



AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2017

Turno de acceso general

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Título:

IMPACTO DEL CAMBIO GLOBAL EN LA DISTRIBUCION DE LA BIODIVERSIDAD

Resumen de la Memoria:

#RESEARCH CAREER

I completed my BSc in Biology (1999) and MSc and PhD in Ecology (2007) at the University of Murcia. I had postdoctoral contracts at Department of Ecological Modelling, UFZ (Germany), Estación Biológica de Doñana (Spain), and Arizona State University (USA), during which I acquired strong modelling skills and my research program turned international. In the USA I have successfully established myself as an independent researcher, and I hold a tenure track faculty position at the City University of New York. At present, I am PI of my own lab, with 8 students (2 PhD, 3 MSc, and 3 undergraduates), where I develop a research program on the impacts of global change on the distribution of biodiversity that is novel, current, global and based on strong collaborative networks. I have a productive publication record (39 JCR articles; h-index=17; 15 as 1st author, and 12 authored by students under my supervision) in top journals such as PNAS (2), Front Ecol Environ, Conserv Lett (2), Ecography (2) or J Ecol; an ample international mentoring experience (6 PhD, 9 MSc students from four different countries) and a successful funding record, with 13 competitive awarded projects (5 as PI, 8 as co-PI) for a total amount of >1.5M EU, most of them recently started.

#RESEARCH LINE

I am an ecologist interested in understanding the impacts of global change on the distribution of biodiversity and their associated ecosystem services, in order to inform conservation and environmental policies. The research I carry out is of maximum societal interest given the current biodiversity crisis. For that purpose, I use a multi-level approach from individuals to communities and biomes. Studying shifts in species distributions and community composition is at the core of my research. In order to understand the underlying processes I also develop studies at lower levels (demography, population genetics). My research has a strong quantitative component, particularly models, that are informed by both field and big data. My research is not taxa or geographically constrained, as I have been working on terrestrial (plant and animals) and marine and freshwater systems, in Europe-Asia, Africa and Asia. The main research lines that are carry out in my lab are: i) impact of past, present and future climate changes on the distribution of species and communities, ii) drivers of range expansions not related to climate change, with an emphasis on invasive species and the genetic signal of range expansions, and iii) community assembling along large natural and anthropogenic environmental gradients.

#MAJOR CONTRIBUTIONS

1. Impact of climate change on the distribution, transition areas and stability of major biomes.
Anadón et al. 2014. *Journal of Ecology* 102:1363-1373.
2. Impact of global change processes on key ecosystem services.
Anadón et al. 2014. *Proceedings of the National Academy of Sciences USA* 111: 12948-12953.
3. Drivers of establishment success and spread rate in biological invasions
Abellán et al 2017. *Proceedings of the National Academy of Sciences USA* 114: 9385-9390. [senior author]
4. Individualistic responses of species to climate changes.
Anadón et al. 2015. *Ecography* 38: 956-966.
5. Use of Local Ecological Knowledge to estimate animal abundance.
Anadón et al. 2009. *Conservation Biology* 23: 617-625.

Resumen del Currículum Vitae:

Bs in Biology (1999) and MSc and PhD in Ecology (2007) by the University of Murcia. I had 4 postdoctoral contracts/stays at UFZ (Germany, 2008-2010), EBD (Spain, 2011), and Arizona State University (USA, 2011-2014). Since 2014 I hold a tenure-track faculty position at City University of New York (USA) where I am PI of my lab researching the impact of global change on the distribution of biodiversity. I have published 52 peer-reviewed articles, 38 of them in SCI journals, including top-ranked journals as PNAS (2; one a first author and other as senior author), Front Ecol Environ, Conserv Lett (2), Conserv Biol, Ecography (2), and J Biogeogr. Out of these 38 articles, I am first author in 14, second in 7, and 12 are first-authored by students under my supervision or I am senior author. My works has been cited 873 times, h-index=17. In addition, I have published 6 book chapters and made >60 contributions to conferences and >10 to workshops. I have disseminated my scientific work in 12 popular sciences articles, 1 popular science book, and 19 technical reports for conservation and environmental agencies. I have participated in 13 national (USA or Spain) and international research projects (5 as PI, 8 as co-PI) funded by USA and Spanish research agencies for a total amount of >1.5M EU. This includes recently started international projects funded by CICYT



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(245.000EU, 2015-2019) and USAID (749.000 EU, 2015-2019) where I am co-PI and have a very active role in their conception and development. I have a wide teaching experience (>500 hr), mostly in the USA for both graduate and undergraduate students, and I have mentored 6 PhD students (2 completed, 4 in progress) and 9 MSc students (6 completed, 3 in progress) from 4 countries (USA, Spain, Mexico and Nepal). I have an extensive multidisciplinary, international and long-lasting collaboration networks, as I have co-authored with 84 scientists from 15 countries and >35 institutions. I have served as reviewer of >70 scientific articles, including PNAS, PLOS Biology, J Biogeogr, J Anim Ecol, Ecography and served in grant panels of NASA, Israel Ministry of Science and Alaska Sea Grant.



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Título:

Spatial ecology of seabirds

Resumen de la Memoria:

My overall field of research covers the spatial ecology of highly mobile vertebrates. This research focusses on ecology, behaviour and conservation of marine top predators, with an especial interest in the ecological role of large and medium-sized seabirds in marine ecosystems. The scientific work I have performed throughout a ten-year research period can be divided into six major axes that structure my scientific career:

- A) studying migratory affairs using intrinsic biogeochemical markers,
- B) assessing the role played by avian feeding habits in the environmental health,
- C) understanding seabird movements and spatiotemporal impacts of human activities at sea,
- D) unravelling the biogeography of seabird taxa from a poorly studied habitat (the pelagic ecosystem),
- E) studying the evolutionary ecology of the maternal antibody transfer (immuno-ecology) in colonial bird species,
- F) and more recently, understanding seasonal interactions in migratory seabirds (influences of carryover effects).

