UAB
Universitat Autònoma de Barcelona

Food Science

Name	e-mail	Doctoral Programme	Department/Institute	Research line of the Doctoral Pr.	Topic Description Proposal related to the Research Line
Pere Puigbò & Miho Nakamura	pere.puigbo@uab.cat	Food Science	Animal and Food Science Department	Food Safety	Impact of microplastics and nanoplastics in the human gut microbiota
Jordi Saldo	jordi.saldo@uab.cat	Food Science	Animal and Food Science Department	Food Processing and Control	Improving the functionality of alternative undervalued proteins by applying high-energy physical treatments and combining different protein sources (rice and pork spleen proteins). https://ja.cat/WaCZF
Bibiana Juan Godoy	bibiana.juan@uab.cat	Food Science	Animal and Food Science Department	Food Processing and Control	Explore strategies to improve the functionality of pea protein to those commonly consumed, using dynamic homogenization technologies (High-Pressure Homogenization, Microfluidization and Ultrasound). https://tuit.cat/qXdj2
Arturo B. Soro	arturo.soro@uab.cat	Food Science	Animal and Food Science Department	Food Processing and Control	Evaluating the application of novel technologies for improving the safety and techno-functionality of insect protein intended to human consumption https://tuit.cat/5sYWy

Animal Medicine and Health

Name	e-mail	Doctoral Programme	Department/Institute	Research line of the Doctoral Pr.	Topic Description Proposal related to the Research Line
Joaquim Segalés & Júlia Vergara-Alert	joaquim.segales@uab.cat / julia.vergara@irta.cat	Animal Medicine and Health	Dept. Sanitat i Anatomia Animals / Institut de Recerca i Tecnologia Agroalimentàries (IRTA-CReSA)	Sanitat Animal	Advancing Pandemic Preparedness through One Health research on Virus evolution using Organoids models (APROVO)

Animal Production

Name	e-mail	Doctoral Programme	Department/Institute	Research line of the Doctoral Pr.	Topic Description Proposal related to the Research Line
Susana Mª Martín-Orúe & Jaume Fatjó Rios	susana.martin@uab.cat Jaume.Fatjo@uab.cat	Animal Production	Departament de Ciencia Animal i dels Aliments	Companion Animal Nutrition	Understanding and Mitigating Chronic Stress in Urban Domestic Cats: Behavioral Identification, Stressor Classification, and Possible Probiotic Intervention. This research aims to investigate chronic stress in domestic cats living in Chinese urban households, focusing on behavioral identification, stressor classification, and gut–brain axis mechanisms. It seeks to develop a culturally adapted stress screening tool and explore non-pharmacological interventions, including probiotics, to alleviate stress-related behaviors and physiological responses. The study combines behavioral observation, owner questionnaires, and physiological sampling to build a three-dimensional assessment system integrating behavior, physiology, and human–pet relationships. By validating the "probiotic–gut–brain axis–behavior" hypothesis and creating practical intervention strategies, the project aspires to improve feline welfare and provide veterinarians with localized, evidence-based tools for early stress detection and management.
Marcelo Amills Eras	marcel.amills@uab.cat	Animal Production	Ciència Animal i dels Aliments	Molecular Genetics applied to Veterinary Medicine	Characterization of the transcriptomic landscape of multiple tissues in domestic goats through massive RNA sequencing

Aquaculture

Name	e-mail	Doctoral Programme	Department/Institute	Research line of the Doctoral Pr.	Topic Description Proposal related to the Research Line
Mariana Teles & Joan Carles Balasch & Irene Garcia	mariana.teles@uab.cat	Aquaculture	Dept. Biologia Cel.lular, Fisiologia i Immunologia	Estrés, bienestar animal, inmunología	This project aims to conduct a comprehensive analysis and evaluation of the combined effects of chronic nanoplastic exposure, elevated stocking density, repeated acute handling, and hypoxic conditions in cultured fish—stressors frequently encountered in intensive aquaculture systems. The assessment will integrate multi-level analyses encompassing biochemical markers, transcriptomic profiling, and metabolomic characterization of key organs and biomarkers related to hormonal stress- and metabolic endocrine axis.

Biochemistry, Molecular Biology and Biomedicine

Name	e-mail	Doctoral Programme	Department/Institute	Research line of the Doctoral Pr.	Topic Description Proposal related to the Research Line

