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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno RYC-INIA-CCAA

Área Temática: **Ciencias agrarias y agroalimentarias**

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Título: AI and Photonic Sensing for Precision Agriculture

Resumen de la Memoria:

My research trajectory has been driven by the goal of advancing the digital transformation of agriculture through artificial intelligence, computer vision and photonic sensing technologies. I began my career investigating the use of photonic sensors for fruit detection and counting in field conditions. During my PhD, I demonstrated that LiDAR sensors could be used not only to reconstruct canopies but also to directly detect fruits by exploiting their radiometric reflectance. I later developed one of the earliest multimodal deep-learning architectures combining RGB, depth and infrared information for fruit detection, and introduced a LiDAR-based method assisted by forced air flow to temporarily reduce occlusions, which significantly improved detection accuracy. To avoid fruit double counting, I merged image-based detections with 3D photogrammetric reconstructions, creating a methodological framework that has since become widely cited.

In my first postdoctoral stage, I shifted from detection to fruit sizing. I proposed the first method to measure apples from structure-from-motion point clouds and introduced a visibility indicator to identify reliable measurements. I then developed a multitask neural network capable of simultaneously detecting and sizing fruits, reducing computational cost, and ultimately introduced amodal segmentation to recover full fruit shapes even when partially occluded. This contribution substantially improved sizing accuracy and strengthened collaborations with Wageningen University & Research.

During my research stay at WUR, I expanded into agricultural robotics within the H2020 TrimBot2020 project. I designed a photogrammetry-based evaluation pipeline that enabled the first quantitative assessment of robotic trimming performance in complex 3D plant geometries, initiating a new line of research on 3D perception within the host group.

More recently at IRTA, I extended my focus to satellite remote sensing to address the need for early crop type identification. I developed a methodology based on multi-year Sentinel-2 time series that provides crucial temporal context when early-season imagery is insufficient. This work received the Best Young Researcher Paper award at IEEE MetroAgriFor 2024 and has already been adopted by irrigation districts and public administrations to estimate water requirements during drought campaigns.

Alongside scientific production, I have progressively assumed leadership roles. I currently lead 5 competitive projects exceeding ?7.7M, including IRTA?s flagship AGROLABS DIGITALS initiative involving more than 120 members, and I coordinate the CONCAT Living Lab within the European ECOREADY network. I work closely with major agricultural cooperatives to validate prototypes in commercial orchards and contribute to IRTA?s digitalisation strategy.

A defining aspect of my trajectory is my commitment to open science. I have released 8 open datasets with more than 8,800 downloads, 16 open software tools, 5 Data in Brief and 2 SoftwareX papers, and created institutional GitHub organisations to support FAIR practices. These efforts were recognised with the Catalan Open Science Award, distinguishing me as a leading early-career researcher in this domain.

Resumen del Currículum Vitae:

I received the B.Sc. in Mechanical Engineering (Extraordinary & Final Project Awards, UdL, 2013), the M.Sc. in Industrial Engineering (Extraordinary & Final Project Awards, UdL, 2015), and the M.Sc. in Computer Vision (UAB, 2018). In 2020, I defended my PhD thesis, comprising 7 articles and honoured with the Special Doctoral Award. My scientific production includes 28 WoS papers (13 as first author, 1 as last author), 16 in Q1 journals, with 870 citations and an H-index of 15. The citation percentile median of my papers is 87% above journal impact factors, with 7 high-impact contributions (3 within the top 1%, 3 within the top 2% and 1 within the top 3% most cited in their category). My dissemination record includes 36 contributions?20 oral presentations, 5 posters and 8 invited talks?together with 1 international workshop organization, 2 IPC member and 2 Special Session Chair.

Beyond metrics, I have pioneered the integration of multimodal data from photonic sensors with AI to develop tools for fruit load and size estimation. More recently, I have focused on remote sensing and AI for early crop type classification, a work that received the Best Paper presented by a Young Researcher at IEEE MetroAgriFor 2024 and has already been transferred to irrigation districts and public administrations.

I systematically release data, code and tools following FAIR principles. I have published 8 open datasets (over 8,800 downloads), 5 Data in Brief articles, 2 SoftwareX papers and maintain 16 FAIR software repositories. I contributed to institutional open-science structures by initiating a public dataset portal, founding GitHub organisations and serving on IRTA?s Software Support Group. These sustained efforts were recognised with the Catalan Open Science Award (Joan Modolell category, ?15,000), distinguishing me as a leading early-career researcher in open science.

