher at the Communication and Society Research Centre, University of Minho, Portugal. My work lies at the intersection of the sociology of crime and punishment and the social studies of science and technology. It is characterized by qualitative research designs that combine cutting-edge theory development with strong empirical components. My empirical object is the technological surveillance of criminalized populations at different stages of the criminal justice system, namely criminal investigations, community measures, and imprisonment. This research agenda can be divided into three interrelated strands: (i) the exploration of the societal, cultural, regulatory and political impacts of the increasing reliance on technology in the governance of crime; (ii) the engagement with cross-country comparisons exploring how the use of innovative technologies in the criminal justice system is framed, shaped and paced by different socio-historical national legacies; (iii) the production of interdisciplinary knowledge that contributes to the development of a new ethical paradigm with concrete impacts on policy design and decision making. The outputs of such research interests are translated into 5 co-authored books, 1 co-edited book, 23 articles in indexed high-impact journals, and 17 book chapters. In addition, I am also frequently invited by high-level organizations to take an active role in discussions, such as the European Parliament (LIBE Committee), the European Network of Forensic Science Institutes (ENFSI), and the American Society of Crime Laboratory Directors (ASCLD).

During my academic career, I have held visiting positions at the University of Cambridge (United Kingdom) and Universidade Federal do Rio Grande do Sul (Brazil). Nonetheless, the internationalization of my career becomes even more evident when considering my past and ongoing collaborations with colleagues from several European institutions (such as United Kingdom, Germany, and the Netherlands), my experience in the organization of international events and thematic panels at international conferences, and the invitations received to conduct seminars at international institutions. Such connections are also translated into my engagement with several international research projects funded by several international institutions, such as European Union, Erasmus+, European Research Council and COST Actions as well as by competitive grants and scholarships I have been awarded. In 2019, I gained a position through the highly competitive scheme "Scientific Employment Stimulus" promoted by the Portuguese Foundation for Science and Technology (success rate of 8%). I am also deeply involved in teaching, supervising and mentoring activities. To date, I have supervised 9 master's and 6 bachelor's dissertations and co-organized five international short courses aiming to establish rich mentoring dynamics between experienced researchers and students.

The Ramón y Cajal grant would be an excellent platform to contribute to the prospering Spanish social sciences community and consolidate my career in ways that enable the attraction of European Union funding. Through this grant, I would be able to conduct in-depth research about electronic monitoring through a comparative study between Spain, Portugal and the United Kingdom.

Resumen del Currículum Vitae:

I hold a PhD in Sociology (2015) from the University of Minho, Portugal. My research explores the technological surveillance of criminalized populations and lies at the intersection of sociology of crime and punishment and social studies of science and technology. My work is intrinsically interdisciplinary, crossing the boundaries between social sciences and natural sciences, and heavily draws upon the European context through cross-national comparisons.

After completing my PhD, funded by a competitive grant attributed by the Portuguese Foundation for Science and Technology (FCT), I was a researcher in a project funded by the European Research Council for 5 years. In 2019, I gained a highly competitive position as a junior researcher promoted by FCT under the scheme "Scientific Employment Stimulus". Since 2021, I became an assistant researcher at the Communication and Society Research Centre, University of Minho, Portugal. For the last 5 years, I have also been an invited lecturer at the Sociology Department of the same university.

To date, I have (co-)authored 5 books (3 of them with Routledge and Palgrave), co-edited 1 book, and published 23 articles in indexed high-impact journals. In the domain of social sciences, I highlight publications in several Q1 journals according to Journal Citation Reports (JCR), such as Social Studies of Science, British Journal of Criminology, Science Technology & Human Values, and Science as Culture. Since my work is intrinsically interdisciplinary, I also publish in natural sciences leading journals, such as Genes, Forensic Science International: Genetics, and Journal of Forensic and Legal Medicine. My publication record also includes 17 book chapters in international publishers such as Palgrave, Sage, Springer, and Oxford University Press. In addition, I have extensive experience in conducting reviews for the leading journals in the fields I work on (both within social and natural sciences) and have been a referee for international funding agencies, such as Czech Science Foundation, GARC.

