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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024 Turno General

Área Temática: Biociencias y biotecnología
Nombre: ESCOBEDO PASCUAL, ALBERT
Referencia: RYC2024-049673-I
Correo Electrónico: albertescobedopascual@gmail.com
Título: Protein biophysics and design: from fundamentals to therapeutics
Resumen de la Memoria:

The aim of my research is to understand and model fundamental aspects of protein biophysics in order to facilitate and engineer strategies and applications in molecular medicine and beyond. In my most recent work as a postdoc at Ben Lehner's lab at the Wellcome Sanger Institute and the CRG, which is available as a bioRxiv pre-print and currently under review at Science, I generated combinatorial protein core and surface randomization datasets that I used to train models able to predict functional cores and surfaces across the evolution of a protein fold, and showed that allostery is a major constraining factor in such evolutionary process. During this postdoc I also contributed to a publication in Nature reporting a complete map of allosteric sites in KRAS, a protein mutated in ~25% of all human cancers.

As a postdoc at the IRB Barcelona with Xavier Salvatella, I developed a single α -helix peptide scaffold that we engineered to target a protein interaction interface and reported it in a first and co-corresponding author publication at Nature Communications. Based on this, I am currently co-leading a project awarded an ERC Proof-of-concept grant at Ben Lehner's lab that leverages AI protein design and massively parallelized binding assays to develop peptide binders against hundreds of target protein interfaces. As a postdoc at the IRB, I also reported the bases of polyQ helix stability in another first-author publication in Nature Communications and took part in four other publications, including one in Nature Structural & Molecular Biology, contributing to the study of disordered proteins and bio-molecular condensates in neurodegeneration and cancer aiming to develop new therapies.

Previous to that, I received training in medical science liaison (MSL) duties at Novartis Pharma, and contributed to research in tropical neglected diseases in a postdoctoral internship at the Universidade Federal do Rio de Janeiro under supervision of 2002 Nobel Laureate in Chemistry Kurt Wüthrich. As a PhD student at the IRB Barcelona under supervision of Maria J. Macias, I contributed to reveal regulatory mechanisms within the TGF- β pathway, with one first author publication in Structure and a paper in Genes & Development in collaboration with Joan Massagué. Prior to that I did my masters in the UK, where I was trained at the lab led by Sheena Radford at the University of Leeds.

Resumen del Currículum Vitae:

- Positions

- 2024-current: Postdoctoral Researcher, Wellcome Sanger Institute Programmable Biology lab (Ben Lehner)
- 2021-current: Postdoctoral Researcher, CRG Genetic systems lab (Ben Lehner)
- 2016-20: Postdoctoral Researcher, IRB Barcelona Laboratory for Molecular Biophysics (Xavier Salvatella)
- 2015-16: Immunology & Dermatology trainee, Novartis
- 2015: Postdoctoral internship, Universidade Federal do Rio de Janeiro (Kurt Wüthrich)
- 2009-14: Predoctoral Researcher, IRB Barcelona (Maria J Macias)
- 2013: Predoctoral internship, FMP Berlin (Hartmut Oschkinat)
- 2009: MSc researcher, University of Leeds (Sheena Radford)

- Education

- 2014: PhD in Biomedicine, Universitat de Barcelona
- 2010: MSc in Molecular Medicine, Cranfield University (UK)
- 2009: Licenciatura (BSc) in Biotechnology, Universitat de Lleida

- Publications (my position in author list/total number of authors)

- Escobedo, Voigt, Faure & Lehner. bioRxiv 2024 (1/4) Under review at Science.
- Weng, Faure, Escobedo & Lehner. Nature 2023 (3/4)
- Basu et al. Nature Structural and Molecular Biology 2023. (20/37)
- Escobedo et al. Nature Communications 2022. (1/17, co-corresponding author)
- Escobedo et al. Intrinsically Disordered Proteins. Methods in Molecular Biology book series (1/3)
- Bhak et al. Bioconjugate Chemistry 2020. (3/5)
- Escobedo et al. Nature Communications 2020. (1/18)
- De Mol et al. ACS Chemical Biology 2016. (6/12)
- Escobedo et al. Structure 2014 (1/6)
- Aragón et al. Genes & Development 2011 (5/7)

- Selected talks in conferences

- Protein Folding Dynamics, Gordon Research Conference, USA 2024
- 12th European Biophysical Societies' Association and 10th ICB-IUPAP Biophysics Congress, Madrid July 2019
- Computational aspects of biomolecular NMR, Gordon Research Conference, Switzerland June 2019
- 16th Iberian Peptide Meeting, Barcelona February 2018
- Spanish Biophysical Society Congress, Sevilla June 2019

- Training of young investigators



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1. 2023: Gesa Voigt (Ruprecht-Karls-Universität Heidelberg), MSc internship supervisor
2. 2019-20: Jonathan Piccirillo (UPF), master's thesis co-supervisor. Second author of a paper at Nature Communications under my supervision, currently PhD student at CNB-CSIC.

- Technology transfer / Dissemination / Outreach

1. 2024: Licensing of discovery exploitation rights to Allow
2. 2022-23: CRG TBDO grant for the translational development of peptide helical binders
3. 2022: Participant in a career advice round table for biotechnology students, UdL

- Fellowships / Awards

1. 2025: ERC-PoC grant to establish an AI-driven platform for peptide binder discovery
2. 2025: CRG postdoc grant to establish an automated phage display platform
3. 2021: BIST grant as a co-PI to study polyQ aggregation determinants
4. 2015: CNPq fellowship for a postdoctoral internship in the UFRJ, Brazil
5. 2013: DAAD fellowship for a PhD internship at the FMP Berlin
6. 2010-14: FPU fellowship for PhD research, Spanish Government
7. 2009: Course director's prize and tuition fees waiver, Cranfield University, UK
8. 2009: Mención especial, Premios a la excelencia en el rendimiento académico universitario, Spanish Government
9. 2009: Premio Extraordinario Fin de Carrera, Universitat de Lleida



AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2024

Turno General

Área Temática: Biociencias y biotecnología
Nombre: VIVAS GARCÍA, YURENA
Referencia: RYC2024-050148-I
Correo Electrónico: yvigar@hotmail.com
Título: Molecular mechanisms underlying metabolism of cancer and aging diseases
Resumen de la Memoria:

My interest has always focused on a key question: how do living systems obtain energy? First, by investigating leptin and circadian rhythms (as undergrad), thereafter studying metabolic homeostasis (PhD) and currently, investigating metabolic mechanisms in tumour progression.