My trajectory has been shaped by 6 mobility periods, totalling 6 years away from my PhD institution: VIA University College (Denmark, 6 months), WUR (Netherlands, 9 months), UPC (Spain, 24 months) and IRTA (Spain, 32 months). I have co-authored papers with 21 international researchers from 11 institutions, hosted 3 visiting PhD students and contributed to the IEEE MetroAgriFor International Programme Committee (2024?2025), chairing two special sessions on AI and optical sensing.

In terms of leadership, I currently lead 5 competitive projects exceeding ?7.7M. I coordinate AGROLABS DIGITALS IRTA (~?7M), involving 122 members from 15 departments. I am PI of YIELD4CAST and lead the CONCAT Living Lab, as well as two applied projects on fruit sizing and photonic monitoring. I have contributed to 12 additional competitive projects (?2.45M).

Regarding training, I have supervised 1 BSc and 7 MSc theses (1 awarded Best MSc Thesis, UdL, 2023). I co-supervise 4 PhD students and will supervise 2 additional candidates starting in 2026. My teaching experience includes 163 hours at UdL (evaluation: 4.57/5). I hold ANECA?s Profesor Ayudante Doctor and AQU?s Professor Agregat accreditations and have served on two PhD committees and 14 hiring panels for data-science-related positions at IRTA.

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Área Temática: **Ciencias agrarias y agroalimentarias**

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Título: The orchards of the future: Temperate fruit production in a warmer world

Resumen de la Memoria:

Temperate fruit trees enter a dormancy state during winter to survive to low winter temperatures. To overcome dormancy, exposure to chill is necessary for a certain period. Each cultivar exhibits specific chilling requirements that condition phenology and yield. Despite the importance of this process, the biology underlying dormancy is barely described, making it difficult to predict the adaptability of cultivars to future warmer winters in a context of global warming. This research topic fascinated me from the beginning, and during my PhD, I tackled it in my search for a biological marker of chilling fulfillment. I used microscopy techniques to relate dormancy to flower development. One of the main findings was the starch turnover in the ovary cells during winter: starch accumulated concomitantly with the chilling accumulation, reaching a maximum in mid-winter, and then starch vanished until bud burst. This is one of the first biological processes linked to chill and heat accumulation for flowering. I am currently advancing this research line by analyzing a multi-environment experiment conducted at the University of Bonn, to closely relate a wide range of temperatures to starch dynamics and flowering.

During my postdoc at Bonn University, I complemented my skills on dormancy research working on phenology modelling. I learnt data analysis and modelling in R. I applied this knowledge to statistically analyze large phenology and temperature data sets to establish the chill and heat periods that influenced flowering time, to then estimated the agroclimatic requirements of cultivars. This methodology has allowed me to determine the chill and heat requirements of numerous sweet cherry, pear, and apricot cultivars. I have also developed skills in analyzing historical temperatures and climate projections based on General Circulation Models (GCMs) from the Intergovernmental Panel on Climate Change (IPCC). This work involves predicting the effects of global warming on winter chill accumulation and assessing how these metrics could impact orchard viability.

These projects directly apply the knowledge derived from my scientific career. The scientific expertise I bring can be categorized into three main areas: (i) empirical determination of the agroclimatic requirements of stone fruit cultivars, (ii) dormancy biomarker (male meiosis and starch in the ovary primordia) for determining the chill requirements, and (iii) adaptability of these cultivars to future prediction of the agroclimatic metrics in the regions. In summary, I am estimating the agroclimatic requirements of 91 cultivars of 5 stone fruits, and predicting the future agroclimatic metrics in four fruit production regions of Aragón.

Building on my scientific background, my final goal is the development of a process-based model, to predict phenology based on a physiological process linked to winter temperatures. This will mean a significant step forward in dormancy research since current models only based on temperatures present limitations when used out of the range of parametrization. A process- based model will overcome these limitations and will result an essential tool for producers and growers to adapt temperate fruit orchards to future conditions in a global warming context.

Resumen del Currículum Vitae:

My research career started with a predoctoral research grant (FPI) on Flower development and dormancy in sweet cherry at the Aula Dei Experimental Station (EEAD-CSIC), supervised by Prof. M. Herrero. I developed skills in histochemistry, microscopy, flower biology, and field experimentation on fruit trees, providing an innovative approach to dormancy. I analyzed histochemical changes within the flower primordia, linking starch dynamics with winter chill accumulation and establishing a biological basis of this process. After defending my PhD in 2015 with the highest qualification, I began a postdoc in the Centro de Investigación y Tecnología Agroalimentaria (CITA) with Dr. J. Rodrigo, where I conducted three transfer contracts with enterprises in the temperate fruit production sector of Aragón.