I have broad experience participating in international and national scientific projects, assuming different functions. These include being an ethics advisor for a project funded by the European Union and a researcher in projects funded by Erasmus+, European Research Council, COST Action, and the Portuguese Foundation for Science and Technology. My research has been disseminated regularly at the best conferences in the fields I research, in which I often participate as a presenter and organizer of thematic panels. I participated in more than 60 oral presentations at national and international scientific events. I have also received 16 invitations to present my work in highly relevant decision-making platforms, directed towards research end-users, such as the European Parliament (LIBE Committee - Committee on Civil Liberties, Justice and Home Affairs).

I am deeply involved in the training of young academics. I have supervised 9 master's and 6 bachelor's dissertations, co-organized several short courses and summer schools and dedicated efforts to the creation of pedagogical materials. Since 2022, I am co-coordinator of a platform that promotes debates with civil society around the main challenges of contemporary societies. Furthermore, I have participated in several national and international journalist pieces as an invited expert.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2022  
Turno General

Área Temática: Ciencias y tecnologías de materiales  
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Título: 2DEXEMPHO

Resumen de la Memoria:

As a "Talento fellow" at IMDEA Nanoscience, I am conducting cutting-edge research on photonic cavities coupled to nanomaterials. I use femtosecond transient absorption spectroscopy to study the dynamic photoexcited states of novel materials, including optical, near-infrared, and terahertz spectroscopies. I am also responsible for managing the femtosecond time-resolved optical spectroscopy laboratory and its associated chemical laboratory.

Previously, I was a postdoctoral researcher at Trinity College Dublin under the supervision of renowned researcher Prof. Jonathan N. Coleman. There, I specialized in liquid phase exfoliation of novel 2D materials such as TIS<sub>2</sub>, GeS, Co(OH)<sub>2</sub>, and MoO<sub>2</sub>, successfully avoiding degradation and applying them in thin film transistors and lithium-ion battery electrodes. I also oversaw the optical and time-resolved electrical characterization for the entire group.

My PhD, earned within a Marie Curie Initial Training Network, focused on the study of photoexcited states dynamics with femtosecond optical transient absorption spectroscopy. My thesis centered on the exfoliation and characterization of novel 2D materials such as MoS<sub>2</sub>, WS<sub>2</sub>, and black phosphorous. I have secured funding from competitive calls as a principal investigator, including a project focused on the ecological and digital transitions. I have been also a member of scientific teams for 1 European project, 2 Spanish projects, and 1 regional project, as well as a former member of a Marie Curie Initial Training Network. During my studies, I received a "Beca de colaboración" scholarship from the Spanish Ministry of Science, Research, and Universities.

My research vision combines my expertise in exfoliation, characterization, and fabrication of 2D materials to explore new possibilities in photocatalytic and light emitting devices, such as lasers, as well as conductive films. My focus on high monolayer content dispersions will enable an accurate characterization of photoexcited states dynamics and their applicability on light emitting photonic devices. The morphology of nanosheets and deposited films will play a crucial role in determining their applications, such as highly porous films for photocatalysis. I am also in discussions with Airbus for a future collaboration.

Resumen del Currículum Vitae:

With a proven track record in 2D materials research, I have published 28 articles in highly regarded journals such as Nature Communications, Advanced Energy Materials, and Angewante Chemie International Edition. My work has garnered over 1110 citations, resulting in an h-index of 17 and an average of 40 citations per article. I have also held a corresponding author position in 4 of my published works, with over 96% of my articles appearing in Q1 journals.

My thesis was awarded the prestigious Jozef Stefan Golden Emblem in 2019, the highest scientific impact award for young scientists in Slovenia, recognizing outstanding contributions to the field. Only 3 theses are awarded per year in the whole country.

As an expert in femtosecond transient absorption spectroscopy, I have studied the photoexcited states dynamics of 2D materials and other nanomaterials, delving into the role of defects, many-body effects, and competing processes during recombination. My research has expanded to the emissive properties of nanomaterials and their coupling with photonic structures, further characterizing these materials as active media for laser applications. I have secured funding (172.500,00 ) in competitive call to study photocatalytic properties of 2D materials.

I have presented my findings at 15 international conferences, receiving recognition for my contributions with a best poster award at the "XXXth international winter school conference on electronic properties of novel materials." As a responsible lab leader, I have secured funding through competitive national calls and am currently supervising a PhD student from the Universidad Complutense de Madrid.