During my PhD thesis, I mainly focussed on the ecological application of intrinsic biogeochemical markers (trace elements and stable isotope analysis) on various fields such as the trophic ecology of seabirds and their long-distance migrations. During five postdoctoral stages, I went on studying the biogeography of several species of seabirds from a poorly studied habitat (the pelagic ecosystem) and how the environment, human activities and long-distance movements affect population dynamics of those seabirds. The knowledge and the numerous technical skills I have acquired throughout these studies have led me into the present question of how individual fitness influences the migratory decisions taken by long-distance migrants (i.e., seasonal impacts of carryover effects). My research has been always interdisciplinary (merging ecology, behaviour, physiology, evolution, biogeochemistry, demography, immunology), and necessarily, highly collaborative.

Resumen del Currículum Vitae:

- Publications, I have published 25 articles in SCI-ranked journals (80% in the first quartile of their area), 18 of them as the first (and corresponding) author. Four publications in popular-science journals. As summary statistics, Google Scholar reports 656 citations and an H-index of 15 (excluding self-citations).
- International Experience, it includes 5 years abroad in three post-doctoral stays: two years at IOZ-CAS (Beijing, China), one year at ISPA (Lisbon, Portugal) and two years at CEFECNRS (Montpellier, France). I am currently conducting a four-year postdoc at the University of Barcelona (IRBio-UB, Spain).
- Research Funding, I have recently led one research project (Marie Curie-CIG project) and Principal Investigator, and participated in 17 more. I have gathered personal funding from various national and international research agencies (AGAUR, MECD, MINECO, FB and European Commission).
- Communicating Research, I have presented my work in >30 national and international conferences, of those 8 oral contributions as first author. I have organized two international conferences (31WSM & IAPC6).
- Training, I have supervised 7 Master theses, and I am currently supervising 2 Master theses and co-supervising 3 PhD theses at the UB.
- Collaborations, I have a wide international research network of collaborators. I have co-authored with >70 researchers from 10 countries and 35 different research institutions.



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Nombre: FERNANDEZ GARCIA, ROSA MARIA
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Título:

A PHYLOGENOMIC APPROACH TO THE METAZOA TREE OF LIFE

Resumen de la Memoria:

I would define myself as a zoologist interested in how animal biodiversity has taken its shape through space and time. For that, I follow an innovative multidisciplinary and integrative approach that is driven by the convergence of both traditional and state-of-the-art techniques applied to different fields of the biological sciences such as systematics, biogeography, phylogenetics and genomics. During my postdoctoral period at Harvard University (2012-2016) and at CRG (2017), I have learnt, optimized and applied new techniques to answer a broad range of biological questions in the context of animal evolution including biodiversity assessments, species descriptions, phylogeographical patterns, population genetics and phylogenomics. This is reflected in my publication record of 43 papers, by ongoing collaborations with more than 10 institutions from several countries, by the participation in 12 international conferences, and by the ability to get funding for my projects (approx. 75,000€ raised as a PI, and ca. 1M € considering all projects where I participated), as well as to get funding for my salary (the fellowships I was granted include Caja Madrid Foundation, Ramón Areces Foundation, Beatriú de Pinós, Juan de la Cierva and Marie Skłodowska-Curie, among others).

A growing interest in evolutionary biology is the application of genomics and transcriptomics to unravel the tree of life. During the last years, this topic has become central in my research. Currently, I lead a productive line of research focused on illuminating the Animal Tree of Life, being leading and corresponding author in multiple manuscripts on this topic. Being aware of the potential of such tools, my second line of research involves the application of these techniques to study genome evolution and comparative genomics in animals. I am particularly interested in using this approach for shedding light on the genetic basis of evolutionary novelties across the Animal Tree of Life (i.e., what is the evolutionary origin of the ecdysis machinery in Ecdysozoa? Did the neural system of Ctenophora evolved de novo? What is the role of horizontal gene transfer and gene duplication in these processes?), and how we can translate this knowledge into benefits for health and value for society.

Resumen del Currículum Vitae:

Summary of the scientific merits of the applicant

Academic merits:

- 43 scientific publications in peer-reviewed journals, including Nature Scientific Reports, Current Biology, Molecular Biology and Evolution or Systematic Biology. First/last author and corresponding author in 40% of them.
- Adjunct Research Associate, Museum of Comparative Zoology, Harvard University (2017-ongoing).
- Invited Plenary Speaker at 2 international conferences.
- Participation in 12 scientific conferences.
- Session chair and symposium organizer in several international meetings.
- Invited speaker at more than 10 scientific institutions, including the Broad Institute of Harvard and MIT, the University of Cambridge and Harvard University, among others.
- H-index: 14. i10-index: 24.

Grants and Fellowships:

- Principal Investigator in 6 projects (4 international and 2 national), obtaining approx. 75,000€ of funding.
- Participant in 12 national and international projects.
- Recipient of several grants and awards (including Caja Madrid Fellowship, Ramón Areces Postdoctoral Fellowship, Juan de la Cierva-incorporación, Beatriú de Pinós and Marie Skłodowska-Curie Fellowship, among others).

Administrative and Evaluation R&D merits:

- Coordinator of the Museum of Comparative Zoology Lunch Seminar series, Harvard University (2016).