Robert Albero Gallego & Natalia Rakislova	robert.albero@uab.cat	Biochemistry, Molecular Biology and Biomedicine	Deparment of Cellular Biology, Physiology and Immunology (Medical Physiology Unit)	Genomics, Proteomics & Bioinformatics	Our research focuses on understanding why many cancers, despite having available treatments, remain difficult to cure. The majority of cancers respond to treatment at first, but the effect is often temporary — the disease can return and evolve into more aggressive and life-threatening forms. To address this challenge, our group studies clinical samples and cellular models to uncover the biological mechanisms and therapeutic targets that drive cancer aggressivity, relapse and clinical progression. Our work emphasizes rare cancers—such as cutaneous lymphomas and uncommon gynecological malignancies—where we collaborate closely with pathologists, oncologists, and other clinical specialists to ensure our research has direct translational relevance. Using multi -omic approaches, including single-cell RNA sequencing, bulk transcriptomics, and whole-exome sequencing, we investigate the genetic and transcriptional programs that sustain tumor growth and resistance. This integrative, patient-oriented approach offers young scientists a unique opportunity to participate in advanced biomedical research, grow personally and professionally and work with a multidisciplinary team.
Ester Boix	Ester.Boix@uab.cat	Biochemistry, Molecular Biology and Biomedicine	Department of Biochemistry and Molecular Biology	Gene regulation, structure and function of macromolecules	We are studying the mechanism of action of human host defence ribonucleases applied to the design of novel antimicrobial agents. To characterize their antipathogen and immune regulation properties we will work on an infection cell model and apply the following experimental approaches: cell edition, antimicrobial activity evaluation, integrative co-transcriptomics and 3D structural biology.
Jordi Moreno-Romero & Martín Hugo	jordi.moreno.romero@uab.cat; martin.hugo@uab.cat	Biochemistry, Molecular Biology and Biomedicine	Department of Biochemistry and Molecular Biology	Gene Regulation, Structure and Function of Macromolecules	**Redox-Controlled Mechanisms Underlying Plant Adaptation to Environmental Stress** Plants rely on dynamic changes in the cellular redox state to sense and adapt to environmental stress. Reactive oxygen species (ROS) and cysteine redox-dependent post-translational modifications (such as S-nitrosylation, overoxidation and persulfidation) act as molecular switches that regulate protein function and activate stress-responsive pathways. However, the specific protein targets and mechanisms through which redox cues shape plant adaptation are still poorly understood. This PhD project will investigate how oxidative signals and redox-driven protein modifications coordinate stress responses, including their influence on key cellular regulators such as chromatin-associated factors. Through an integrative approach combining biochemistry, proteomics, molecular genetics, and genome-wide analyses, the successful candidate will uncover novel redox-sensitive regulatory mechanisms that enhance plant resilience under adverse environmental conditions.
Alicia Roque & Inma Ponte	alicia.roque@uab.cat inma.ponte@uab.cat	Biochemistry, Molecular Biology and Biomedicine	Department of Biochemistry and Molecular Biology	Gene Regulation, Structure and Function of Macromolecules	**Histone H1 Variants in Cancer Biology** Histone H1 is a key player in shaping chromatin architecture and regulating gene expression. Seven H1 variants are differentially expressed in somatic cells, and their frequent dysregulation is a common hallmark of cancer. This project aims to uncover the molecular mechanisms behind H1 expression and the translational impact of H1 variants in cancer using state-of-the-art genomics (e.g., next-generation sequencing, ChIP-seq) and advanced proteomics techniques. The specific objectives of the project are as follows: 1. Investigate the transcriptional control of the H1.0 promoter and the emerging roles of epitranscriptome marks (m6A and m5C) in orchestrating H1 regulation. 2. Determine the potential of specific H1 subtypes as predictive biomarkers in Chronic Myeloid Leukemia (CML) and melanoma, paving the way for improved diagnostics and personalized medicine.
Natalia Sanchez de Groot	natalia.sanchez@uab.cat	Biochemistry, Molecular Biology and Biomedicine	Department of Biochemistry and Molecular Biology	Clinical Biochemistry, Molecular Pathology and Pharmacology	We study the microbiota and neurodegenerative diseases connection. We combine molecular experiments, cell biology and C. elegans models to measure the impact of microbiota prion-like proteins on the host. We also look for compunds to reduce their toxicity and the incidence of neurodegeneration.
Salvador Ventura Zamora	salvador.ventura@uab.cat	Biochemistry, Molecular Biology and Biomedicine	Institute of Biotechnology and Biomedicine Parc de Recerca UAB, Mòdul B Universitat Autònoma de Barcelona E-08193 Bellaterra (Barcelona)	Gene Regulation, Structure and Function of Macromolecules	**A structurally designed next-generation nano-vaccine to prevent Parkinson's Disease.** Parkinson's disease (PD) is a serious and fast-growing brain disorder that severely affects movement and quality of life, impacting millions globally. The disease is driven by the toxic buildup of a protein called alpha-synuclein (aSyn), which clumps together and damages brain cells. While current treatments can help manage early symptoms, they do not slow or halt the progression of the disease. Our research uncovered a specific region of aSyn that is key to its harmful clumping. Blocking this region prevents brain cell damage and improves motor function in animal models of PD. Building on this discovery, we developed an innovative nano-vaccine that trains the immune system to generate antibodies that precisely target the toxic aggregated forms of aSyn. Our ultimate aim is to deliver a long-term, preventive treatment for PD, potentially halting disease progression and offering new hope to patients and families living with this devastating condition. https://ibb.uab.cat @PPMC_UAB Reference articles: Santos et al. doi: 10.1016/j.tibs.2022.02.001. Santos et al. doi: 10.1038/s41467-021-24039-2.
Marc Torrent Burgas & Enea Sancho Vaello	marc.torrent@uab.cat	Biochemistry, Molecular Biology and Biomedicine	Bioquímica i Biologia Molecular	Genòmica, Proteòmica i Bioinformàtica	To fulfil their function, proteins need to interact with each other forming complexes. Understanding how pathogen proteins bind their host counterparts is important to explain how bacteria can infect, survive and proliferate inside cells (Crua et al. Nat. Comm, 2017). To achieve that, pathogen proteins mimic eukaryote interfaces to interact with the host (Sánchez de Groot et al. PLoS Comp Biol, 2020). Our results suggest that host-pathogen protein-protein interactions are potential targets for a new generation of antimicrobials (Gómez Borrego et al. eLife, 2024; Gómez Borrego et al. J. Cheminformatics, 2025). If an interaction is required for the pathogen to infect the host, blocking this interaction would help to stop or delay the infection (Rendon et al. Nucleic Acids Res., 2021; Rendon et al. Nucleic Acids Res., 2020, Cruat et al. Biofilm, 2025). In summary, treatments interfering with the adhesion and invasion of bacteria to host cells could be used as preventive strategies during surgical procedures or after infection by reducing the resistance of pathogens to known antibiotics by combating their spread in the organism. The PhD student enroled in this project will use genomic and proteomic tools to identify critical host-pathogen complexes in *P. aeruginosa* infection and design new compounds, such as peptides, peptidomimetics and small drugs aimed to interfere with such host-pathogen interactions to develop new antimicrobials against drug resistant strains (Sandin et al. Pharmaceutics, 2022; Sandin et al. J. Med. Chem., 2021, Bello et al. Mol. Syst. Biol, 2025). Webpage: https://sites.google.com/site/marctorrentburgas/
Laia Armengot Martínez & Núria Sánchez Coll	laia.armengot@uab.cat; nuria.sanchez-coll@cragenomica.es	Biochemistry, Molecular Biology and Biomedicine	Dpt. Bioquímica I biologia Molecular, unitat de biociències /Centre de Recerca en Agrigenòmica	Regulació Gènica, Estructura I funció de macromolècules	The proposed PhD project will focus on unraveling the molecular mechanisms underlying plant cell death triggered by pathogenic attack, with particular emphasis on the role of the endoplasmic reticulum (ER). Pathogen-induced stress often disrupts ER homeostasis, activating the ER stress response and influencing cellular fate decisions. This research will investigate how ER signaling pathways contribute to programmed cell death, and how a specific triple ATPase functions as a regulatory hub in this process. By integrating molecular biology, cell imaging, and functional genomics approaches, the project aims to provide new insights into the interplay between ER stress responses and pathogen defense, ultimately advancing our understanding of plant immunity and stress adaptation.
Jaume Farrés Vicén & Martín Hugo Pereira	jaume.farres@uab.cat / martin.hugo@uab.cat	Biochemistry, Molecular Biology and Biomedicine	Biochemistry and Molecular Biology	Gene Regulation, Structure and Function of Macromolecules	Development of dual-target enzyme inhibitors as novel pharmacological agents against cancer disease