In 2018, I secured a position as a Research Associate at the Horticultural Department of the University of Bonn, working alongside Prof. Dr. E. Luedeling. These two and a half years in Germany marked a significant advancement in my research, as I shifted towards a modeling-based perspective on winter dormancy. I acquired proficiency in the R language and specialized packages for dormancy, skills that I used to analyze extensive phenology datasets of temperate fruit trees. Phenology modeling is data-intensive but only one flowering date per year can be recorded. To address this limitation, I conducted a two-year experiment exposing potted trees to diverse winter environments resulting in a wide variation in flowering dates, which allowed me to evaluate the impact of winter temperatures on flower phenology and biology. I taught several modules in the Master in Crop Science program and supervised a Bachelor s thesis.

In my current position at CITA Aragón, I have secured competitive funding through international and national projects, as well as contracts with enterprises and fruit producers. The international project Agroforestry Farms and Municipalities in the Pyrenees (PYRENAF) was recently funded by Interreg POCTEFA (2026 2029). As Principal Investigator of the CITA team, I will promote the agroecological transition and adaptation to climate change through the agroforestry in the Pyrenees. I am also leading the project FRUit Trees and Berries in TEruel: Opportunities for Climate Change Adaptation (FRUTEC, 2025-2027), funded by the Fondo de Inversiones de Teruel (FITE) in 2024, as well as 10 transfer contracts with enterprises. Together with the enterprises, we are characterizing nearly 100 cultivars of five stone fruit species and predicting their adaptation potential to the main production areas of Aragón. I have also been involved in an international PRIMA project (2021 2023) coordinated by Prof. Dr. E. Luedeling, as well as the ADAPFRUTCC project funded by the Biodiversity Foundation (2023 2025). I have supervised two master s theses and am currently supervising two PhD theses.

As a result of my scientific career, I have authored 25 WoS-indexed publications (18 as first or last author), which have received 707 citations in WoS, including three papers with more than 100 citations. My current h-index is 13 (WoS). I have contributed to 13 international and 12 national conferences, with 16 oral presentations and 8 proceeding papers. I have also published 6 outreach articles in specialized journals.

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Área Temática: **Ciencias agrarias y agroalimentarias**

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Título: Innovative strategies for Integrated Pest Management and agroecosystem resilience

Resumen de la Memoria:

As a passionate agroecologist, I am committed to advancing sustainable pest management solutions that address global change challenges and enhance agroecosystem resilience. My multidisciplinary expertise in ecology, agriculture, entomology, molecular biology, and artificial intelligence allows me to develop innovative approaches that deliver impactful results across the food industry.

My research trajectory has evolved through collaboration in diverse agricultural systems, including industry, fields, and greenhouses, enabling me to effectively integrate sustainability into smart farming practices. I adopt an integrative approach that combines experimental and observational studies with spatial analysis (GIS), omics, genetics, big data analysis, and quantitative modeling. My research spans a variety of organisms and crops (fruit, horticultural, and grain) in different systems (field, greenhouse, and storehouse) and at various scales, from local to global.

My primary goal is to embed sustainability into smart farming within the ecological intensification paradigm, balancing food production with biodiversity conservation. My long-term research agenda focuses on three key areas:

1. Impact of Global Change Drivers: I investigate how habitat loss and invasive species affect biodiversity and ecosystem functioning, with the aim of developing strategies to enhance agricultural resilience against environmental stressors.
2. Sustainable Pest Management Strategies: I examine natural service relationships, including predators, parasitoids, and pollinators, to promote ecosystem balance and optimize both biodiversity and food production.
3. Smart Farming: I leverage advanced technologies to improve pest detection and management techniques. By integrating tools such as metabarcoding and AI, my research enhances precision in pest control and fosters sustainable agricultural practices.

I prioritize mentorship and collaboration among multidisciplinary teams to cultivate the next generation of researchers. By focusing on holistic solutions that integrate smart farming technologies with sustainable practices, I consider multiple interacting factors such as meteorology, landscape, intensive management, natural services, and pest dynamics. My goal is to develop long-term strategies that enhance agroecosystem resilience and promote human health, aligning with global agricultural needs.