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- Organizing Committee member for the XXXVII Willi Hennig Society meeting (Barcelona, 16-20 September 2018) and the 17th Center for Genomic Regulation Symposium (Barcelona, 27-28 September 2018).
- Evaluator of scientific projects for the National Agency of Research and Innovation of Uruguay, the Chilean Antarctic Institute and the National Center of Science and Technology Evaluation, Kazakhstan.
- PhD Committee member of one PhD thesis.
- Reviewer for 21 scientific journals (Molecular Biology and Evolution, BMC Genomics, Frontiers in Ecology and Evolution, etc.).

Teaching, Mentoring and Outreach activities:

- Advisor of 4 senior theses (Harvard University, Boston University and Complutense University), 2 master thesis (Complutense University), and one PhD thesis (Complutense University, recently defended with *suma cum laude*).
- Certificate of Undergraduate Mentoring in Life Sciences, Harvard University (2015).
- Organizer and Instructor in the Course on Principles of Phylogenomics, Buenos Aires, Argentina (2016).
- Instructor in the I Workshop on Phylogenomics, Czech Republic (Evomics, 2017).
- Teaching experience at Universidad Complutense de Madrid (2009-2011) and Universidad Pompeu Fabra (intensive practical course, 2017).
- Mentor of graduate and undergraduate students in the Harvard Association of Women in Science (USA)(2012-2016), and in the International Mentoring Foundation for the Advancement of Higher Education, IMFAHE, Spain (2014-2015).
- Outreach Coordinator in Life Sciences, IMFAHE (2015-ongoing).

Other merits:

- Visiting Scientist at several international institutions in Switzerland and Germany.
- Organizer and Leader of field expeditions to several European countries, USA, New Zealand and New Caledonia.
- Ongoing collaborations with over 20 scientists from more than 10 scientific institutions, including prestigious ones such as Harvard University (Massachusetts, USA), The Natural History Museum (London) and the George Washington University (Washington DC, USA).



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Título:

EVOLUTIONARY DYNAMICS OF PLANT GENOME SIZE IN LAND PLANTS: CAUSES AND CONSEQUENCES

Resumen de la Memoria:

My main scientific interest since I finished my PhD at the University of Barcelona and joined the Royal Botanic Gardens, Kew (RBG Kew) in United Kingdom as a Postdoctoral Researcher for five years in January 2010, and subsequently as a Research Leader since April 2015 has been plant genome evolution. More specifically, I am interested in using comparative research to uncover the extent of genome size diversity across land plants, the mechanisms underpinning this astonishing diversity and its biological, ecological and evolutionary significance. My passion and commitment to evolutionary biology research has only strengthened over time, which is illustrated by many of the key achievements reached during my career as a researcher. In summary, after all these years I have been awarded eight grants or fellowships for research projects, and I have collaborated in ten research projects (one of them as principal investigator). In relation to my scientific productivity, I have published in total 67 papers, 50 publications included in SCI journals and 17 publications in non-SCI journals. Of the papers published in SCI journals, 22 papers have been published in journals of the top quartile category, and I have been the lead/last/corresponding author of 18 papers. My publications have attracted a good number of citations [Google Scholar: 1259 citations, h-index: 20; Web of knowledge: 713 citations, h-index: 15]. Furthermore, I have contributed to 57 presentations in scientific international conferences (9 as invited speaker).

There are three main areas in which I have proven expertise and a relevant number of peer-reviewed publications, which are pivotal to the development of my research: molecular cytogenetics, plant genome size and genome evolutionary dynamics. These three disciplines are complementary and have provided unparalleled opportunities for me to apply model-based approaches to reconstruct, infer and trace the mode and tempo of genome size and chromosome evolution in land plants across several lineages, leading to important achievements and publications, such as for example the discovery of the largest eukaryotic genome so far reported in the monocot lily *Paris japonica* (223 citations according to Google Scholar), which received international media coverage at the time of publication. My continuously growing network of collaborators at RBG Kew and with partner institutions (both within the UK and abroad) have allowed me to deliver critical understanding of the evolutionary dynamics of genome obesity in non-model groups such as Liliales, and more recently to secure funds as principal investigator in a project aimed at better understanding of the evolutionary processes shaping the distribution of alpine Asteraceae. I have also participated in the supervision and training of visitors, predoctoral (MSc and PhD students) and postdoctoral researchers, and have been involved in teaching (Pharmacy Degree, MSc in Plant Taxonomy and Horticulture Diploma). I have contributed to a number of outreach activities, specially at the RBG Kew (Kew Science Blogs, Summer Science Festivals).

Resumen del Currículum Vitae:

I am interested in using comparative research to uncover the extent of genome size diversity in plants, the mechanisms underpinning this huge diversity and its biological and evolutionary significance. There are three main research approaches, which are pivotal to the development of my research: molecular cytogenetics, plant genome size and evolutionary dynamics of repetitive DNA. **SCIENTIFIC PRODUCTION:** As a summary of my scientific production, after all these years I have been awarded eight competitive grants and fellowships for research (including pre- and post-doctoral programmes), I have collaborated in ten competitive research projects, one of them as a principal investigator (PI). I have published 67 papers, 50 publications in SCI journals and 17 publications in non SCI journals. Of the papers published in SCI journals, 22 are published in journals ranked within the first quartile [Q1 top 25%, 5 of them in the top 10% (e.g. *New Phytologist*, *Trends in Plant Science*)], 17 papers are published in journals within the second quartile (Q2) and 11 in journals of Q3 and Q4. Concerning the number of citations, according to the Web of Science, I have received a total of 713 cites (h index 15), and according to Google Scholar I have received a total of 1359 cites (h index 20). In relation to the number of conferences and seminars attended, I have contributed to 57 conferences, 31 of which are oral communications (9 as speaker), including invited and plenary talks. I have also presented 26 posters in conferences and symposiums (8 first/corresponding author). Some of my scientific achievements have had relatively high impact and have received a wide media coverage including specialized scientific media, but also being featured in wide audience newspapers. For example, the publication of the largest eukaryotic genome found in *Paris japonica* was featured in *Science* (<http://www.sciencemag.org/news/2010/10/scienceshot-biggest-genome-ever>), but also in many other resources reaching to a wide diversity of readers (<http://www.telegraph.co.uk/news/science/science-news/8196572/Worlds-largest-genome-belongs-to-slow-growing-mountain-flower.html>). This paper was published in the *Botanical Journal of the Linnean Society* and so far has received a significant amount of citations: 128/223 (Web of Science/Google Scholar). **EXPERIENCE OF SUPERVISION AND TEACHING:** Since I started my postdoctoral career in 2010 I have had the opportunity to demonstrate and apply my skills by conducting original research as well as training and supervising visitors, staff and students in different disciplines of cytogenetics, including karyology techniques for chromosome work, molecular cytogenetics (fluorochrome banding and FISH), flow cytometry (for both genome size and population cytotype analysis)