Bioinformatics

Name	e-mail	Doctoral Programme	Department/Institute	Research line of the Doctoral Pr.	Topic Description Proposal related to the Research Line
Xavier Daura Ribera	xavier.daura@uab.cat	Bioinformatics	Institut de Biotecnologia i de Biomedicina	Biologia de Sistemes i Sintètica	An integrative systems biology approach to the modeling and simulation of the Quorum Sensing system of the nosocomial pathogen Stenotrophomonas maltophilia, a model system of clinical significance for its multidrug-resistance. The project will entail the development of a model of the Quorum Sensing system and its downstream pathways, involved in the regulation of motility, virulence, biofilm formation, resistance, etc. The model will be based on publicly available data as well as transcriptomic, proteomic and mutational data obtained by the group. These data correspond to different growth phases of the wild type and mutants of a reference clinical strain, thus reflecting different physiological states. The ultimate purpose of the study will be to establish the model and a simulation approach able to explain and predict phenotypic changes as a result of a perturbation in the network (for example, the action of a drug).
Sònia Casillas & Antonio Barbadilla	sonia.casillas@uab.cat	Bioinformatics	Institut de Biotecnologia i de Biomedicina	Òmiques i genètica computacional	We offer a PhD position in evolutionary and population genomics within the Bioinformatics of Genome Diversity group, working on PopLife and genomic signatures of adaptation across species. The project integrates large-scale sequencing data, 3D genome architecture, and comparative genomics to uncover mechanisms of adaptation and genome evolution.
Jean-Didier Maréchal & Laura Masgrau	JeanDidier.Marechal@uab.cat	Bioinformatics	Institute of Biotechonology & Biomedicine & Dept. of Chemistry	Structural Bioinformatics and Pharmacoinformatics	Computer-Aided understanding, design and optimization of Biocatalysts. The topics associated to this Ph.D. application include optimization and design of industrially relevant enzymes using a combination of computational chemistry approaches like docking, molecular mechanics as well as software developped in the group.
Maria Sabater Lleal & Jordi Surrallés Calonge	msabater@santpau.cat / jsurralles@santpau.cat	Bioinformatics	IR Sant Pau	Genomic Instability and DNA Repair Syndromes	We propose to take advantage of the new genomic data and innovative bioinformatics tools to evaluate the genetic variants that regulate mechanisms influencing different vascular diseases. This will include GWAS, transcription-wide association studies (TWAS), mendelian randomization, and generation of polygenic risk score (PRS) among others. Finally, we propose to use pleiotropy to understand shared pathological mechanisms with related diseases, and increase statistical power to detect shared mechanisms, by use of multi-phenotype analyses.
Jaime Martínez Urtaza	jaime.martinez.urtaza@uab.cat	Bioinformatics	Genética y Microbiología	Ómicas y Genética Computacional	Pathogen Genomics & Evolution. Interplay of Genomics, Climate, and Disease Dynamics: The project will be focus on: • Developing Bioinformatic Tools for Genomic Analysis. • Integrating Genomic Data with Environmental & Clinical Variables. • Tracing Global Transmission Routes & Reservoirs. • Creating Predictive Models for Public Health Preparedness. • Investigating Adaptive Mechanisms (e.g., Gene Loss in Pandemic Clones) • Quantifying Impact of Rising Temperatures on Pathogen Dynamics. • Contributing to Global Initiatives (e.g., Lancet Countdown). • Predicting Future Outbreak Risks under Climate Scenarios.