I am dedicated to enhancing my skills and have completed workshops on transversal skills such as gender balance, group management, time management, dissemination, scientific leadership, and programming. As a member of the Spanish Research Society in Ireland and the Real Sociedad Española de Física, I am committed to diversity and inclusion in my research endeavors, working on balanced and diverse teams.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2022  
Turno General

Área Temática: Ciencias y tecnologías químicas  
Nombre: SÁIZ GALINDO, JORGE  
Referencia: RYC2022-036243-I  
Correo Electrónico: jorge.saizg@gmail.com  
Título: Analytical tools towards Forensics and Metabolomics  
Resumen de la Memoria:

My scientific career is multidisciplinary, as it is the Analytical Chemistry, the common tool I used during these years trying to provide solutions to social problems. My research starts in a Forensic Chemistry group, developing analytical solutions to forensic issues. Terrorist attacks, defense or chemical abuses are some of the topics I studied. The development of portable analytical tools had also an important impact in my career, since these tools avoid sample transportation and degradation, and several prototypes of different types were constructed. I also applied analytical techniques to the study of food safety, related to the migration of plasticizers from the containers to the food and to Ecology studies of lizards. During the last 6 years I have been focused on metabolomics studies, helping to deeply understand the mechanisms underlying the development of several diseases, as well as trying to provide clues about potential treatments. I have worked hard from the basis of metabolomics, developing new methods and implementing new techniques, such as ion mobility-mass spectrometry, for the analysis of complex samples and the characterization of lipids, oxidized lipids and lipid isomers. The research line proposed in this call falls within metabolomics too, and it is based on the study of a very relevant samples of patients with schizophrenia. This is a common mental disease that I want to investigate applying my experience, trying to shed more light on the mechanisms of the development of the disease as well as the options for its treatment.

Resumen del Currículum Vitae:

Jorge Sáiz's career has focused on Analytical Chemistry in different environments. He performed his PhD (2010-2014) in the research group INQUIFOR, at the University of Alcalá, developing analytical solutions for the resolution of forensic problems. He started his training in Analytical Chemistry working with capillary electrophoresis and soon other analytical techniques became part of his daily work. During the PhD, he performed 3 research stays in the University of Basel, in which he got experience in the design of analytical instruments. From these stays, a research swiss-company arose (ECyTech Sàrl), of which Jorge is the R&D director and co-founder. This company focuses on the development and construction of cost-effective analytical tools for water monitoring in developing countries. A post-doc grant allowed him to continue his research in the University of Alcalá. Later, he joined the Institute of Organic General Chemistry at CSIC (2015) for two years, where he specialized in the use of chromatographic techniques coupled to mass spectrometry. After this period, in 2017, he joined the Center of Metabolomics and Bioanalysis (CEMBIO), directed by Prof. Coral Barbas, at the University San Pablo CEU. Since then, he has participated in several metabolomics studies and directs several research lines within CEMBIO. In 2018, he joins San Pablo CEU staff as lecturer in the Department of Chemistry and Biochemistry in the area of Analytical Chemistry. Currently, he is carrying out significant metabolomic research projects for lipids, oxidized lipids and polar compounds in the search of biomarkers for different diseases.



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2022  
Turno General

Área Temática: Energía y transporte  
Nombre: BURGUÉS CEBALLOS, IGNASI  
Referencia: RYC2022-035399-I  
Correo Electrónico: ignasiburgues@gmail.com  
Título: Solution-processed semiconductors for energy applications  
Resumen de la Memoria:

My scientific career has been carried out in 6 different research groups in 4 European countries, including an academic career break in a world-class industrial environment (Merck Group, UK). The rest of my academic experiences have taken place in 2 research institutes (ICMAB-CSIC and ICFO, Spain), 3 universities (UPC, Spain; CUT, Cyprus and FAU, Germany), and 1 centre of technology (Eurecat, Spain).

I have focused my research on nanostructured, solution-processed semiconductors, including organic, inorganic and hybrid materials, for their use as functional thin films in optoelectronic applications such as photovoltaics, photodetectors, and light emitting diodes. Most of my works involve the design, fabrication, and advanced characterisation of lab-scale devices, with the aim of providing innovative solutions towards the upscaling of such technologies. In that sense, I have investigated alternative materials and realised new device concepts as well as developed new processing and post-processing techniques that may result in more efficient, cost-effective, stable, or environmentally friendly products. My multidisciplinary works encompass different fields of expertise, spanning from material design and synthesis of advanced materials to device engineering and advanced processing methodologies.