Resumen del Currículum Vitae:

I am a researcher committed to advancing sustainable pest management to strengthen agroecosystem resilience under global change. My work integrates ecology, entomology, bioinformatics, and biostatistics with cutting-edge tools such as omics, machine learning, GIS, and big data modeling to deliver science-based solutions that reduce pesticide reliance while maintaining productivity.

Over the past decade, I have built a multidisciplinary and international profile, contributing to 17+ projects across 8 laboratories in 5 countries. Supported by competitive grants (FPI-INIA, MITACS), my career spans over 3 years as a researcher, 3 years as a postdoc, and the completion of a PhD and two master's degrees. I am fluent in four languages and proficient in R and Python

My research takes a holistic approach, integrating climate, landscape dynamics, biodiversity, land management, and pest–natural enemy interactions. Recent work on Lygus lineolaris produced four SCI publications (+2 to be submitted/under review). I developed IPM strategies based on trap crops and natural enemies, examined pest behavior, diet-related fitness, and gut content using metabarcoding. Additionally, I selected genetic traits for biological control purposes, resulting in three SCI papers. Previous studies on stored-product pests led to four SCI articles on molecular detection, a parasitoid rearing and releasing device, and the study of key pest–parasitoid interactions. Ongoing work includes predator compatibility against Tetranychus urticae (one paper in preparation), ecological impacts of intensive agriculture (two papers in preparation), and predictive pest models across four projects.

I recently secured a tenured researcher position as Research Specialist at IRTA, where I lead project design, team building, and funding acquisition. Previously, I was PI of 8 projects and Co-PI in 2, managing multidisciplinary teams of 10+ people. I have secured over 1M CAD and managed nearly 2M CAD in research initiatives. Despite broad responsibilities, I have coauthored 12 SCI publications (6 as first author) in Q1 journals, with 376 citations. I have published four conference proceedings and four outreach articles, mentored 8 undergraduate and 2 master's students, and taught over 75 students as lecturer at UQAM. I have delivered 30 conference presentations (90% as first author), including 26 oral communications in 10 countries, earning two Best Communication awards and invited talks in China (2018) and Quebec (2022).

As an active community member, I serve as IPM expert for apples DO Girona and contribute to the Fruit Hub. I previously served on the Comité Scientifique de la Programmation de Recherche de Québec and remain engaged with entomological societies (SEEA, ESC, SEQ, ESA). My international collaborations foster a strong multidisciplinary network, paving the way for future joint initiatives. My long-term goal is to advance sustainable pest management as a Principal Investigator in Spain, delivering impactful solutions in close collaboration with the agricultural sector.

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Área Temática: **Ciencias agrarias y agroalimentarias**

Nombre: FANARI , FABIO

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Título: From Alternative Protein Ingredients to Structured Foods: Improving Functionality through Innovative Processing and Microstructural Modeling

Resumen de la Memoria:

My research trajectory began with a PhD and postdoctoral work focused on decoding the structure□property relationships in dough systems, bridging fundamental science and industrial application through advanced analyses. During this phase, I developed models to predict how formulation and processing conditions affect dough behavior. I also studied thermal transitions to explain water distribution and protein changes and introduced dielectric spectroscopy to reveal molecular relaxations in frozen dough, linking these to gluten strength. Later, I combined FTIR spectroscopy with statistical modeling to estimate dough performance from protein structures conformation, offering solutions to develop fast, non-invasive tools for quality control. These studies provided practical solutions for improving texture, reducing waste, and increasing quality in bakery processes.

Moving to IRTA, I shifted my research path toward sustainable food innovation, focusing on microalgae as new ingredients. I led research on drying technologies for Chlorella vulgaris, comparing conventional and novel methods such as pulse combustion and solar drying, and evaluated their impact on protein quality, functionality, and sustainability. I also worked on incorporating microalgae and alternative protein ingredients into foods, showing that they can improve nutrition while remaining compatible with industrial processing and consumer acceptance. These results marked a clear evolution from studying traditional systems to creating solutions for future food challenges. Currently, as a tenure-track researcher, I am the responsible researcher leading the research line on Food Structure and Functionality, focused on the field of alternative proteins.

Starting from my recent career evolution, the future research line builds on previous experience but takes a major step forward: moving from characterization to active design of structured foods based on alternative proteins. Unlike previous work focused on dough and microalgae, this new line will integrate advanced extraction, structuring, and texturization with predictive models and AI tools to create scalable and sustainable food systems. It will explore new protein sources such as legumes, fungi, and agro-industrial side streams, using innovative extraction methods like dry fractionation, membrane separation, and fermentation to improve functionality and reduce environmental impact. Functionalization will also be pursued by applying biotechnological and physical treatments to enhance solubility, emulsifying capacity, and gelling properties, supported by advanced analysis to link microstructure with performance. Pilot-scale trials, in-line monitoring, and AI-based optimization will ensure scalability and efficiency. Strong collaboration with industry will speed up technology transfer and align results with market needs.