Specifically, I investigate how metabolic factors such as excess of nutrients determine cancer onset and phenotypic changes leading to cancer cell survival.

Next, I aim to move forward on the comprehension of metabolic aspects that allow cells to adapt to metabolic stress, since this will provide key insights into the mechanisms underpinning stress resistance and cancer cell survival, the necessary event that dictates metastatic dissemination, by consensus the main cause of cancer death.

Intratumor phenotypic heterogeneity is a major driver of metastasis that is partially underpinned by metabolic rewiring. Thus, different phenotypic states show different metabolic programs. Regarding to FA metabolism, proliferative states are associated to FA synthesis, while invasive phenotypes are linked to increased FA uptake. This highlights what is my main interest: the existence of a tight functional relation between lipid metabolism and cancer aggressiveness. Thus, I aim to understand the mechanisms that enable cancer cells to switch from some preferential pathways to others, conferring to them metabolic flexibility and aggressiveness. Focus on FA, there are specific questions that I consider as central for cancer progression, especially for tumour types that rely greatly on lipid metabolism.

These yet open questions include the role of FA homeostasis in cancer cell fate, through its crosstalk with processes like ER stress and nutrient signalling pathways; the identification of cellular responses triggered by anti-lipogenic drugs (Vivas-García et al, 2020, Mol Cell), that might help to elucidate general adaptive mechanisms promoting cancer cell survival subjected to metabolic stress; to clarify the role of FAO as a source of Acetyl-CoA, that might affect regulatory events such as transcription factor and histone acetylation, and therefore promote reversible changes in gene expression programs underlying cancer cell fate;

Summarizing, I find fascinating the study of the molecular events that allow cancer cell metabolic flexibility, since I metabolic rewiring is likely a key link between cancer cell behavior and tumour microenvironment, and a major driver of metastasis and relapse. Thus, in the next future, I would like to investigate these aspects, as first step to open an outstanding lab based on these topics.

Resumen del Currículum Vitae:

I graduated in Biology (Complutense University) and, awarded with a Collaboration Scholarship, I started my scientific training in the group of Professor Delgado. There, I studied the circadian dependence of leptin effects on food-intake and the clock genes dependency on feeding time in Goldfish. The results were published in Peptides 2011; J Biol Rhythms 2011.

In 2010 I obtained a FPI fellowship to move to the laboratory of Dr. Medina (Rey Juan Carlos University). There, I obtained a PhD focused on PPAR α and its role in metabolic homeostasis in mouse models of lipotoxicity.

Aside to my thesis, I contributed on other projects in collaboration with different labs (Metabolic changes in placenta-Prof. Ramos, ESP; Beta-cell plasticity-Dr. Costancia, UK), and I did an internship in the laboratory of Prof. Vidal-Puig (Cambridge University, UK) to study beta-cell and adipose tissue expandability. This period produced 7 publications: Aging Cell 2023 and 2019; Sci Rep 2021; Mol Med 2016; PLoSOne 2015; Dis Model Mech 2012; BMC Med Genomics 2011.

In 2015, I joined the group of Professor Goding as postdoctoral researcher (University of Oxford-LICR, UK), where I investigated on fatty acids as drivers of melanoma, a relevant contribution published in Molecular Cell 2020.

In 2022, I started at the CNIO after obtaining funding from the Domingo Martínez Foundation. In this time, I have contributed to a high-impact work that reveals how the excess of nutrients accelerates aging. (Nature Aging, 2024). Moreover, I have been awarded with the prestigious Marie Curie Fellowship (2022), and more recently with the Asun Almajano fellowship (2024) and the César Nombela grant (2024).

Along my career I have published a total of 11 original articles, 4 as first author; I have written 2 reviews on metabolism (1 as corresponding author); I have presented more than 20 communications at national and international congresses and I have participated in 14 national and international projects, 4 as principal investigator.



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Área Temática: Biociencias y biotecnología
Nombre: MARÍA SOLANO, MIGUEL ANGEL
Referencia: RYC2024-049905-I
Correo Electrónico: biochem0904@gmail.com
Título: Advancing biomolecule design through molecular dynamics insights
Resumen de la Memoria:

A key contribution from Dr. Miguel A. Maria-Solano's (MS) PhD work at the University of Girona has been elucidating the mechanisms of allosteric regulation in enzyme complexes.

During MS's PhD, funded by a Spanish government FPI fellowship, MS focused on computational enzyme design, working with various industrially relevant enzymes. MS mastered molecular dynamics simulations, enhanced sampling techniques, and protein networks to uncover the biomolecular mechanisms of allosterically regulated enzymes. In a particularly challenging project, MS deciphered how allosteric mutations finely tune the conformational ensemble of Tryptophan Synthase during its multi-step reaction mechanism. MS demonstrated the power of protein network analysis in elucidating enzyme allosteric pathways and identifying mutational hotspots (Maria-Solano et al., JACS, 2019). This work led to an international collaboration with Prof. Sterner (Regensburg University, Germany), developing a computational framework for the rational design of new enzyme variants through allosteric mutations (Maria-Solano* et al., ACS Catal, 2021). Furthermore, MS obtained PhD international recognition by conducting a four-month research stay at Prof. Roberto Chica's group (Ottawa University, Canada).