Thanks to my participation in 5 European, 6 national and 3 industrial projects, I have been involved in multiple, interdisciplinary, national, and international collaborations in academia and industry. With these collaborations I have contributed to R&D and technology transfer activities (including the 3 patents filed at Merck Group) to help advance the printed electronics and solution-processed semiconductors sectors.

I have published 22 articles in peer-reviewed international journals (Nature, Cell press, Wiley, ACS, RSC, AIP journals) in the field of solution-processed semiconductors and nanoparticles. These publications proof i) my ability to conceive and carry out ground-breaking research: 9 articles published in journals with impact factor (IF) above 10, ii) my capacity of developing research independently: 3 articles as corresponding author, 1 article as last author, 12 articles as first or second author, 16 without the PhD supervisors, and iii) that I have acquired sufficient knowledge and skills to lead research projects.

Throughout my career, I have gained extensive scientific and management skills, undertaking higher responsibilities upon my career advancement, to become a consolidated, independent researcher. In regards of public R&D projects, it is worth mentioning that I have secured 900 k in funding through competitive projects: one AGAUR s Beatriu de Pinós Postdoctoral Fellowship (ICFO), to develop novel synthetic methodologies for AgBiS<sub>2</sub>-based nanocrystal solar cells; and two projects (one individual and one as a consortium leader, both at Eurecat) funded by the Spanish Agencia Estatal de Investigación, to advance on strategic applications for transparent organic photovoltaics. These contributions showcase my scientific maturity and capacity of leading research activities and projects, as well as the conception and development of new ideas and proposals in different topics and areas of expertise.

Resumen del Currículum Vitae:

Experimental scientist with a strong commitment to Materials Science for energy-related applications. My main research contributions pivot around the development and application of solution-processed organic/hybrid semiconductors for thin film optoelectronic applications, with a special focus on photovoltaics. My areas of work include both fundamental as well as applied studies, spanning from material design and synthesis of advanced materials to device engineering and advanced processing methodologies.

I am a chemist from the IQS School of Engineering (2007) and have been awarded a PhD in chemistry from the Institute of Materials Science of Barcelona, ICMAB-CSIC (2014), and a Beatriu de Pinós postdoctoral fellowship (2018). My career has been carried out at 6 different research groups in 4 European countries, including an academic career break in a world-class industrial environment (Merck Group, UK). The rest of my academic experiences have taken place in 2 research institutes (ICMAB-CSIC and ICFO – The Institute of Photonic Sciences, Spain), 3 universities (Universitat Politècnica de Catalunya UPC, Spain; Cyprus University of Technology, and Friedrich-Alexander-Universität FAU Erlangen-Nürnberg, Germany), and 1 centre of technology (Eurecat, Spain). Currently, I am a senior scientist at the Functional Printing & Embedded Devices unit in Eurecat, and lecturer of the Chemical Engineering Department at the UPC. I have co-authored >20 peer-reviewed international journal publications, including one paper in Nature Photonics and one in Joule, as well as a variety of significant papers in excellent journals including Advanced Energy Materials, Advanced Functional Materials, Nano Energy and leading Chemistry journals. I am also co-inventor in 3 patents (Merck Group) and have given 10 invited talks and seminars at international conferences and advanced schools. Currently, I am the principal investigator in two projects of the Spanish Agencia Estatal de Investigación and have participated in 5 European projects.





## AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2022

### Turno General

Área Temática: Estudios del pasado: historia y arqueología  
Nombre: COHEN GARCÍA-JUEZ, MARÍA ÁNGELES  
Referencia: RYC2022-036778-I  
Correo Electrónico: angycohen@gmail.com  
Título: Colonialism, transnational migrations, and women's movements among Sephardi Jewish communities in the Maghreb, Israel, and South America (20th-21st centuries)

#### Resumen de la Memoria:

My research career has been defined by extensive international experience in prestigious academic institutions in Israel and Canada. My PhD was completed in a Joint PhD program between the Autonomous University of Madrid, Spain, and the Hebrew University of Jerusalem, Israel. My line of research has focused on 20th and 21st century Sephardi communities, especially in the Maghreb. I have studied the impact of colonialism on Sephardi Jewish life, transnational migrations which followed the collapse of the colonial period and the religious, social, and political transformations of Sephardi Jews throughout these events. My research puts forward a multidisciplinary approach that includes historical anthropology, cultural studies, cultural history, cultural psychology, sociology, and Jewish studies. First, through a combination of ethnographic methods and text analysis, my work bridges disciplines, and regions. Second, I have advanced comparative research in the study of Sephardi communities, which are transnational in nature and thus require comparative methods. Third, I developed a model for the analysis of Sephardi experiences of modernity under colonial rule that connects ethnography, text analysis and historiography. Fourth, I have directed my attention to Sephardi feminist movements and their use of traditional rabbinic sources in their creation of a feminist and traditionally Sephardi voice.