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and the use of high throughput sequencing technologies (NGS - Illumina HiSeq). I have also been invited to be a member of PhD panels (acting as internal and external examiner at the University of Barcelona, University of Zaragoza and University of Free State, South Africa). In addition, I have been asked to review grant applications for several research organizations (e.g. Czech Science Foundation, German Research Foundation), and more regularly, for a wide range of SCI journals. I have given lectures for the range of venues including MSc courses in Plant Taxonomy (QMUL/RBGK), Degree in Pharmacy (UB), Horticulture Diploma (RBGK) and NERC-supported Applied Taxonomy Courses (RBGK).



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Título:

A mechanistic understanding of species coexistence and ecosystem functioning

Resumen de la Memoria:

I am a community ecologist interested in answering two basic questions in ecology: 1) what are the determinants of species coexistence at local and regional scales? 2) what are the consequences for ecosystem functioning of different ecological assemblages? Approaches to answer these questions are always motivated by ecological theory and include a combination of field observations, lab experiments, and existing databases with a diverse range of modeling techniques. Studied systems cover a wide diversity of environments such as annual grasslands, and Mediterranean and Temperate forests.

During my PhD, I explored these questions from the side of invasion biology, more particularly, investigating the effects of functional traits and phenotypic plasticity on promoting success of exotic plant species over natives under Mediterranean climate conditions, and the consequences of plant invasion for nutrient cycling. For this research, I focused in the five Mediterranean-type regions of the world because of their climate complexity, contrasted evolutionary histories, and different degree of human impact. Results obtained arose from combining greenhouse experiments under a robust phylogenetic comparative design and compilation of existing information with modeling techniques such as structural equation modeling, statistical analysis of circular data, and meta-analyses.

Later, during my postdoctoral period at University of California-Santa Barbara, I used recent advances in coexistence theory to understand the side of the maintenance of species diversity. I developed a mathematical toolbox coupling plant population dynamics to the determinants of competitive outcomes (niche and fitness diff.), and applied this toolbox to understand the role of phylogenetic relatedness and functional traits in promoting species diversity. From detailed experiments, I moved to understand tree diversity maintenance at larger scales (North American forests) by collaborating with researchers from University of California-Irvine using maximum likelihood and comparative biology techniques.

Since I came back to Spain, I am performing research in parallel on invasion biology and on diversity maintenance, as they are two sides of the same coin, thus, I can apply the same ecological principles. From the invaders side, I am investigating at local scales the combined effect of climate change and invasive species on the ecosystem dynamics of mixed oak forests. At regional and global scales, I am participating in evaluating the effects of non-native tree species on multiple ecosystem services (regulating, provisioning, and cultural). From the diversity side, I am investigating species coexistence under competitive and plant-mutualism-antagonism networks, and the linkages between the mechanisms that maintain diversity and promote ecosystem functioning. This research was possible thanks to integrate ecological concepts from niche and network theories into a single framework and applying this novel framework to detailed experiments and field observations. Moreover, I am leading an international research initiative evaluating the effect of land use intensification on community assembly. My research interests for the near future are integrating theory on species coexistence with metabolic theory to understand how species interactions modulate energy fluxes across ecosystem.

Resumen del Currículum Vitae:

BSc degree in Environmental Sciences (2004) at University of Alcalá (Spain). In Nov 2009, I completed my PhD research with a FPI fellowship at CCMA-CSIC (Spain) with 4 stays abroad (The Netherlands, South Africa, Chile). My PhD thesis focused on the role of functional traits and phenotypic plasticity in promoting invasiveness of alien plant species. It was awarded as the best PhD thesis in Environmental Sciences during 2009/2010 at UAH, and I received the maximum academic distinction and the European PhD mention. After a six-month postdoc at University Rey Juan Carlos (Spain) funded by Remedial network, I was awarded with a Fulbright fellowship at University of California-Santa Barbara (USA) (Sep 2010-Aug 2012). There, I applied recent advances in coexistence theory to understand how functional and phylogenetic differences determine species coexistence using annual plants as a model system. From Sep 2012 to Dec 2013, I was hired by USCB as an associated researcher to include the effect of the temporal and spatial scales on my previous research. Meanwhile, I collaborated with researchers from University of California-Irvine (USA) to explore determinants of tree species coexistence in North American forests.