Another key contribution of MS PhD work was elucidating the mechanisms of enantioselectivity. Enantioselective enzymes hold immense potential for the production of chiral pharmaceuticals and other fine chemicals. MS developed a computational strategy tailored for rationalizing and engineering the enantioselectivity of Alcohol Dehydrogenase (ADH) enzyme variants (Maria-Solano et al., OBC, 2017 HOT article collection). In a collaborative study, MS showed how computational methods can be used to evaluate the enantioselectivity of ADHs towards substrates with multiple chiral centers, a challenge for the production of steroidal medicines, with the findings published in Nature Catalysis in 2019. This work was also highlighted in an article in the Spanish newspaper El Punt Avui in November 2019, bringing the research to the general public.

During MS's postdoctoral stage at the Ewha Womans University, MS broadened his research scope by developing new lines of research and securing funding through the Brain Pool program via the National Research Foundation of Korea (NRF). In his primary project, MS embarked on computing the activation conformational pathway and allosteric networks of a G-protein coupled receptor (GPCR), gaining a deeper understanding of its allosteric modulation and activation mechanism. The project resulted in an innovative computational framework to advance the rational design of allosteric drugs in GPCRs. Predicting and understanding drug effects depending on how they redistribute the protein communication supposes a promising avenue for drug discovery. (Maria-Solano* et al., eLife, 2023).

Beyond research, MS is committed to mentorship and education, having guided numerous students. During his trajectory, MS has consistently taken on leadership roles in research projects, as proven by seven authorships as first-author publications and/or four corresponding author roles. In addition, MS is committed to open science practices, with most of his publications in open access and sharing key data on his GitHub repository.

Resumen del Currículum Vitae:

Dr. Miguel A. Maria-Solano's (MS) research focuses on understanding the molecular mechanisms underlying biological processes to develop innovative computational frameworks for biomolecular design. MS is committed to an academic career that bridges scientific knowledge with societal and industrial applications. MS has a strong background in computational biochemistry, gained during his PhD at the Institute of Computational Chemistry and Catalysis (IQCC) at the University of Girona, Spain, as well as during his postdoctoral research at Ewha Womans University in South Korea.

During MS's PhD, funded by a Spanish government FPI fellowship, MS focused on computational enzyme design, working with various industrially relevant enzymes. MS mastered molecular dynamics simulations, enhanced sampling techniques, and protein networks to uncover the biomolecular mechanisms of allosterically regulated enzymes (Maria-Solano et al., JACS, 2019). These findings led to the development of computational frameworks for the rational design of new enzyme variants through allosteric mutations (Maria-Solano* et al., ACS Catal, 2021). Furthermore, MS obtained PhD international recognition by conducting a four-month research stay at Prof. Roberto Chica's group (Ottawa University, Canada).

During MS's postdoctoral stage, MS broadened the research scope by developing new lines of research and securing funding through the Brain Pool program via the National Research Foundation of Korea (NRF). In MS's primary project, he developed an innovative computational framework to advance the rational design of allosteric drugs in G-protein coupled receptors (GPCRs) (Maria-Solano* et al., eLife, 2023).

Throughout his career, MS has developed a great ability in goal setting, project planning, and managing, resulting in 13 publications in high-impact-factor SCIE journals, one preprint in BioRxiv, and a total of 640 citations. Remarkably, one landmark publication was awarded the best 2022 article in the area of computational chemistry by the Royal Spanish Society of Chemistry (Calvo-Tusell, Maria-Solano* et al., JACS, 2022). Additionally, MS has presented his main scientific findings at prestigious international conferences, such as the Biophysical Society (BPS) Annual Meeting, the ACS National Meeting, and the Gordon Research Conference (GRC), earning 2 poster presentation awards. MS has actively participated in several international collaborations with industry and academic experts in experimental assays and artificial intelligence, which led to 4 outstanding publications (Chem Commun 2017, Nat Catal 2019, ACS Catal 2021, and Nat Commun 2024).

MS is currently a Postdoctoral researcher at the Institute of Marine Sciences (ICM), which holds Severo Ochoa accreditation and is part of the Spanish National Research Council (CSIC). Here, MS is expanding his expertise by working on the computational design of plastic-degrading enzymes.



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With a broad background in computational biochemistry and an extensive international network of academic researchers and industry collaborators in structural biology, biocatalysts, medicinal chemistry, and artificial intelligence, MS is focused on developing new research lines, supervising students, and building interdisciplinary research teams.



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Turno General

Área Temática: Ciencias físicas
Nombre: ALONSO ÁLVAREZ, GONZALO
Referencia: RYC2024-048931-I
Correo Electrónico: gonzaloonso92@gmail.com
Título: Multi Messengers of the Dark Universe

Resumen de la Memoria:

Scientific and Technical Contributions. I have made impactful contributions to highly topical research lines within particle physics and astrophysics. My key research highlights include (1) pioneering the detection of dark radiative emissions as a way to discover dissipative dark matter, (2) solving the final parsec problem of supermassive black hole mergers with self-interacting dark matter, (3) obtaining world-leading limits on dark photon dark matter-neutrino interactions using neutrino oscillation experiments, (4) revealing that QCD axion dark matter may be discovered in rare kaon decay experiments, (5) mapping the phenomenology of dark baryons interacting with strange quarks, (6) showing that a mechanism of baryogenesis and dark matter production from B mesons can be tested at current collider experiments, (7) proposing that scalar and vector dark matter can be produced gravitationally during inflation, (8) challenging the cosmological stability of axion-like particles, (9) probing the couplings of the QCD axion to electroweak gauge bosons at colliders, and (10) organizing a high-profile workshop to optimize astrophysical simulation tools for dark matter discovery.

Internationalization and Mobility. I have established a strong network of international collaborators and I am well known in the European and North American academic circles. During my PhD at Heidelberg University, I engaged with the German physics community and also carried out research stays at the University of Washington (US), Durham University (UK), and the Universidad Autónoma de Madrid (Spain). My postdoctoral positions at McGill University and the University of Toronto have allowed me to establish strong ties with the North American community, where I have been recognized with awards and invitations to seminars and workshops. I have fostered lively research environments in all my host institutions through organizational and mentorship roles.