Margarida Julià Sapé	margarita.julia@uab.cat	Bioinformatics	IBB	Data Science in Bioinformatics and Biomedical Informatics	Using MRS data and imaging to find diagnostic and prognostic biomarkers in brain tumours. Applying advanced machine learning (ML) tools to in vivo MRS data for: Biomarker discovery Automated quality control Developing and testing user-friendly software tools for clinical applications
Miquel Angel Senar Rosell	miquelangel.senar@uab.cat	Bioinformatics	Arquitectura de Computadors i Sistemes Operatius	Ómicas y Genética Computacional	This topic focuses on the study of methods to assess the relative abundance of species in complex genomic samples. Starting from traditional methods (metabarcoding, metagenomics), their limitations are analyzed and new approaches are designed and evaluated to achieve better results in terms of accuracy and performance.

Biotechnology

Name	e-mail	Doctoral Programme	Department/Institute	Research line of the Doctoral Pr.	Topic Description Proposal related to the Research Line
Marina Guillén Montalbán & Óscar Romero Ormazábal	marina.guillen@uab.cat	Biotechnology	Department of Chemical, Biological and Environmental Engineering	Biotechnology Engineering: Microbial production of enzymes and Applied Biocatalysis	Development of biotechnological processes for obtaining products of interest to the chemical, pharmaceutical, and food industries, as well as to the health sector. The focues lies, on one hand, in (i) the microbial production of recombinant proteins and low–molecular-weight molecules (bulk/fine chemicals) in Escherichia coli from renewable raw materials, and (ii) the development of multienzymatic processes (including Carbon Capture and Utilization strategies).

Cell Biology

Name	e-mail	Doctoral Programme	Department/Institute	Research line of the Doctoral Pr.	Topic Description Proposal related to the Research Line
Aurora Ruiz-Herrera & Berta N. Vazquez	aurora.ruizherrera@uab.cat; berta.vazquez@uab.cat	Cell Biology	Cell Biology, Physiology and Immunology	Reproduction Biology and Genetics	**Uncovering epigenetic responses to chemotherapy in mammalian gonads and exploring strategies for gonadoprotection.** Cancer therapies have profound genotoxic effects on the gonads, potentially causing infertility in survivors. As the number of cancer survivors continues to rise, with more than 14 million in Europe alone, finding ways to preserve natural fertility is critical for those individuals wishing to start a family after recovery. In his PhD, we will evaluate the epigenome response to commonly used chemotherapy drugs and test whether epigenetic-modifying compounds can provide gonadoprotective effects[1]. Special emphasis will be placed on the Sirtuin family of proteins, which play critical roles in responding to environmental stress and epigenetic processes[2,3]. The project will use a combination of tissue and cellular models, human samples, epigenomic profiling, and high-resolution imaging techniques. References: [1]Vazquez et al. 2021.Molecular Reproduction and Development. [2]Guitart-Solanes et al. 2024. BioxRiv. [3]Vazquez et al. 2016. EMBO J.
Ignasi Roig Navarro	ignasi.roig@uab.cat	Cell Biology	Cell Biology,Physiology and Immunology	Preclinical validation of a new preventive treatment for premature ovarian failure associated with the FMR1 premutation	This project is part of the preclinical development of an innovative therapy based on a mitochondrial antioxidant with potential to prevent premature ovarian failure (FXPOI) in women carrying the FMR1 premutation. The student will participate in in vivo animal studies, in vitro experiments with human ovarian samples, granulosa cell culture, analysis of mitochondrial markers and oxidative stress, and interpretation of proteomic and metabolomic data. The project offers a unique opportunity to contribute to translational research with a direct impact on female reproductive health and personalized medicine.
Aurora Ruiz-Herrera Moreno	aurora.ruizherrera@uab.cat	Cell Biology	Cell Biology, Physiology and Immunology	Genome evolution and biodiversity and Reproductive biology and genetics	The central goal of this proposal is to investigate the evolutionary plasticity and function of higher-order vertebrate genome organization, and how this is transmitted to the offspring. We will use these data to provide new interpretive hypotheses on the mechanism(s) responsible for the origin and function of genome architecture. In the present proposal we will focus on the function and the extent of higher-order organization conservation in representative vertebrate genomes. Using cutting-edge computational and experimental methods we will examine whether chromatin interactions are conserved in distantly related vertebrate clades. Our breakthrough research on mammals demonstrates that our goals are feasible, and that analysis of the mechanistic forces responsible for chromatin structure is central to understanding genome organization and evolution in deep evolutionary assemblages. Recent references from the group: Vara et al. (2019a) Cell reports 28 (2): 352-367, e9; Vara et al. (2019b) Mol Biol Evol 36 (8), 1686-1700; Waters and Ruiz-Herrera (2020) TiG 36(10):728-738; Vara et al. (2021) Nature Communications 12 (2981); Waters et al. (2021) PNAS 118(45) e2112494118; Álvarez-González et al. (2022)Cell Reports 41, 111839.
Jordi Camps Polo Mariona Terradas Ill	jordi.camps@uab.cat mariona.terradas@uab.cat	Cell Biology	Cell Biology, Phisiology and Immunology	Genomic Instability	Role of Chromosomal Instability in Colorectal Metaplasia and Cancer Recurrence