Since Jan 2014, I am a researcher at IRNAS-CSIC (Spain). I moved there thanks to a three-year postdoctoral contract (Juan de la Cierva Fellowship) to study the combined effects of climate change and invasive species on the dynamics of Mediterranean mixed oak forests. Later, I became a Marie Skłodowska-Curie fellow awarded by the European Research Program Horizon2020 (July 2016-June 2018) investigating the linkages between species coexistence and ecosystem functioning together with IPS researchers (Bern, Switzerland). Parallel to this research, I am a Core Group member of the COST action FP1403 (Sep 2014-Nov 2018), investigating management



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experiences, risk and opportunities of non-native tree species for European forests. I am also an external researcher in the Biodiversity-Exploratories (Germany) leading a project of the effect of land use intensification on diversity maintenance. As PI, I have been awarded by two ecological societies (AEET and BES) and as co-PI by MINECO (Explora program) to apply obtained theoretical knowledge on species coexistence to plant competitive and plant-mutualism-antagonism networks. I have also participated in 12 National and International research projects funded with competitive calls.

Overall, after finishing my PhD 9 years ago, I have authored 26 SCI papers in leading journals of multidisciplinary sciences, ecology and physical geography (Ecol. Lett. (4papers), PNAS (1), New Phytol (1), Glob. Ecol. Biog (2), Ecology (2), Funct. Ecol. (2). 2 papers highlighted in F1000 Prime (rated as "very good"). 81% published in Q1 journal, average impact factor 5.942, being first author in 13, second author in 5, and senior author in 3 of them). All my publications accumulate 2098 citations (h-index=16). I am currently supervising 2 PhD students. I have supervised 2 MSc (1 more ongoing) and 2 BSc theses (1 more ongoing). I am an Associated Editor at Functional Ecology since Feb 2017 (15 manuscripts handled) and I am now Guest Editor at Journal of Ecology (handling 12 manuscripts). I have reviewed 65 papers for 19 SCI-journals and for 4 international agencies. I actively participate in outreach activities.



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Título:

Effects of anthropogenic landscape changes on ecological processes, from genes to communities

Resumen de la Memoria:

I am an ecologist broadly interested in the effects of anthropogenic landscape changes on ecological processes, and their consequences for the maintenance of biodiversity and the provision of ecosystem services. My research particularly focuses on plant-animal interactions, which have a pivotal role on demographic and genetic processes within populations and communities. I work on real-world, large-scale landscapes by combining observational and experimental fieldwork, spatial analysis and molecular tools, to address questions that can be framed within landscape and spatial ecology, population ecology and genetics, community ecology, conservation biology, and applied ecology. This multidisciplinary research includes theoretical and applied perspectives, and provides sound knowledge on ecosystem functioning that is relevant for conservation. I have used a diverse array of organisms as study systems, including plants, birds, mammals, and insects. The focus of my research has progressively shifted from population ecology to community ecology, and from processes occurring within natural habitats to processes occurring through the landscape, across natural and anthropogenic habitats. Indeed, my primary intellectual motivation in the last years has been the understanding of ecological functions and ecosystem services provided by animals acting as "mobile-links", i.e. organisms that actively move in the landscape and connect ecological processes across habitats. I have recently coordinated a network of leading researchers from nine institutions to develop a EU project, in which I am the PI, in multiple landscapes from different European countries. We are now incorporating spatial information to the links and nodes of complex seed dispersal networks sampled at the landscape scale. This international research network ensures fruitful collaborative outcomes for the coming years. In my research production, I have targeted quality rather than quantity, prioritizing works of high conceptual novelty and generalization over specialized results. My contributions include original research, methodologies, synthesis, and opinion articles, and most of them are published in top journals.

Resumen del Currículum Vitae:

I got my degree in Biology (2003) at University of Granada (Granada, Spain) after one year of mobility at University of Santiago (Santiago de Compostela, Spain) thanks to a SENECA fellowship. I did my MSc (2007) and PhD (2010) in the Dept. of Plant Sciences and Ecology of the University of Seville (Seville, Spain), where I also got a part-time position as Assistant Teacher of Plant Biology between 2006 and 2008. I got a postdoctoral contract from 2011 to 2013 to work with Prof. Montserrat Vilà at the Doñana Biological Station@CSIC (Seville, Spain) in the EU project Status and Trends in European Pollinators. I got a postdoctoral Severo-Ochoa fellowship at the Doñana Biological Station@CSIC (Seville, Spain) to work from late 2013 to late 2015 with Prof. Pedro Jordano. In 2015 I was awarded with a Marie Skłodowska-Curie Fellowship to work with Prof. William J. Sutherland in the Dept. of Zoology at the University of Cambridge (Cambridge, UK).

My main achievements include:

- Two postdoctoral highly competitive fellowships ("Severo Ochoa" and "Marie Curie")
- Participation in 13 research projects (9 national and 4 international)
- PI in two projects, an EU project and a grant from the Linnean Society of London
- 29 peer-reviewed publications
- Papers in Science, TREE, Ecology Letters, PLoS Biology and Nature Ecol Evol
- First author in 66% of my papers (19)
- Most JCR papers (85%) in first-quartile journals
- More than half of my papers in journals with IF >#8805; 4
- More than 700 citations (h-index = 15; Google Scholar, 12 January 2018)
- First author in my three most-cited papers (140, 93 and 51 citations)
- My research outputs have been used in international policy documents (e.g. IPBES)
- 17 contributions in 12 international and 5 national conferences
- Invited plenary speaker in a national congress
- Speaker in several seminar series and international workshops
- Supervisor of four MSc theses
- Hosting researcher of a visiting PhD student
- Advisor of a PhD student ("Comité de Tesis at EBD-CSIC")
- Dissemination through several interviews for TV and radio programs
- Popular science publications in book chapters, blog posts, magazines and press releases