Independence and Leadership. I am an independent researcher with a proven track record of generating innovative ideas: my highly-cited research has received extensive media coverage and I have been invited to present in seminars and workshops at 13 top institutions in 2024 alone. I have shown scientific independence since an early career stage thanks to successful funding applications and leadership in research projects. I have experience as a lecturer in a Master's course at McGill University and have mentored 3 PhD, 2 Master's, and 3 undergraduate students. I am a member of the ONIX experiment, a moderator at arXiv.org, a peer reviewer for leading journals in the field, and I have organized high-profile scientific meetings and contributed to two review papers.

Line of Research to be Developed. As a Ramón y Cajal Fellow, I will develop novel astrophysical dark matter search strategies that exploit new electromagnetic and non-electromagnetic windows to our Universe. This will include eliminating astrophysical uncertainties in electromagnetic searches for axion and dark photon dark matter; revealing the impact of dark matter in black hole mergers and their associated gravitational wave emission; using laboratory and astrophysical neutrinos to test dark matter and other physics beyond the Standard Model; and designing novel directional experiments sensitive to the dark radiation emitted by dissipative dark matter.

Resumen del Currículum Vitae:

I am an expert in the astrophysical and collider phenomenology of particle physics beyond the Standard Model. Since Sept. 2023, I have been a Postdoctoral Fellow at the University of Toronto. From Jan. 2021 to Aug. 2023, I held a Trottier Chair Postdoctoral Fellowship at McGill University. In 2023, I was on parental leave for six months (Jan.-Jun.). I completed my PhD at Heidelberg University under the supervision of Joerg Jaeckel in July 2020, and was awarded a Summa Cum Laude and the Wilhelm und Else Heraeus Dissertation Prize 2020. As a PhD student, I did research stays at the University of Washington, Durham University, and the Universidad Autónoma de Madrid.

My leadership in high-energy physics is demonstrated by impactful contributions to axion and neutrino physics, dark matter, and baryogenesis. My expanding expertise in astrophysics spans cosmological, galactic, and stellar scales. Among my most relevant breakthroughs are a dark matter solution to the final parsec problem of supermassive black hole mergers; a novel paradigm connecting baryogenesis and dark matter to B mesons, which has inspired new searches at top particle physics experiments; pioneering a new approach to dark matter detection, targeting the dark radiation emitted in dissipative interactions; and participating in an experimental collaboration using precision atomic physics to search for axion dark matter.

I have authored 27 research papers totalling 839 citations and I have an h-index of 14 (as of Jan 8, according to the INSPIRE database). My work has been published in high impact journals including PRL, where my most recent paper was highlighted as Editor's Suggestion with a Physics Magazine featured synopsis. I have presented my research at 21 international conferences and have been invited to deliver seminars at 29 high profile institutions. My work has received broad media attention including articles at New Scientist and Quanta Magazine, as well as coverage on YouTube channels that have received over 200,000 views.

I consistently secure funding to support my research. I was awarded two prestigious fellowships to pursue my PhD, a Marie Curie Early Stage Researcher Fellowship within the Elusives network (167,000), and a la Caixa Foundation Fellowship for Postgraduate Studies (36,000). As a postdoctoral researcher, I received a McGill Trottier Chair Astrophysics Postdoctoral Fellowship (60,000) and a McDonald Institute Postdoctoral Scholar Award (10,000). I also obtained a PBEER/Quebec Merit Scholarship for Foreign Postdocs (23,000), which I declined.

I contribute through multiple leadership roles in the community. I serve as referee for major journals in the field and as moderator for the Cosmology and Extragalactic Astrophysics section at arXiv.org. I have organized high-profile events such as the Defining New Simulation Frontiers for Dark Matter



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Discovery workshop at the University of Toronto, for which I raised over 11,000 in grants, and the upcoming 2025 Dark Side of the Universe conference.

I have extensive teaching experience. I was Course Lecturer for the graduate course Electromagnetic Theory at McGill University in 2022, (39 class hours). I have also delivered a total of 120 hours of problem classes at Heidelberg University for 4 different Master's courses. My mentorship experience spans 3 PhD, 2 Master's, and 3 undergraduate students.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: TORDONI, ENRICO
Referencia: RYC2024-049361-I
Correo Electrónico: e.tordoni@gmail.com
Título: Unravelling biodiversity dynamics in the Anthropocene through functional, evolutionary, and interaction networks across taxonomic groups

Resumen de la Memoria:

The Anthropocene is characterized by unprecedented global changes that disrupt species' functional strategies, evolutionary relationships, and interactions, threatening biodiversity and ecosystem stability. My research plan seeks to advance macroecology and global change ecology by integrating multiple biodiversity dimensions: taxonomic, functional, evolutionary and biotic interactions. This innovative approach aims to uncover mechanistic links among species, analyze temporal changes in functional and phylogenetic diversity, and forecast the impacts of global change to inform conservation strategies.

While biodiversity is inherently multidimensional, biotic interactions crucial to ecosystem structure, function, and stability remain underexplored in global syntheses. My objectives are to (i) assess the temporal dynamics of functional and phylogenetic diversity across taxa, (ii) analyze how global change reshapes biotic interaction networks, and (iii) develop a comprehensive biodiversity metric for forecasting impacts. To achieve these goals, I will integrate time-series data, traits and phylogenetic information from published datasets, and species interaction data. By coupling changes in functional and phylogenetic structures with climatic and land-use variables, I aim to identify the strategies underlying species' resistance or resilience to global change and explore how biotic interactions integrate with other biodiversity dimensions.