Chemistry

Name	e-mail	Doctoral Programme	Department/Institute	Research line of the Doctoral Pr.	Topic Description Proposal related to the Research Line
Oscar Palacios Bonilla	oscar.palacios@uab.cat	Chemistry	Chemistry	Synthesis and Bioorganic and Bioinorganic Applications	Quantification of metalloproteins by chemical and biochemical procedures for the dignosis and therephy of minoritari diseases (Menkes, Wilkinson, etc.)
Pau Bayón Rueda	pau.bayon@uab.cat	Chemistry	Chemistry Department	Synthesis and Bioorganic and Bioinorganic Applications	Within the proposed line of research, in particular, this work proposal focuses on deepening and expanding an ongoing project with which we have obtained interesting results on the use of nanoparticles with optical properties for drug delivery and phototherapies

Maria Isabel Pividori Gurgo	isabel.pividori@uab.cat	Chemistry	Chemistry Department	Sensors and Biosensors	Rapid Diagnostic Tests for the early diagnosis of non-communicable diseases based on exosomes. Keywords: i) exosomes; ii) bioanalytical chemistry, rapid diagnostic tests iii) analytical bioinstrumentation, biosensors, genosensors, immunosensors, DNA chips, lateral flow assays iv) nanobiomaterials, metallic nanoparticles, magnetic nanoparticles, oriented immobilization of biomaterials in nanomaterials Further details about research lines can be found in https://isabelpividori.net/research/ This proposal is related to the development of rapid tests (RDTs) to meet the features for RDTs summarized under the acronym ASSURED by the WHO (Affordable; Sensitive; Specific; User-friendly; Rapid and Robust; Equipment-free; and, Delivered to those who need it) for different applications, but specially for inflammatory biomarkers and cancer. Novel biomarkers as is the exosomes will be exploited for improving the clinical diagnosis and prognosis of different non-communicable conditions. Recently, our research group have developed our own technologies for the separation and detection of exosomes from different nature (breast cancer, osteoblastic, neuronal) from complex biological matrix. Accordingly, this proposal will address three major technological challenges that have been identified as technology bottleneck for the use of novel biomarkers as in RDTs. The first one is related to the specificity in the isolation of the biomarker from complex matrices. To achieve that, a rational study of the biomolecules will be performed, followed by the isolation by novel solid-phase preconcentration strategies and advanced materials including magnetic molecularly-imprinted polymeric particles. The second one addresses the increase in the sensitivity using strategies for the simultaneous amplification and tagging of overexpressed transcripts by ultrasensitive isothermal approaches. Finally, in all instances, analytical simplification will be implemented in order to minimize pipetting, washing steps and manipulation of reagents to provide analytical tools requiring minimal training for final users, but without any loss in the analytical performance. Biosensors and Lateral flow tests will be considered as prominent RDTs technologies based on electrochemical and optical readout, respectively, which can operate under minimal technical requirements in scarce-resource settings. The application that are envisaged includes targets affecting global health. All the developed strategies will assess a coherent business-focused analysis of research and innovation bottlenecks and opportunities to current and future societal challenges related with health and wellbeing. The SPECIFIC OBJECTIVES are as follows: O1 Defining the needs of novel biomarkers based on exosomes in RDTs for the diagnosis of communicable and non-communicable diseases. O2 Defining the technological specifications for the specific isolation of exosomes, in order to prevent interference of free receptors in biological fluids. O3 Assessing the biomarkers present in the exosome membrane for the specific isolation and detection of exosomes by RDTs directly from the clinical samples. O4 Interfacing solid-phase preconcentration strategies and advanced materials in RDTs for exosomes. O5 Defining the technological specifications in order to enhance the sensitivity for the detection of exosomes in RDTs. O6 Studying the overexpression of the genetic material in the exosomes to increase the sensitivity for the detection for communicable and non-communicable diseases. O7 Integrating amplification techniques and CRISPR on genetic material presents as cargo in exosomes. O8 Designing RDTs for the early detection of communicable and non-communicable diseases based on exosomes. O9 Exploiting novel routes of analytical simplification in order to prevent ultracentrifugation, and to minimize pipetting, washing steps and manipulation of reagents. O10 Performing a platform prototype in laboratory and hospital conditions. O11 Disseminating the results and enabling knowledge transfer to a wide range of stakeholders. O12 Studying the technology transfer to different targets and biomarkers. TRAINING CAPACITY One of the most important objectives of this multidisciplinary proposal is to train young fellows who take part of our research team. The training capacity of the team members is illustrated by their large experience in college teaching and postdoctoral training, by the direction of doctoral dissertations, and by their research capacity, resulting in