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- Collaborations with artists in Art & Science works and events
- Committee member in three PhD theses and four MSc theses
- Reviewer for >30 different SCI journals and different international funding agencies
- Organization of a congress and several symposia, workshops and seminars



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Título:

TOWARDS A QUANTITATIVE NEURO-ECOLOGY: Searching for principles of behavioral organization across species

Resumen de la Memoria:

I am a theoretical physicist by training who transitioned from pen-and-paper calculations of stochastic processes (PhD) to the study of animal behavior. First working on active-sensing in *Drosophila* larval chemotaxis (1st postdoc) and then studying self-paced actions in worms, flies and mice (2nd postdoc), this unique path has allowed me to integrate expertise in a wide range of organisms, with deep conceptual insights, experimental skills, and advanced computational techniques. I am also fluent with genetics, neural recordings, behavioral tracking, theoretical modeling, and "big data" analyses. In 2016 I started my own lab at the Instituto de Neurociencias de Alicante, where we search for principles of animal behavior across species, at the interface between fundamental mathematical theories and exquisite biological data.

The behavior of animals is not the behavior of their brains, but the processes emerging from the interaction between neural activity, body biomechanics and environmental constraints. Behavior is foundational, from ecology and evolution to neuroscience. This proposal aims to contribute to balance and strengthen computational, algorithmic and mechanistic levels of explanation in the study of animal behavior ("without Mendel there is no Watson & Crick"). We have identified four central, interrelated, and multi-scale problems in neuroecology: (1) behavioral variability, (2) behavioral organization, (3) behavioral evolution and (4) behavioral units. We propose to address them using, respectively, the theoretical notions of entropy production, hierarchical compressibility, behavioral homologies and pixel-kinematics similarity. We will articulate and experimentally test these ideas in suitably different animals species (worms, larvae, flies and rodents). We hope to contribute to the study of behavior with a triple long-term intention: (i) to uplift the relevance of animal behavior as a central phenomenon of its own right, thus more than a simple readout, across neuroscience, genetics and developmental biology, (ii) to increase the scarce role of normative quantitative theories in the study of animal behavior, and (iii) to merge abstract constructs with precise data, seeking for a unified understanding of animal behavior as a dynamical emergent process stemming from the brain-body-world triad. At the heart of our research is the quest to discover shared principles of behavioral organization across phyla.

Resumen del Currículum Vitae:

Young Group Leader at Instituto de Neurociencias de Alicante CSIC-UMH (since 2016).

PhD in Physics, Masters in Biophysics, Postdocs in Behavioural Neuroscience.

Publications: H-index: 16 (h10-index: 19, total citations: 861). Total peer-reviewed publications: 28 (22 as first author, 9 as corresponding author, 5 as middle author). Journals: *Neuron*, *Nature Neuroscience*, *Nature Communications*, *Nature Scientific Reports*, *eLIFE*, *Current Biology*, *Physical Review Letters*, *Current Opinion in Neurobiology*, *Neuroscience & Biobehavioral Reviews*. Book chapters: 5 (all corresponding, single author). Editor of 1 book (in press, Process Century Press). Divulcation articles: 5.

Highlights: 2017 *Neuron* paper on behaviour accumulates 76 citations in 11 months. It has been featured in 13 international (ie. *Scientific American*, *NY Magazine*, *The Atlantic*) & 5 national media. 2016 Royal Society paper featured in 10 national newspapers. Other articles also received media coverage (*eIPais*, *la Vanguardia*, *ScienceDaily*) plus editorial highlights (*eLIFE*, *Nature Neuroscience*).

Reviewer: *Nature Communications*, *Trends Ecology Evolution*, *PLoS Computational Biology*, *Frontiers Behavioural Neuroscience*, *Journal Visualised Experiments*, *Journal Statistical Mechanics*, *Physical Review Letters*.

Evaluator: Princeton University Press book reviewer, Henry Dale Fellowship WellcomeTrust, MINECO & Argentina FONCYT, PhD Evaluator (Denmark, Valencia, Barcelona).

Fellowships: PhD (FI & Spanish FPU fellowship), postdoc (Juan de la Cierva), postdoc (FCT Portugal), young investigator (SO & JIN MINECO).

Grants (as PI): start-up funds Severo Ochoa Excellence Program (100K€+1PhD+1tech), Jóvenes Investigadores JIN MINECO (169K€), RETOS (under evaluation, 90K€).

Mentor: current director of 2 PhD students, 1 postdoc, 2 master students, and 2 season-students (past alumni: 4).



AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2017

Turno de acceso general

Teacher: quantitative neuroEthology (Masters), mathematics (University), neuroCognition (University), computer vision (summerschool), data visualization, programming for biologists, behavior tracking, presentation skills (workshops).

Organizer: International symposia at FENS Berlin (2018), Measuring Behavior UK (2018), SENC Alicante (2017). Meetings: Unsolved Questions in Neuroscience (2018), Memory (2017), Circuits & Behavior (2016). Advanced Courses for PhD students (2013-2015).

Invited recent: BBVA Openmind (2017), FENS-ENCODS (2017), Princeton (2016), Janelia (2016). Total oral talks >30.

Mobility: PhD at UB + 2 long stays in UCSD and Stuttgart. Postdoc at CRG-EMBL + several stays at Janelia-USA. Postdoc at Champalimaud Lisbon + visiting scientist at Tel Aviv University & OIST Japan.

Active collaborations: Krakauer (Johns Hopkins), Mainen (Champalimaud), Brown (Imperial College), Stephens (OIST Japan), Lacquaniti (Rome), Flash, Golani, Benjamini (Tel Aviv), Ghazanfar (Princeton).

Outreach: radio interviews, BrainWeek, scientific cafés, divulgation articles.