This research will ultimately result in the development of a novel biodiversity metric that combines multiple dimensions of biodiversity and will be applied to forecast ecosystem vulnerability under various socio-economic scenarios. Key innovations of this research plan include the integration of time-series data with biotic interaction analyses and the creation of a comprehensive biodiversity index. For the first time, interaction diversity derived from mutualistic and trophic networks will be combined with functional and evolutionary diversity to evaluate how species interactions respond to global change and contribute to ecosystem stability. By leveraging cutting-edge analytical tools, this work will address critical gaps in macroecology and global change ecology.

The project's impact will extend beyond academia, offering valuable insights for policymakers, conservationists, and stakeholders to guide effective conservation and mitigation strategies.

Resumen del Currículum Vitae:

I am a macroecologist working at the University of Tartu (Estonia) interested in understanding biodiversity patterns across taxa, organizational levels (from species to biomes), and spatial scales (from local to global scale), along with the consequences of global change (climate and land-use change, biological invasions) on natural ecosystems. My main research line involves trait- and evolutionary approaches, especially using big data, complex computational methods, and reproducible workflows. I have authored 54 peer-reviewed articles (30% as first, last, or corresponding author), with 70% of publications in Q1 journals in the past two years. I secured funding from the Estonian Research Council for 482,000 as a principal investigator, and I participated in six other competitive projects totalling 6.8M. I collaborated with several researchers worldwide being a member of some international research networks (TraitDivNet, Invacost, DarkDivNet).

I have been the teacher of 5 courses for master's and PhD students (~150 hours) and I am currently supervising two PhD students. I also co-supervised 11 MSc and 4 BSc students. I once acted as a member of a PhD evaluation committee at the University of Tartu. In terms of outreach activities, I have been involved in scientific divulgation in primary and secondary schools, and I have also been invited to give talks at three different research institutions. I am also one of the organizers of a thematic session at the joint international meeting SIBECOL/AEET.

I served as a reviewer both for funding agencies (French National Research Agency and Czech Science Foundation) and for international peer-reviewed journals (>50 reviews for >20 journals including Nat. Comm., Glob. Ecol. Biogeogr., New Phyt.) and I am also in the editorial board of the Journal of Vegetation Science and npj Biodiversity.



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Turno General

Área Temática: Ciencias y tecnologías medioambientales
Nombre: RODRÍGUEZ SEIJO, ANDRÉS
Referencia: RYC2024-048166-I
Correo Electrónico: andresrodriguezseijo@uvigo.gal
Título: Environmental and toxicological implications of emerging contaminants and interactions with soil properties and biota under a climate change scenario

Resumen de la Memoria:

Andrés Rodríguez-Seijo holds a PhD in Terrestrial Ecosystems with a strong background in soil contamination. His scientific-technical interests and goals in the medium/long term are focused on understanding the impact of emergent contaminants on terrestrial ecosystems and how climate change can modulate the potential adverse effects of soil properties and organisms. His PhD thesis focused on the behaviour of heavy metals in different SUITMA areas (urban, mining, and shooting areas). To that end, he combined different analytical techniques, from classical techniques for soil contamination assessment to the use of isotopes as Pb tracers or ecotoxicological techniques with aquatic and terrestrial organisms.

During the end of their PhD and postdoctoral stage at UPorto, he also began to work on the impact of microplastics on worms (2nd worldwide study on this topic). During their postdoc, he expanded this question to include the effect of plastics on soil properties, as carriers of contaminants, etc., including different projects as PI. He also worked on the development and proposal of new analytical techniques for plastic assessment in soils.

Besides, the impact of nanomaterials on soils and plants has also been assessed through different ecotoxicological techniques that included biochemical approaches, both from a toxicological perspective and with their use as environmental remediators or fertilizers.

Since their incorporation at Uvigo as JdCi, he has also been involved in the assessment of antibiotics on soils and the use of bioadsorbents as environmental remediators. He has also been involved in project leading at both levels, including Project coordinator of the Horizon European Project, WP leader and Task leader at 4 Horizon European Projects. His research career has developed around the use of different analytical strategies to address the impact of contaminants in various environmental compartments, with a multidisciplinary approach that allowed the candidate to gain vast experience in different techniques and develop strong collaboration networks with researchers abroad.

The research line proposed for the coming years is linked to the study of emerging contaminants, such as nanomaterials, microplastics or PFAs (per- and poly-fluoroalkyl substances), on terrestrial ecosystems from a global change perspective. Climate change is a present and growing concern with environmental impacts on the contaminant's fate, as highlighted for inorganic contaminants. However, there are several uncertainties for emerging contaminants since, in most cases, they are understudied in soil environments such as PFAs or microplastics. In the case of plastics, although they have been widely studied in recent years, we still lack a clear methodology for the detection and analysis of plastics in complex matrices such as soils. A similar issue with environmental pollutants adsorbed to their surface. In this sense, climate change is a reality that could exacerbate the potential impacts of these contaminants on soil properties and soil organisms and, therefore, on the ecosystem services and functions provided by soils. This will require a multidisciplinary approach to have a holistic view of the environmental issues and the potential solutions to combat them.

Resumen del Currículum Vitae:

I obtained my PhD in Terrestrial Ecosystems from UVigo (2013-2016), funded by university grant, and I was honoured with an Extraordinary Doctorate Award. My doctoral research explored the behaviour of HM in SUITMA areas. During my PhD, I completed a research stay at UPorto (Portugal) under the supervision of Prof. R. Pereira, where I learned new ecotox. Techniques and began studying the impact of microplastics on soils.

Between Dec16 and Feb17, I conducted further research at UP, advancing oxidative stress biomarkers on soil organisms. In Nov17, I joined UP and GreenUPorto as an integrated member, securing two CNRS-funded projects, one as PI (Matisse) with MPs. In March19, I moved to CIIMAR-UP as an independent FCT junior researcher. In May 22, I returned to UVigo with a JdCi contract, working under the supervision of Prof. Arias-Estévez and Dr. Fernández-Calviño. I have 68.5 months (5.7 years) of international experience, including recent stays in 2024 at Çukurova University (Turkiye, Prof. S. Gündoğdu), where I learned new MPs extraction methodologies and at MRU (Lithuania, 3 months, Prof. P. Pereira), where I was trained in remote sensing techniques.