I am currently the Principal Investigator of the project *The Voice of the Mothers: Feminist Reclaiming of Jewish Tradition among Sephardi Women in Israel*, funded by the Social Sciences and Humanities Research Council in the highly competitive framework of the Insight Development Grants (IDG). I am a fluent Spanish, English, and Hebrew speaker, and I have lectured and published in those three languages. I have high command of rabbinic and biblical Hebrew, as well a strong familiarity with Haketia (Judeo-Spanish language of northern Morocco). My education includes two forms of training that are unusual amongst researchers of Sephardi modernity and contemporary Sephardi communities. First, my non-academic education in institutions of traditional Jewish learning in Israel. Second, my training in cultural psychology and ethnographic study of cultural practices.

I am a member of research teams and networks in Spain, Israel, Canada, and the US. I have co-authored articles and co-organized knowledge dissemination activities with international researchers since the beginning of my academic career as a doctoral candidate. My work has won international recognition, as proved by the awards and fellowships I have received throughout my career.

#### Resumen del Currículum Vitae:

I am a cultural researcher with an expertise on 20th and 21st century Sephardi communities of the Maghreb, colonialism's impact on Sephardi Jewish communities, Mizrahi Jews in Israel, and Sephardi/Mizrahi feminism in Israel. For the last ten years, I have developed my academic career abroad, thanks to internationally competitive research fellowships and contracts. I received my PhD from the Autonomous University of Madrid and the Hebrew University of Jerusalem in a Joint PhD program. My PhD project was awarded the Moshe David Gaon Prize for Projects on Judeo Spanish Culture (Ben Gurion University of the Negev, Israel, 2016). I completed my PhD thanks to the reputable Doctoral Fellowship in Jewish Studies of the Rothschild Foundation (Hanadiv) Europe (2014-2016). I conducted all my postdoctoral research in prestigious academic institutions where I was awarded highly competitive research fellowships: Tel Aviv University (Dean's Distinction, 2018-2019), Concordia University, Canada (Azrieli Institute of Israel Studies, 2019-2020) and University of Calgary (Hy and Jenny Belzberg Postdoctoral Associate in Israel Studies, 2020-2023). My research has been supported by international agencies such as the Social Sciences and Humanities Research Council of Canada, which awarded me an Insight Development Grant (\$56,000 CAD) for a project on Sephardi feminism and transmission of women's religion, which will set my research agenda in the next five years.

I have been hired on to different national and international research projects (Israel and the US) as expert in transnational Sephardi Jewish communities and contemporary Israel. I have been sought by top-ranking historians and anthropologists of 20th and 21st century Maghrebi and Middle Eastern Jewish communities to join their research teams and projects. My expertise was sought by the Consul General of Spain in Jerusalem (2016) and I became academic advisor throughout the process of drafting the Citizenship Law for Descendants of Sephardi Jews.

I have authored 10 peer-reviewed articles in English, Spanish, and Hebrew, three book chapters and two non-academic articles (English and French). I have a publication contract with the renowned Canadian publisher McGill-Queen's University Press for my first monograph (December, 2023). I have coordinated three international seminars on Sephardi Thought and Modernity (2021-2022, collaboration with Yuval Evri, Brandeis University) and a symposium (25th Anniversary of the Immigrant's Lament, by Mois Benarroch, Tel Aviv University, 2019).

I have been a lecturer on graduate and undergraduate levels in Israel and Canada. I created two courses: a graduate course on theories of cultural research (Laboratory of Cultural Mediation of Experience, Tel Aviv University, 2018-2019) and an undergraduate course called Women and Judaism (University of Calgary, 2022).

In summary, my cv reflects my internationalization and recognized expertise, my leadership in obtaining support for my research and creating academic activities of knowledge mobilization, my collaboration with international scholars, my language skills, and methodological innovations, as well as the inter-disciplinary approach required to study transnational communities in modern times.