Transdisciplinary: art-science residency at CCB Lisbon (9 months), specialist Vernadsky project, Propeller, The Beauty of Science exposition.

Open science: code (SourceForge, Github), data (Dryad), preprints (bioRxiv).

Awards: Outstanding Doctoral Thesis, Art of Neuroscience honorable mention, 1st Prize NeuroArt SENC, Paton Fellow preselection, CSHL & Lindau Nobel Meeting funded, EU Invest in Science finalist.



AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2017

Turno de acceso general

Nombre: CHRISTIE DE OLEZA, JOSEPH A.
Referencia: RYC-2017-22452
Área Científica: Biología Vegetal, Animal y Ecología
Correo Electrónico: j.christie-oleza@warwick.ac.uk

Título:

Marine Molecular Microbiology and Ecology

Resumen de la Memoria:

Dr Joseph Christie-Oleza (JC-O) is currently an Assistant Professor and Group Leader at the University of Warwick, UK. In 2015, this prestigious university (i.e. ranked within the ten best university of the UK and in the top 100 of the world \square position 57 according to QS) offered a position to JC-O based on his outstanding scientific trajectory. Throughout his career JC-O has been externally funded through competitively won fellowships (Areces Foundation Fellowship, IEF Marie Curie Research Fellowship and an ongoing NERC Independent Research Fellowship \sim £815k) demonstrating his ability not only to put forward original research ideas but also his capacity for managing his own research projects. JC-O has produced 24 peer-reviewed research publications (18 in scientific journals ranked in the top Q1 of their field, e.g. ISME, Molecular & Cellular Proteomics, Environmental Science & Technology or Environmental Microbiology, and one recently published in Nature Microbiology; 16 as first/last author), three book chapters and a patent as first author. As a pro-active group leader, JC-O has gained management skills through the development of his own vibrant research group, with nine PhD students (one recently completed; 7 as main supervisor), a research technician and a postdoc from his involvement in the Warwick Synthetic Biology centre (WISB; \sim £15M). During his two main international career moves (i.e. Spain to France and France to UK), JC-O has built new collaborations between his previous and receiving institute, and everything indicates that he will do the same during the tenure of the Ramon y Cajal. The multidisciplinary and collaborative nature of his work has pushed him to work closely with researchers from different fields (i.e. Synthetic Biology, Chemistry, Physics and Engineering), be part of a Spanish government funded project, lead a recently awarded international LINKS project (Newton Fund, \sim £335k), and be part of an international EU consortium preparing a bid for the H2020 call on marine plastic debris.

The research in his laboratory has two main lines of work in marine molecular ecology which he will continue to expand during the tenure of the Ramon y Cajal:

Research line 1: Marine microbial interactions \square pushing evolution towards extreme oligotrophy.

Research line 2: Microbial interactions with marine plastic debris \square the ultimate fate of plastic in the oceans.

Resumen del Currículum Vitae:

Joseph Alexander CHRISTIE-OLEZA

Gender: Male

Nationality: Spain

Date of birth: 12/09/1981

Born: Worcester, UK

Assistant Professor in Marine Molecular Microbiology

NERC Independent Research Fellow

University of Warwick, School of Life Sciences

Gibbet Hill Road, Coventry CV4 7AL

E-mail: j.christie-oleza@warwick.ac.uk

Website: <http://www2.warwick.ac.uk/christie-oleza>

Academic achievements

\square BSc in Biology (2004) and Biochemistry (2005), University of the Balearic Islands, Spain

\square MSc in Advanced Microbiology (2008), Environmental Microbiology and Biotechnology (2007), and Pedagogic Aptitude Course (2005), University of the Balearic Islands, Spain

\square PhD in Environmental Microbiology and Biotechnology: \square Genetic and physiological characterization of two ISL3-like insertion sequences in *Pseudomonas stutzeri* AN10 \square University of the Balearic Islands, Spain. (06/02/2009). Supervisors: Dr Bosch and Dr Nogales.

Summary of research positions

\square Assistant Professor. SLS, University of Warwick. 2015 \square

\square NERC Independent Research Fellow. SLS, University of Warwick. 2013 \square 2018



AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2017

Turno de acceso general

- IRF Marie Curie Research Fellow. SLS, University of Warwick. 2011-2013
- Ramon Areces Postdoctoral Research Fellow. CEA Marcoule, France. 2009-2011
- Postdoctoral Researcher. University of the Balearic Islands, Spain. 2009

Impact and R+D activities in the past 3 years

- Organising committee for the MMEG conference at the University of Warwick 2017
- Organising committee for The Chemistry and Biology of Natural Products Symposium XI at the University of Warwick 2017
- NERC's 50th Anniversary Ambassador 2015 - 2016
- Microbiology Seminar series at the University of Warwick. 2013 - 2017
- Aquatic Science Meeting (ASLO-2015). Organising / chairing session: Aquatic microbes in a drop of water: from single cells to community interactions. Granda, Spain. 2015

Research projects

- Newton Institutional Links Grant (British Council, UK): Sustainable management of keratin biomass in Egypt: a biotechnological approach to convert waste into feed (2018-2020). PI. £298,000
- SLS Pump Priming at the University of Warwick, UK: Important secondary metabolite produced by marine *Synechococcus* (2017). PI. £5,000
- CTM2015-70180-R Ministerio de Educación y Ciencia, Spain: Caracterización fisiológica y proteogenómica de degradadores eficaces de hidrocarburos aromáticos del linaje *Roseobacter* (2016-2018). Team member (PI: Dr Bosch). £157,000
- BB/M017982/1: Warwick Integrative Synthetic Biology Centre. Multidisciplinary Research Centres in Synthetic Biology (2015-2020). Co-I (PI: Professor McCarthy). £13,488,965
- NE/K009044/1: NERC Independent Research Fellowship. Eco-interactomics: From microbial interactions to the fate of dissolved organic matter in the oceans (2013-2018). PI. £719,081
- SLS Pump Priming at the University of Warwick: Defining the right pipeline for proper metaproteomics (2014). PI. £5,000
- PIEF-GA-2010-272593: FP7 Marie Curie Actions. Do *Synechococcus* regulatory networks underpin marine ecological distinctness? (2011-2013). Fellowship. £209,593.