I have 56 peer-reviewed articles and 13 book chapters. My work has garnered ~1840/2390 citations (Scopus/GS) and a 21/24 h-index, > 300 citations/year (2022-2024). I have presented 63 conference and workshop works (18 oral, 7 invited), co-edited 3 books of abstracts, and contributed to 3 policy documents within the Scientists' Coalition for an Effective Plastics Treaty. Moreover, I participated in different datasets and a methods handbook.

I ve secured 3 individual competitive research contracts (~313k). I have been PI in research projects (~210k) (Matisse, CEEC, EnvAgro, JdCi), and I ve participated in 21 other research projects, including 5 ongoing funded by H2020/HE where I m Project Coordinator, WP and Task leader in 4 of them. My involvement also spans funding for an Erasmus+ Project, managing committee member in a COST action and being involved in funding for R&D centres in Spain and Portugal. As WP leader at the Bioservices project, I coordinated a big soil sampling (750 samples) in 4 European countries to understand the relationship between land uses, soil properties and biodiversity. Due to the good work as WP leader and due leave of the previous coordinator, UVIGO appointed me as Project coordinator of the INBESTSOIL European project, where we will get data about how investment in soil health can contribute to a long-term sustainable use of soil.



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I've co-organized 3 int. conferences, served for 5 as scientific comm., and co-chaired 2 sessions. I'm a reviewer for >80 WoS journals (410 reviews), guest editor for 6 special issues and assoc. editor/editorial board for 8 Q1/Q2 journals. I'm a project panel reviewer for 10 national/European agencies. Beyond academia, I've engaged in public dissemination through press interviews/podcasts/etc, and I also served as a scientific expert at the "Contamination by Plastics" panel in the Spanish Congress.

I have teaching experience at UVigo and UP, as coordinator of 4 subjects and teaching >250 h at BSc/MSc levels. I co-supervise 2 PhD students and co-supervised 4 BSc, 3 MSc and 2 visiting students. I've also served as a jury member for 10 BSc, 13 MSc, and 3 PhD theses. I've been certified by ANECA as PAD, PUP, and PCD (Dec. 2017).



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Área Temática: Ciencias y tecnologías químicas
Nombre: RIGOTTI , THOMAS
Referencia: RYC2024-048671-I
Correo Electrónico: thomas.rigotti@uam.es
Título: Enantioselective synthesis of novel phenyl bioisosteres
Resumen de la Memoria:

The obtainment of enantioenriched molecules is of fundamental importance since two enantiomers of the same drug candidate can display completely different biological properties. In recent years, an increasing interest in rigid sp³-hybridized scaffolds has been observed in medicinal chemistry since they provide tridimensionality and well-defined exit vectors that give access to novel unexplored chemical space, leading to a higher success in drug discovery programs. Some polycyclic bridged skeletons have been identified as suitable saturated bioisosteres of aromatic rings which represent the common two-dimensional, flat moieties that are routinely employed in the drug discovery process. The replacement of phenyl rings with their bioisosteres can lead to a modulation of the biological and physicochemical properties of the drug, increasing its potency and metabolic stability. Indeed, this became a common strategy to improve the efficacy of a drug candidate, allowing also new opportunities for intellectual property. Nevertheless, the asymmetric synthesis of phenyl bioisosteres is still an unmet challenge in synthetic chemistry and the development of tools that allow the construction of these building blocks in a stereocontrolled manner would be highly desirable. Thus, my independent research line is aimed at providing novel enantioselective strategies for the synthesis of phenyl bioisosteres, enabling unprecedented approaches to obtain sp³-hybridized drug analogues with improved properties. My initial efforts towards this goal have resulted in the first method to prepare enantioenriched ortho-phenyl bioisosteres. Building upon these results, I aim to extend the toolbox of enantioselective methods to prepare phenyl bioisosteres through different activation modes and catalytic strategies which rely on transition metal catalysis, photoredox catalysis and organocatalysis.

Resumen del Currículum Vitae:

I am an early career researcher (16 published works with 8 of them as the first author and 4 of them as the corresponding author; h-index: 10) with experience in different fields of organic chemistry (organic synthesis, asymmetric catalysis and photocatalysis). After completing my Bachelor and Master studies in Italy, with an internship in a pharmaceutical company and a semester in Poland, I had the great opportunity of conducting my PhD studies in a foreign country (Spain) under the supervision of Prof. Dr. José Alemán at the Organic Chemistry Department of the Autonomous University of Madrid. After obtaining my PhD (cum Laude) in 2020, I conducted a postdoctoral research period of 28 months in Prof. Dr. Thorsten Bach's research group at the Technical University of Munich (Germany). At the end of 2022, I joined the group of Prof. Dr. Mariola Tortosa at the Autonomous University of Madrid, where I was allowed to pursue new research ideas toward an independent research line that I am actually leading, focusing on the development of enantioselective strategies for the preparation of novel phenyl bioisosteres. Besides the research achievements (showcased by the publication of them in high-impact multidisciplinary journals such as Nat. Chem., J. Am. Chem. Soc., Angew. Chem. Int. Ed., ACS Catal., Chem. Sci., etc.) and many contributions in international conferences, I have received various competitive awards and fellowships such as: a Marie Skłodowska-Curie Postdoctoral Fellowship, a TUM University Foundation Postdoctoral Fellowship, and an award from the Autonomous University of Madrid for the best PhD thesis in Organic Chemistry of 2019/2020. Additionally, during the last years I could acquire teaching (157 hours) and leadership experience (official co-direction of 3 Master students and 2 PhD theses) and I served as an official reviewer of various scientific journals.