By combining knowledge of structure□function relationships with digital tools and industrial partnerships, the proposed work will help turn alternative proteins into high-quality, widely accepted food products, supporting the goals of the EU Green Deal and the UN Sustainable Development Agenda.

Resumen del Currículum Vitae:

Fabio Fanari is a tenure-track researcher in the Safety and Functionality program at the Institute of Agrifood Research and Technology (IRTA). His research career combines expertise in chemical and food engineering with a strong focus on the relationship between food microstructure and texture, a topic he began exploring during his PhD at the University of Cagliari. His doctoral work focused on characterizing food products, particularly bread dough, using rheological, spectroscopic, and thermal techniques to link physical□mechanical properties with microstructural and textural parameters. After completing his PhD, he spent one year as a postdoctoral researcher at the same university, deepening his investigation into the correlation between infrared spectroscopy and rheological behavior in dough and other matrices, including food creams, sauces, and synthetic inks. He then joined IRTA for a two-year postdoctoral position, where he worked on the functionalization of alternative protein ingredients, mainly microalgae, and studied their incorporation into different food matrices. Currently, he leads the Food Structure and Functionality research line, developing novel food concepts using alternative protein sources such as microalgae, cereals, pulses, and fungi within the Protein.cat project. In this framework, he secured a national grant as co-principal investigator of the TEXTURISE project, aimed at studying food texturization processes and developing non-invasive control tools. He also participates in three European projects□ALLIANCE, LOCALITY, and GIANT LEAPS, focused on the extraction, characterization, and application of alternative proteins in food development. He has contributed to four completed projects, including the European PROFUTURE project, where he served as both researcher and project manager to valorize microalgae as protein sources for food and feed applications, and three Italian national projects aimed at optimizing processes and increasing automation in industrial bakery production. He has also been actively involved in preparing European proposals and regional proposals in partnership with food processing companies. His scientific output includes 28 publications, 19 as first author and one as corresponding and last author, with 14 papers in Q1 journals, a book chapter, and approximately 260 citations. He serves as a reviewer for SCI-indexed journals and has presented his work at numerous national and international conferences. In terms of academic activities, he has supervised two bachelor□s theses at the University of Girona and two master□s theses at the University of Cagliari, collaborated with PhD candidates and post-docs in several publications, and is expected to supervise three PhD theses starting in 2026. He has international experience through a ten-month research stay at the Institute for Chemical Technology and Polymer Chemistry (KIT) and has established collaborations with research groups such as Wageningen University Research, DIL e.V., MATIS OHF, ILVO, and GreenCoLab. Through European projects and contracts, he has also worked with companies including AlgoSource Technologies SAS, Necton SA, Allmicroalgae Natural Products SA, Enervit Srl, Liquats Vegetals SAU, Blauver Foods SL, Alver World SA, Algemy Ingredients SL, and Fruselva Global SA.

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Área Temática: **Ciencias agrarias y agroalimentarias**
Nombre: PATKO , DANIEL
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Título: Researcher

Resumen de la Memoria:

The research aims to enhance the productivity and sustainability of cropping systems by leveraging soil biological mechanisms. This involves developing enabling technologies, investigating scientific questions, and disseminating proven technologies to the agritech sector.

I. Development and Integration of Measurement Technologies

Micro and Nanofabrication: Miniaturizing experimental devices to reduce costs, increase detection limits, and enhance replication. Establishing a microfabrication pipeline using photolithography, wax printing, and 3D printing.

Sensors: Focusing on optical detection and developing electrochemical sensors to capture real-time biochemical changes. Integrating these sensors into microcosm or microfluidic devices for in situ analysis.

High-Throughput Screens: Adapting measurement technologies to experimental platforms to develop new fertilizers or breed resilient crops.

II. Identification of Key Biophysical Processes

Root Exudation: Analyzing real-time variations in rhizodeposits using electrochemical sensors and machine learning to understand how environmental conditions affect root exudation.

Microbial Movement and Colonization: Studying how soil structure affects the transport of rhizobacteria and the factors contributing to the switch from motile to biofilm-forming populations.