publication of numerous papers in peer review journals of international repute. The team also actively interacts with other national and international leading research groups. This project will provide the CSC fellow with a unique training and research environment which will allow him/her to obtain a set of valuable skills for future career development. The CSC fellow will benefit from a training structure that creates a rich and supporting learning environment that will encourage him/her to reflect on personal strengths or weaknesses and to identify specific actions for further career development. As supervisors, we also intend to encourage independent research capacity by solving specific analytical problems, as well as encouraging literature searching, by writing papers and technical reports and by presentations at conferences and meetings. This project would also be an excellent opportunity to train the CSC fellow in a multidisciplinary field. This proposal is the product of the integration of different disciplines, such as analytical chemistry, electrochemistry, biochemistry, biological chemistry, cell biology, genetics, microbiology, enzyme technology, immunology, material technology, nanotechnology, and methodologies such as advance biomolecular techniques, electroanalysis techniques and microscopy (SEM, TEM, AFM), spectrophotometry, among many others. The applications that arise from this proposal would ensure interaction between young people in training with industry. Besides, a multidisciplinary education and training in different areas will provide highly skilled workers that are ready to embark on a career in one of the knowledge sectors of Spain and the EU, being private or public sector. We envisage the strong training capacity and the clear impact this proposal will have on the fellow's future careers. Doctoral Plan: The CSC fellow will be enrolled in the UAB PhD programme in Chemistry, which has been awarded the prestigious Distinction to Excellence of the Ministry of Education. The aim of the doctoral dissertation will be related with the assessing of the genetic and proteic signatures in exosomes and the integration on RDTs. This objective will be realized through a versatile training programme that will address both academic expertise and personal skills, and that is tailored to the individual needs and aspirations of the fellow. The training scheme will be centered on five domains, as follows: ●Intellectual skills involving the classical triad of analytical, synthetic and conceptual thinking, but also relating to creativity and interdisciplinary attitude. ●Academic and technical skills aiming for methodological and technological expertise, formulating and testing research hypotheses, fluency in data analysis and presentation and expert knowledge. ●Self-management skills containing time and project management with result-driven approach, independence and a problem solving attitude. ●Relational skills focus on communication both in writing and in speaking, ability to networking, team working and collaboration. ●Leadership and change management skills deal with creativity, innovation, team management and international focus. Deliverables ●At least three papers or patent in coauthorship in indexed journals. ●At least one annual international meeting with poster or oral presentation. ●At least 10 seminars and lectures given by guest speakers. ●Technical skills. ●Annual technical reports
María Jesús Sánchez Martín	mariajesus.sanchez@uab.cat	Chemistry	Química	Separation Techniques in Chemistry	Valorization of residues from the food industry, including spent coffee grounds and other agro-industrial byproducts: Extraction and nanoencapsulation of biomolecules for the controlled release of plant biostimulants (plant growth promotion, stress resistance, etc.)
Roberto Boada Romero & María Jesús Sánchez Martín	roberto.boada@uab.cat mariajesus.sanchez@uab.cat	Chemistry	Química	Separation Techniques in Chemistry	Sustainable valorization of food industry residues through the green extraction of biomolecules for the design of functional nanostructured materials. These bio-derived materials will be tailored for applications in controlled drug delivery and environmental remediation. Advanced analytical and synchrotron-based techniques will support molecular separation and structural characterization. This work bridges the circular bioeconomy, nanotechnology, and biomedical innovation.
Manel del Valle	manel.delvalle@uab.cat	Chemistry	Chemistry	Sensors and Biosensors	Utilization of new technologies to modify electrodes, with use of the principles of nanotechnology and surface immobilization of chemical ligands and biomolecules governed by click chemistry principles. Stages of the research: (1) to prepare electrodes based on carbon platform and to immobilize ligands and/or biomolecules; (2) Structural, microscopic and electrochemical characterization of the surfaces prepared; (3) to characterize the analytical properties of the sensors and biosensors developed; (4) to perform the final application of the devices developed to determine compounds of interest in environmental, pharmacy or clinical applications.
Gregori Ujaque & Giuseppe Sciortino	gregori.ujaque@uab.cat	Chemistry	Química	Computational Nano- and supracatalysis	Use of Multiscale Modelling and Machine Learning for: Developing next generation of catalysts under green chemistry principles.