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Turno General

Área Temática: Derecho
Nombre: KUBICA, MARIA
Referencia: RYC2024-050419-I
Correo Electrónico: mariakubica787@gmail.com
Título: HACIA UN CONCEPTO UNIFORME DE RESPONSABILIDAD CIVIL BASADO EN EL RIESGO: RETOS DERIVADOS DE LA ERA DIGITAL

Resumen de la Memoria:

La candidata ha realizado su tesis doctoral sobre «Riesgo y Responsabilidad Objetiva» en el marco del Proyecto del Ministerio de Innovación y Ciencia español titulado « Principios of European Tort Law : más allá del Common Frame of Reference (CFR). Hacia una nueva etapa en el proceso de aproximación de Derecho de la responsabilidad civil en Europa» (FFI2008-00647), anteriormente 'Principles of European Tort Law': Principios, Práctica y Culturas Jurídicas en la Aproximación al Derecho de Daños» (SEJ2005-00907). El trabajo ha sido dirigido por el IP del proyecto mencionado, Prof. Dr. Miquel Martín Casals, Catedrático de Derecho Civil de la Universidad de Girona y miembro del European Group on Tort Law (EGTL). El objetivo de la investigación llevada a cabo por la candidata era analizar los fundamentos y el alcance práctico de la denominada «responsabilidad basada en el riesgo». Este análisis se llevó a cabo a través de la experiencia jurisprudencial española de los últimos cincuenta años y en relación con el marco jurídico europeo y comparado. Como contrapunto, la candidata examinó también la viabilidad y el alcance de una cláusula general de responsabilidad objetiva, cuya norma básica se ofrece en el artículo 5:101 de los Principios del Derecho europeo de la responsabilidad civil (PETL). La investigación abarcó no sólo la responsabilidad objetiva en el sentido estricto, sino también otros fundamentos de imputación, como culpa en versión pura o culpa con la inversión de la carga de la prueba, probando que el actual estado de Derecho demuestra que no existe una clara línea de demarcación entre la responsabilidad por culpa y la responsabilidad objetiva. La distinción entre una y otra es conveniente únicamente a efectos de clasificación y exposición. En consecuencia, no existen dos únicas alternativas: la responsabilidad objetiva y la responsabilidad por culpa, sino un conjunto de alternativas. Tal status quo podría describirse como un continuum que, en un polo, empieza con las reglas tradicionales de la responsabilidad por culpa, que se extienden a través de las mutaciones de ésta creadas por la jurisprudencia o expresamente establecidas por el legislador y reglas de la responsabilidad objetiva con variantes hacia la responsabilidad absoluta, que culmina este continuum en el otro polo. El elemento de peligrosidad juega en esta situación un papel central. De ahí que la peligrosidad de una actividad pueda revestir diferentes grados de intensidad y el fundamento de la responsabilidad correspondiente pueda variar en función de grado de esta peligrosidad. En los últimos años, la digitalización ha transformado profundamente numerosos aspectos de la sociedad, incluyendo el ámbito jurídico. En este contexto, por ejemplo, la UE ha emprendido un esfuerzo significativo para regular el desarrollo y la implementación de la IA con el objetivo de garantizar un equilibrio entre la innovación tecnológica y la protección de los derechos fundamentales. La propuesta de Regulación en materia de IA introduce un marco normativo pionero basado en un enfoque de riesgo, clasificando los sistemas de IA según su impacto potencial en la salud, la seguridad y los derechos fundamentales. Así, la UE opta por el enfoque generalista, adaptando el Derecho existente a la nueva realidad digital, oponiéndose al enfoque excepcionalista, cuyo objetivo es crear las reglas totalmente nuevas.

Resumen del Currículum Vitae:

MLK has made significant contributions to the scientific community, particularly in Torts, Digital and Comparative Law. Her research has advanced knowledge by generating results that have been shared through peer-reviewed publications, numerous conferences in Spain and abroad, and international collaborations (eg. within ELI's Special Interest Groups on Global Private Law and Digital Law). The impact of her research can be measured by received awards: the second prize of the Center for Financial Studies within Civil and Commercial Law and the Prize for the Promotion of Procedural Law of the Basque Institute of Procedural Law in the 6th edition of 2016. She has been distinguished with special mention in the Sancho Rebullida Award, 18th edition of 2016, for the best doctoral thesis in Civil Law and was a recipient of the YCC Scholarship Exchange Program of the American Society of Comparative Law in 2019. She has successfully secured competitive funding for her projects (eg. Jan Kochanowski Scholarship of Jagiellonian University, Cracow, FPI scholarship of the Spanish Ministry of Education and Science, AGAUR scholarship at Hamburg University, Postdoctoral Scholarship for Female Researchers of Passau University or DAAD Scholarship at Passau University) evidencing her ability to translate ideas into viable research initiatives. Her expertise spans extensive teaching experience in Spain, Poland, Germany and Chilly in Spanish and English as well as research activities, with responsibilities ranging from project leadership (eg. Principal Researcher in the European Project (Key Action 2- EC) "Careleavers: Accompanying Careleavers on a path of Autonomy, Resilience and Empowerment" or Member of the Advisory Committee for Global Partnership on Artificial Intelligence (GPAI) Project on Cogenerated Data, of European Law Institute and Global Partnership on Artificial Intelligence (GPAI), an integrated partnership that brings together OECD members and GPAI countries to advance an ambitious agenda for implementing human-centric, safe, secure and trustworthy artificial intelligence) to mentoring (numerous Master's and Bachelor's dissertations). She has been a key player in fostering global partnerships, working with researchers across Spain, US, Germany, Italy, Switzerland, Poland, Austria, Latin America, UK, and at the European level (through the membership in European Law Institute and its Council) demonstrating her leadership in multi-disciplinary and multi-institutional teams. She is a co-founder and vice-president of the Spanish Society of Comparative Law and a member of the ENIA Chair on Generative AI: Risks and Challenges, American Society of Comparative Law, Spanish Association of Civil Law Professors, Latin American Group on Tort Law, REDIJEA and WASET. Maria's work extends beyond academia, influencing technological advancements and innovation. Her collaborations with private companies, and public institutions (SAMU, O2, CLAVAR or Police Offices and Courts) have resulted in a valuable transfer of knowledge, technology and products (eg. VRIME patent) into the society. She has actively participated in disseminating scientific knowledge to broader audiences (eg. as a member and co-director of the legal clinic for vulnerable people of Loyola University). She is also in the editorial board of Transformacje Prawa Prywatnego and in REDS adv. council.