III. Dissemination of Technologies for Precision Agriculture

Testing on Neiker□s Experimental Platforms: Testing promising techniques in ongoing trials to increase data acquisition throughput and develop applications in other research areas.

Commercialization of Technologies: Continuing successful technologies for commercialization with funding from proof of concept and commercialization grants.

Resumen del Currículum Vitae:

My work focuses on engineering soil biosystems and studying plant-soil interactions. My career began in biomedical sciences, where I developed diagnostic sensors for the P3SENS project and sensing technologies for CREOPTIX. This experience provided valuable skills for agricultural sciences. I later worked on fundamental projects like SENSOIL, using new materials and optical methods to study root-microbe interactions and root exudation patterns.

My research is highly multidisciplinary, combining biological sciences (plant, soil sciences, microbiology, biochemistry) with physical sciences (microfabrication, optics, sensors) to develop instruments and methods. This has led to applications in soil and plant sciences, breeding, and environmental microbiology.

I have made significant contributions to biosystem engineering, such as developing sensors for detecting anomalies in biological samples and super-sensitive detection methods for small molecular and protein-protein interactions. I also developed double-sided tape-based microfluidics for flow-through sample analysis.

Recently, I applied my expertise to agricultural sciences, addressing key problems like fertilization, disease, stress, and climate change resistance. I designed growth chambers with fluidics for environmental microscopy of plants and contributed to the development of artificial soils with sensor particles. I created a Powel-lens based light sheet microscope to observe root-microbe interactions and developed a paper microfluidic system for studying root exudation patterns. Currently, I am working on a hybrid photopolymerization-pressure sensitive adhesive microfluidic system to study bacterial movement in soil pore spaces, which could lead to biofertilizers that boost crop drought resistance.

I have become an independent scientist, leading my own research projects and securing over □200k in grants. I have received fellowships and awards, supervised students, and presented my work at seminars and international conferences. I enjoy participating in science dissemination events and recently presented my work at the Science is Wonderful fair in Brussels.

There are great opportunities for my research line as agriculture moves towards precision agriculture, which relies on real-time data from sensors. My profile addresses the need for new measurement technologies in Agritech. With a Ramon y Cajal fellowship, I aim to develop a successful biosystem engineering group at NEIKER and grow the impact of my research through collaboration and external funding.

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Área Temática: **Ciencias agrarias y agroalimentarias**

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Título: Human-marine wildlife conflict. to what extant human activities may impact marine apex consumers foraging ecology and health status?

Resumen de la Memoria:

Ana María García Cegarra□s research focuses on the ecology, trophic dynamics, health, and conservation of marine megafauna□particularly cetaceans, seabirds, and other top predators□within the context of intense human pressures such as pollution, industrial activity, shipping, whale-watching, fisheries, and aquaculture. Her work integrates field ecology, biochemical and molecular tools, spatial modelling, and conservation management, with a strong emphasis on the Southeast Pacific and the Humboldt Current System.

A central line of her research addresses cetacean ecology and conservation. She investigates habitat use, population structure, seasonal patterns, social behavior, and predator□prey interactions of species such as fin whales, humpback whales, dusky dolphins, long-beaked common dolphins, Burmeister□s porpoises, and orcas. Her studies have contributed novel ecological observations, including the first documented cases of orca predation on dusky dolphins and other marine mammals in northern Chile. She employs diverse methodological approaches□boat- and land-based surveys, drone-based body-condition assessments, photo-identification, and biopsies□to evaluate the health, feeding ecology, and risk exposure of cetacean populations. A second major research line focuses on trophic ecology, stable isotopes, and contaminant dynamics. Through stable isotope analysis, heavy-metal and POP quantification, and molecular markers, she examines diet composition, trophic niche, and pollutant bioaccumulation in marine predators and seabirds. This work reveals how contaminants circulate through the marine food web and how industrialized coastal zones pose risks to wildlife and human communities. Her studies in heavily impacted bays of northern Chile have highlighted the combined threats of metal contamination, anthropogenic stressors, and reduced prey availability. She also leads research on human□wildlife interactions and conflict mitigation, addressing the impacts of vessel traffic, risk of ship collisions, whale-watching disturbance, fisheries bycatch, and habitat degradation.