Gregori Ujaque & Giuseppe Sciortino	gregori.ujaque@uab.cat	Chemistry	Química	Computational Nano- and supracatalysis	Use of Multiscale Modelling and Machine Learning for: Design of nanodevices for energy technology (catalysis and molecular recognition).
Dr. Arnau Carné & Prof. Daniel Maspoch	arnau.carne@uab.cat / daniel.maspoch@icn2.cat	Chemistry	Departament de Química, Facultat de Ciencies, UAB / Institut Català de Nanociència i Nanotecnologia (ICN2)	Chemistry	The Group's research interests are focused on controlling the assembly -Supramolecular Chemistry- of molecules, metal ions and nanoparticles for the creation of functional nanostructured materials -Nanotechnology- with empty spaces; and use them to encapsulate, store, separate, react and deliver molecules of interest. Specifically, our main contributions are in the fields of nanoporous Metal-Organic Frameworks (MOFs), Covalent-Organic Frameworks (COFs), Metal-Organic Polyhedra (MOPs) and Delivery Systems for applications in myriad areas, including Energy, Catalysis, the Environment, Encapsulation, and Life Science. Within the last years, the group has published more than 50 scientific papers in prestigious international journals (Chem. Soc. Rev., Nature Chemistry, Nature Communications, Adv. Mater., JACS, Angew. Chem. Int. Ed., among others). Specifically, the main objective of this thesis will be to design, synthesize, and characterize a new family of nanoscale metal-organic cages or polyhedra, study their post-synthetic modification with functional molecules, and explore their use as advanced adsorbents in both liquid and solid states.
Sira Defaus Fornaguera	Sira.Defaus@uab.cat	Chemistry	Departament de Química	Síntesi i aplicacions bioorgàniques i bioinorgàniques	Medicinal Chemistry for the Development of Peptides as Therapeutic Agents: combining solid-phase peptide synthesis with advanced chemical modifications and peptide-design strategies to generate next-generation therapeutic peptides with enhanced specificity, stability, and efficacy for targeted cancer treatment.
Dr. Xavier Sala Román & Jordi García Antón Aviñó	xavier.sala@uab.cat	Chemistry	Departament Química UAB	Inorganic Materials and Catalysis	This project develops advanced hybrid photocatalysts by integrating surface-functionalized inorganic nanocatalyst with pre-designed photoactive porous organic frameworks. These light-driven systems aim to boost solar-to-chemicals conversion efficiency, opening pathways for the production of renewable fuels and carbon-neutral feedstocks. Results can potentially impact sustainable energy technologies, industrial decarbonization and climate change mitigation. The work will be conducted within a collaborative project between the SelOxCat research group (www.seloxcat.com) at Autonomous University of Barcelona (UAB) and the PimPamChemistry group (www.pimpamchemistry.com) at Autonomous University of Madrid (UAM), internationally recognized research teams with strong scientific output, providing an excellent platform for academic career development. Research will be mainly developed at UAB but stays (i.e 3-months/year) at UAM are envisaged. REFERENCES Green Chem. 2025, 27, 4352. https://doi.org/10.1039/D4GC06606E Adv. Energ. Mater. 2023, 2300282. https://doi.org/10.1002/aenm.202300282 Nanoscale, 2025, 17, 8880 – 8891. DOI: https://doi.org/10.1039/D4NR05363J
Xavier Solans Monfort	xavier.solans@uab.cat	Chemistry	Departament de Química	Computational Simulations of Chemical and Biochemical Systems	In silico earth abundant based catalyst design for the nitrate electrocatalytic reduction to ammonia.
Ramon Alibés & Ona Illa	ramon.alibes@uab.cat; ona. illa@uab.cat	Chemistry	Department of Chemistry	Bioorganic and Bioinorganic Synthesis and Applications	Cannabinoid-inspired molecules for new therapeutic avenues. The endocannabinoid system (ECS) regulates immune function, inflammation, and cellular homeostasis through diverse receptors and ion channels. Among these, the cannabinoid receptor type 2 has attracted considerable attention as a target for anti-inflammatory and immunomodulatory therapies. This project aims to explore cannabinoid-based molecular scaffolds as selective modulators for the CB2R target—developing and optimizing ligands designed specifically to engage these types of receptors (see J. Med. Chem. 2021, 64, 9354).
Raphael de Paiva	raphael.depaiva@uab.cat	Chemistry	Chemistry, Inorganic Chemistry	Synthesis and Bioinorganic Applications	Metal-promoted catalytic systems for promoting selective C-Se coupling in peptides and proteins under biocompatible conditions
Raphael de Paiva & Martín Hugo Pereira	raphael.depaiva@uab.cat and martin.hugo@uab.cat	Chemistry	Chemistry, Inorganic Chemistry; Biochemistry and Molecular Biology	Synthesis and Bioinorganic Applications	Elucidating the molecular basis of gold(I)-thiolate coomplexes as ferroptosis inducers
Jean-Didier Maréchal & Giuseppe Sciortino	JeanDidier.Marechal@uab.cat	Chemistry	Departament of Chemistry & Institute of Biotechnology and Biomedicine	Computational Simulations of Chemical and Biochemical Systems	Cutting-edge Molecular Modeling for Efficient Design of Metalloenzymes and minienzymes. The topics associated to this Ph.D. application include determining by computaional modeling tools aspects like substrate scope, stability and mechanistic preferences (e.g., stereoselective) in artificial metalloenzymes and metallopeptides for sustainable chemistry practices.