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Turno General

Área Temática: Tecnologías de la información y de las comunicaciones
Nombre: PACHECO SÁNCHEZ, ANÍBAL URIEL
Referencia: RYC2024-051113-I
Correo Electrónico: anibal.u.pacheco.s@gmail.com
Título: Investigador Pacheco-Sanchez: dispositivos nanoelectrónicos y circuitos emergentes para radiofrecuencia
Resumen de la Memoria:

The international research path of Dr. Pacheco started during his undergraduate studies in Mexico, where he obtained a research scholarship granted by the Texas A&M University, USA, to participate in a 6-month internship in 2007. He obtained a full scholarship for attending a 2-year master program in IPN, where he developed a thesis related to HF noise modeling of silicon-germanium Heterojunction Bipolar Transistors. He continued working as a research assistant and lecturer at IPN until he started his doctoral studies at the Chair for Electron Devices and Circuits (CEDIC), TUD, DE in 2012. The candidate has been involved in research projects funded by the European Union, Germany and Spain. During his time at TUD, in addition of being a Ph. D. candidate sponsored by a competitive 4-years Mexican scholarship, he was a Guest Researcher at the Center for Advanced Electronics Dresden (CFAED) with an involvement in 2 projects funded by the German government, where he collaborated in the following research tasks. He has participated in the development and implementation of the Verilog-A code in different electron design automation (EDA) tools of the first large-signal compact CNTFET model describing static and HF response of devices provided by the company RF Nano, USA, and by the academic partner Technische Universität Chemnitz (TUC), DE. Besides, he was in charge of providing model cards for these technologies, as well as in ensuring model convergence. The candidate also became the laboratory leader for advanced electrical measurements (HF and pulsed) of CNTFETs for CEDIC and its partners. Dr. Pacheco was also involved in the design of HF circuits based on CNTFETs. Dr. Pacheco was later hired as a Research Associate at TUD within the EU-funded TARANTO project to continue modeling and experimental research on CNTFETs towards their heterointegration into CMOS platforms. During his time as a postdoctoral researcher at UAB, Dr. Pacheco was involved in the EU-funded project Graphene Core 3 and in regional (RIS3CAT) and national Spanish (FronTHierz) projects, mainly working on the modeling and characterization of graphene- and other 2D-based FETs. At UAB, he contributed to the development, implementation in open-source EDA tools, maintenance and extension of the most complete accurate compact GFET model up to date.

The main project to be developed will be identified as Integrated circuits based on Microwave GRaphene devices at room- and cryogenic-Temperatures (IMIGRAT). Graphene field-effect transistors (GFETs) and metal-insulator-graphene diodes (MIGs) have emerged as attractive technologies for low-power HF applications mainly due to the advantageous properties (such as high carrier mobility, high velocity saturation and ambipolarity) of graphene as well as their versatile integration over different substrates. The long-term vision based on current European initiatives such as 2D EPL, Infrachip, among others, is the realization of graphene-based devices integrated in the same chip as other technologies, e.g., silicon-based CMOS. In this project, a heterogeneous integration of a wafer-level GFET and MIG technologies with an available mature Back-End-of-Line (BEOL). Work packages are WP1: device characterization at room and cryogenic temperature; WP2: device modeling at RT and cryo; WP3: microwave circuit design.

Resumen del Currículum Vitae:

Aníbal Pacheco-Sánchez (Mexico City, MX, 1984) received the Dr.-Ing. (Ph. D.) degree in Electrical and Computer Engineering from the Technische Universität Dresden (TUD), DE, in 2019 and the Master of Science degree in Telecommunications Engineering and bachelor degree in Electronics and Telecommunications from the Instituto Politécnico Nacional (IPN), MX, in 2011 and 2008, respectively. Between 04/2019 and 08/2024, Dr. Pacheco worked as a postdoctoral researcher at the NANOCOMP group in Universitat Autònoma de Barcelona (UAB), ES, under different projects including a Juan de la Cierva fellowship between 04/2022 and 03/2024 (FJC2020-046213-I). Since 09/2024 he works as a postdoctoral researcher at the PEARL group in Universidad de Granada (UGR), ES. He has been a guest researcher at the Center for Advancing Electronics Dresden, DE, between 2012 and 2017. He was a visiting researcher at IEMN, FR and UGR, ES, in May 2023 and September 2023, respectively. He is a guest researcher at IPN, MX since October 2022.

In his current role, Dr. Pacheco supervises master and doctoral students and he is the principal investigator of the GRAMMIC project within the INFRACHIP initiative, a collaboration between UGR and the company AMO GmbH, DE, towards the demonstration of heterogeneous chips of graphene devices and silicon technology for microwave applications. His present research interests involve advanced characterization, parameter extraction, compact and numerical modeling of emerging devices based on one-dimensional (1D) and two-dimensional (2D) materials for high-frequency (HF), energy-efficient and THz applications. He has conducted a productive research activity with a strong international involvement mainly on (i) electrical characterization of emerging and advanced transistor technologies, (ii) compact and numerical modeling and parameter extraction techniques of carbon nanotube (CNT) field-effect transistors (FETs), nanowire (NW) FETs and organic (O) FETs, (iii) compact modeling and parameter extraction of two-dimensional (2D) FETs and 2D-based nanoswitches, (iv) HF circuit design based on emerging transistors considering energy and chip area efficiency, (v) cryogenic HF performance of 2DFETs, and (vi) modeling of graphene-based diodes, resulting in 35 peer-reviewed journal papers, 23 conference papers and 20 invited talks