Her work in Mejillones Bay, documenting collision risks for whales, directly contributed to the development of a voluntary maritime traffic separation scheme□one of the first mitigation measures of its kind in South America. She designs management recommendations that balance conservation needs with local economic activities. Another important line of her work focuses on baseline biodiversity monitoring in understudied regions. Through long-term surveys, citizen-science programs, and collaborations with NGOs, local communities, and universities, she documents species distribution, abundance, and ecological trends in the Atacama Desert coast, Rapa Nui, Patagonia, and Peru. This effort is crucial for assessing population trends and detecting changes associated with climate variability, industrial development, and fishing pressure.

Across all her research lines, the candidate integrates interdisciplinary methods that bridge field ecology, laboratory analysis, GIS-based spatial modelling, and advanced statistical approaches. Her work frequently informs conservation policy and contributes to the design of evidence-based management strategies for marine protected areas, industrial bays, and threatened species.

Resumen del Currículum Vitae:

Ana María García Cegarra is a marine scientist specializing in conservation, trophic ecology, ecotoxicology and human□wildlife interactions, with extensive experience in research on cetaceans, seabirds and marine predators across the Southeast Pacific, Patagonia, Antarctica, the Atacama Desert and Rapa Nui. She is currently an Assistant Professor at the Universidad de Antofagasta (Chile) and has previously held postdoctoral positions in Chile and Spain. Her academic background includes a PhD in Applied Sciences (Marine Coastal Systems) from Universidad de Antofagasta, a Master□s in Aquaculture and Fisheries Management, and a Bachelor□s in Marine Sciences from Universidad de Cádiz.

She has published 31 scientific articles, 29 in ISI journals, being first author in 15 and corresponding author in 17. Her work has received 507 citations, with an H-index of 13, and includes highly cited contributions on cetacean conservation, whale□ship collision risk, ecotoxicology, stable isotope ecology, and human impacts such as whale-watching disturbance and bycatch. She also authored a book chapter for the Spanish Ministry of Culture.

Her research integrates molecular methods, stable isotopes, heavy metal and POPs analyses, GIS tools for spatial risk modeling, and advanced statistical modelling (Bayesian inference, habitat models). In the field, she conducts boat- and land-based surveys, drone-based morphometry and body condition assessments, cetacean biopsies, and sampling of fish and zooplankton. She designs sampling schemes, leads data collection and analysis, manages interdisciplinary teams and publishes results independently.

She has secured competitive funding as Principal Investigator in 15 projects, including ANID FONDECYT Iniciación and Postdoctorado, INACH Antarctic projects, and international grants from Save Our Seas Foundation, The Rufford Foundation, PADI Foundation, Pacific Seabird Group, Porpoise Conservation Society, and National Geographic. One of her most impactful conservation achievements has been the creation of a maritime traffic separation scheme to reduce whale□ship collisions in Mejillones Bay, a pioneering initiative in South America highlighted in documentary films.

Ana María has built an extensive international network, collaborating with institutions such as the University of Brest (France), University of Murcia and Cádiz (Spain), Aarhus University (Denmark), University of Washington, Western Australia University, and multiple universities and NGOs across Chile, Peru, Ecuador and Rapa Nui. Her work contributes directly to marine conservation policy, sustainable aquaculture, mitigation of wildlife□human conflict and the protection of vulnerable species such as humpback whales, fin whales, Burmeister□s porpoises and Southern right whales.

MINISTERIO
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AYUDAS RAMÓN Y CAJAL – CONVOCATORIA 2025

Turno RYC-INIA-CCAA

Área Temática: **Ciencias agrarias y agroalimentarias**

Nombre: COLLADOS RODRIGUEZ, MILAGROS

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Título: Action Herpesvirus and Orthopoxvirus Research during Autophagy (AHORA)

Resumen de la Memoria:

My international scientific trajectory is marked by a strong publication record in molecular virology and plant biochemistry with articles in Nature and PLoS. I led pioneering research on plant autophagy thanks to my prestigious MSCA-ITN PhD in Warsaw (Poland). My career advanced by joining the Ebola Task Force at the renowned Institut Pasteur in Paris; here, I transferred my knowledge in molecular biology to drug discovery, leading the identification of novel antiviral molecules against Ebola virus. My achievements include first-author publications, presentations at international conferences, and the establishment of international collaborations. At the Medical Research Council-Centre for Virus Research-Glasgow University (MRC-CVR, UK), I led innate and intrinsic immunity research against multiple vertebrate viruses, and self-initiated projects in host defence to drive independent research initiatives as PI. Moreover, I contributed to the CVR response to Monkeypox virus (MPOX) by writing risk assessment, virus growth protocols, and supporting experimental workflows by testing novel antibodies. Combining my expertise molecular virology and drug development, I am PI of a new line of research funded by a highly competitive European MSCA-IF (Action 101146746) to restore DNases anti-viral potential aiming for a global herpesvirus cure. I want to expand my research by exploring the effects of Herpes- and Orthopox-viruses, such as herpes simplex 1 (HSV-1) and vaccinia (VACV), on approximately 40 core autophagy proteins to determine the autophagy requirements of these human viruses with Action Herpesvirus and Orthopoxvirus Research during Autophagy (AHORA). Studying a conserved core process as autophagy in different viral systems will facilitate cross-species findings as national preparedness for future pandemics and outbreaks. Autophagy has the potential to degrade external pathogens like viruses, identifying novel viral-host interactions can lead to future translational research that directly benefits patients by reducing disease burden and enhancing global quality of life. This innovative approach will represent a great contribution to multiple fields as it will evidence functions of autophagy proteins not described so far, and also shed light on uncharacterized processes during the viral cycle of large DNA viruses that replicate in different cell compartments (nucleus and cytoplasm respectively).

My expertise, scientific excellence and leadership is well-rounded by my commitment to mentorship and training, as demonstrated by my role as an Outstanding PhD Mentor at the University of Glasgow, where I have supervised 3 international master's students and 2 undergraduate students, while also contributing to the scientific training of younger students leading various educational initiatives. Additionally, I have organized and chaired the annual Glasgow Virology Workshop twice, receiving the Microbiology Society Supported Conference Grant, which highlights my leadership in scientific community engagement. I connect academia and society through outreach activities like scientific stands, Pint of Science and dissemination at conferences such as the International Herpesvirus Workshop. All of this has been recognized through the Synthego Genome Engineer Innovator Grant, the John Robertson Bequest, sustainability LEAF awards, and two MSCA programs.

Resumen del Currículum Vitae:

I am a highly skilled and versatile molecular biology researcher trained in European and UK laboratories through plant and mammalian cell culture research models, with a strong focus on preclinical research. My academic journey started in Biochemistry at the University of Valencia and acquired an international perspective with an Erasmus at the University of York (UK), followed by a Marie Curie-ITN PhD at IBB PAS (Warsaw, Poland) in plant selective autophagy cargo receptors. Supported by my expertise in virology, molecular biology techniques and IT skills, postdoctoral roles contributing to the Ebola task force at prestigious international institutions as the Institut Pasteur (Paris), Zika response at the École Normale Supérieure in Lyon (ENSL), the role of the ubiquitin system during viral infection and the MPOX response at the Medical Research council-Centre for Virus Research (MRC-CVR, University of Glasgow, UK) have enriched my CV.

My background in virology involves working and leading research with diverse viruses, resulting in numerous publications in prestigious journals such as Nature and PLoS Pathogens, as well as dissemination through poster and oral presentations in international conferences and workshops. I have secured funding from various sources and competitive projects (CSIC JAE-Intro investigation grants, grants from companies like USA based Synthego, the Microbiology society, Robertson bequest, and MSCA-IF), showcasing my ability to manage research within budget and leadership in executing original projects independently of my PI. I chaired the Work-life balance Athena Swan committee at the University of Glasgow (UofG), I have training and practical experience on communication and transversal skills, as well as commitment to sustainable research. In this line, I have received oral presentation and sustainability LEAF awards.

Dedicated to fostering the next generation of scientists, I mentored three PhD students, directed three official master's projects of international students, two undergraduate projects, and taught masters official subjects at the UofG (UK) and UMH (Spain) as designing research projects, intrinsic immunity, Biochemistry, virology, and journal club tutorials, accounting for 88 taught hours. My teaching expertise is well rounded by my commitment to mentorship at all academic levels, as I am recognized as an Outstanding PhD Mentor at the UofG.

My leadership in scientific community engagement extends to reviewing UKRI grants, organizing and chairing the annual Glasgow Virology Workshop in two occasions, where I also obtained the Microbiology Society Supported Conference Grant since I am a member of the Microbiology Society. My engagement and communication skills are further evident in outreach activities such as podcasts, Women in STEM videos, talks to the general public such as Pint of Science, and guiding 6-10 years old as well as teenagers in science-related outreach events at the UofG and UMH. I am also mother to two young children I manage and involved along with my international scientific career.

In summary, my diverse academic background, extensive research experience, commitment to education, technical expertise, and contributions to the scientific community define me as a well-rounded and accomplished researcher in virology and molecular biology, actively advancing science on multiple fronts.