Patents and intellectual properties

- Christie-Oleza J.A.; Brunet, I.; Lalucat, J.; Nogales, B.; Bosch, R. University Balearic Islands. Minitransposon miniUIB and its derived uses. Pub. No.: WO/2013/167784. International Application No.: PCT/ES2013/070294. 2013.

Publications and conferences (see full CVN)



AYUDAS RAMÓN Y CAJAL CONVOCATORIA 2017

Turno de acceso general

Nombre: SANZ AGUILAR, ANA
Referencia: RYC-2017-22796
Área Científica: Biología Vegetal, Animal y Ecología
Correo Electrónico: ana.sanzaguilar@gmail.com

Título:

Demography and population dynamics of endangered and invasive species □ methodological advances and novel applications

Resumen de la Memoria:

I am interested in a broad range of scientific questions dealing with animal ecology. My research trajectory focuses on theoretical and applied aspects of demography, population ecology and animal behavior with specific emphasis on conservation biology. I combine the study of individuals, populations and communities at marine as well as terrestrial ecosystems. This involves the study of multiple animal species (e.g. insects, reptiles, mammals, raptors, seabirds, waterbirds, storks, passerines and parrots) in collaboration with numerous national and international research groups.

Individual-based data provide detailed information to study life-history tactics, identifying population threats and predict future population trajectories. However, obtaining parameter estimates from individual-based data from wild populations poses statistical and mathematical challenges. Part of my theoretical research focuses on methodological advances in numerical ecology, such as the development of novel capture-recapture models. By combining complex statistical analyses and long-term high quality data (including my own research program on storm petrels, 2003-2018) I have studied the contribution of individual traits (age, sex, experience, behaviour, etc) on demography, population dynamics and evolutionary tradeoffs of long-lived species.

Finally, considering the current threats to biodiversity resulting from global changes (e.g. climatic factors, biotic relations and socio-economic activities), my research aims to understand how environmental factors and human activities affect the population dynamics and viability of endangered and invasive species. For example, I investigate individuals, populations and species traits contributing to successful invasions and which are the key processes governing biological invasions. In relation with vulnerable species, I study the role of present threats and of the future scenarios previsions on their future dynamics and conservation. These research lines are fundamentally applied and aim to devise optimal management strategies.

My research is highly multidisciplinary with a particular attention to the transference of knowledge between science and society.

Resumen del Currículum Vitae:

SCIENTIFIC INTERESTS AND NUMERICAL SKILLS: My research trajectory focusses on theoretical and applied aspects of animal ecology, demography and population dynamics with special emphasis on conservation biology. I lead a long term research program on seabirds since 2003. I have broad knowledge on advanced modelling of individual-based data (e.g., multi-event capture-recapture models, IB models, etc.) and Population Viability Analysis. Part of my research focuses on methodological advances in the field of animal demography and population dynamics, which I combine with studies on basic ecology (e.g., evolutionary trade-offs, individual strategies), animal behaviour and conservation biology (e.g., population viability of endangered species, evidence-based management and demography of invasive species).

HIGH QUALITY EDUCATION AND TRAINING: I have a MSc Degree in Environmental Sciences (2003). I obtained 4 research grants at the Miguel Hernández University (2003-2004). In 2005 I personally obtained a competitive FPU grant at IMEDEA CSIC-UIB and I finished my thesis in 2009 (4 years). In 2010 I won a IEF Marie Curie fellowship at CEFÉ-CNRS Montpellier (France). After two years I have been granted a Juan de la Cierva fellowship (2012-2015) to develop my research at the Estación Biológica de Doñana (CSIC). During the period 2015-2017 I was contracted as Scientific Researcher at the Miguel Hernández University and at IMEDEA CSIC-UIB. In 2017 personally obtained a competitive postdoctoral contract within the program Vicenç Mut- Govern de les Illes Balears.

RELEVANT ACTIVITIES AND OUTPUT: I have published 35 SCI articles with an average SCI impact factor of 3.57 (86% in the first quartile of their field: e.g., Ecology, J. Animal Ecology, J. Applied Ecology, Ecography, PRSL, MEE), of which I am first author in 18 (53%; being 17 ms. published in Q1 SCI journals) second in 5, and last author in 7. I have also published 6 non-SCI articles, 1 book chapter, 5 publications in Conferences Proceedings and 28 technical reports. I have participated in 15 research projects funded in competitive calls by public bodies (of which 4 as PI) and in 11 research contracts with administrations or private bodies (3 as PI). I have participated in 6 scientific advisory committees. I organized 1 congress and presented 21 oral contributions at international scientific meetings (9 invited) and 14 oral contributions at national meetings (10 invited), presented 6 posters and attended 14 workshops (contributing as teacher in 8). I have stayed a total of 30.5 months at foreign research centers. I have supervised 6 students (2MSc, 1 ongoing MSc, 1 ongoing PhD) and collaborated in the supervision of 3 additional PhD thesis. I have reviewed 47 SCI papers for 23 journals (e.g. Science, Ecology, Ecography, Methods in Ecology and Evolution).