Computer Science

Name	e-mail	Doctoral Programme	Department/Institute	Research line of the Doctoral Pr.	Topic Description Proposal related to the Research Line
Joaquim Borges i Ayats	joaquim.borges@uab.cat	Computer Science	Dept. of Information and Communications Engineering	Security, Coding and Compression	Error correcting codes and their applications: Hadamard codes, codes over rings, quantum codes, regular codes, codes for distributed storage. Software in Coding Theory
Anna Sikora	anna.sikora@uab.cat	Computer Science	Computer Architecture and Operating Systems	High Performance Computing	Auto-tuning of HPC applications based on Machine Learning. The goal is to analyze HPC applications and indicate/apply possibilities of their automatic and dynamic tuning using Machine Learning techniques.
Eduardo César	eduardo.cesar@uab.cat	Computer Science	Computer Architecture and Operating Systems	High Performance Computing	Parallel Agent Based Modeling and Simulation of Social Systems.
Javier Panadero	javier.panadero@uab.cat	Computer Science	Computer Architecture and Operating Systems	High Performance Computing	Predicting Natural Hazards Evolution Considering Climate Change Impacts by Combining High-Performance Simulation and Artificial Intelligence
Javier Panadero	javier.panadero@uab.cat	Computer Science	Computer Architecture and Operating Systems	High Performance Computing	Design of Placement Algorithms for Large-Scale Volunteer Fog and Edge Systems Combining Optimization Techniques with Machine and Reinforcement Learning
Javier Panadero & Laura Calvet	javier.panadero@uab.cat	Computer Science	Computer Architecture and Operating Systems	High Performance Computing	Design of Intelligent Algorithms Based on Machine Learning, Deep Learning, and Simulation for Mobility Optimization with Unmanned Vehicles
Abraham De la Rosa & Javier Panadero	abraham.delarosa@uab.cat	Computer Science	Department of Compuiture Architecture and Operating Systems	High Performance Computing	Fog computing and volunteer server smart placement job allocation using AI strategies.
Miquel Angel Senar Rosell	miquelangel.senar@uab.cat	Computer Science	Arquitectura de Computadors i Sistemes Operatius	High Performance Computing	Energy-aware scheduling policies. This topic relates to the study and design of mechanisms and strategies that can be applied to reduce power consumption in large data processing infrastructures by applying AI based-predictions into the job scheduling phase done by traditional Batch Queue System used in large and hetergeneus computing systems.
Victor Sanchez Silva & Joan Serra-Sagrista	VictorFrancisco.Sanchez@uab.cat	Computer Science	Dep. of Information and Communications Engineering	Artificial Intelligence	Generative AI analysis: development of deep learning solutions to determine which generative AI tool was used to create a deepfake video. The focus will be on Generative Adversarial Networks (GANs), diffusion models, text-to-video models, and image-to-video models.
Fernando Vilariño Freire	FernandoLuis.Vilarino@uab.cat	Computer Science	Dept. of Computer Science & Computer Vision Center	Computational Models for Artificial Vision	**Quantum Machine Learning.** The project proposes basic research in the field of quantum machine learning (QML), with explorative research in potential applied contributions to hard problems in the field of computer vision. The PhD student will develop a review of the state of the art, an in-depth investigation of the current use of quantum computers applied to machine learning, with a specific focus on their application to hard computer vision tasks. Research will be focused on the development of hybrid quantum-classical and quantum-inspired techniques, designing and evaluating methodologies that integrate QML with classical models, seeking to improve computational efficiency (runtime and memory usage) and energy consumption without sacrificing predictive accuracy. Specific practical applications will be probed in order to validate the implementation of these techniques in key computer vision-related tasks, such as image classification, multimodal data generation, or manipulation of graph embeddings using accessible databases as proof of concept. Analysis of the performance and efficiency of hybrid quantum-classical and quantum-inspired approaches will be done, comparing them to traditional methods, focusing on their ability to solve hard problems more efficiently. Finally, selected developed techniques will be proposed for integration into real-world computer vision workflows, generating quantitative metrics on performance, efficiency, and accuracy. The ultimate goal is to produce transferable knowledge that serves as a basis for future developments with higher levels of technological maturity (TRL), fostering collaboration with companies, universities, and research centers at the national and international levels. The PhD will have guaranteed secondments for collaboration with other research and technological insitutions in Spain, such the Institute of Materials from CSIC in Madrid, under the co-supervision of Dr. Yue Ben.
Javier Vazquez Corral	Javier.Vazquez.Corral@uab.cat	Computer Science	Dept. of Computer Science & Computer Vision Center	Computational Models for Artificial Vision	**On deriving interpretable and efficient Deep Image Signal Processors.** Image Signal Processors (ISPs) encompass all the processes that happen in camera from image capture to display. Examples of such processes are image denoising, deblurring, or color constancy, among many others. However, ISPs have historically been one of the last barriers to deep learning in Imaging Technology. This is due to the apprehension of camera makers to output an unsatisfactory image to users without the ability to debug and learn from errors. This said, recent advancements have proven that methods can overcome these concerns, and, therefore, different publications started aiming at end-to-end deep learning based ISPs. The main reason for this new trend is the current ubiquity of mobile phones as camera devices and the fact that mobile phones are equipped with Neural Processing Units that specifically focus on the processing of the images captured by the camera sensor. In this Thesis the goal will be to derive new deep learning based ISPs. Our newly derived methods will focus on fulfilling the following goals: - Our models should be interpretable, allowing camera engineers with the ability to debug. - Our models should be as small and efficient as possible, reducing both their memory and their energy consumption requirements. This PhD. Thesis will be carried out in the Computer Vision Center, a thriving institute with +100 researchers in sunny Barcelona.
Javier Vazquez Corral	Javier.Vazquez.Corral@uab.cat	Computer Science	Dept. of Computer Science & Computer Vision Center	Computational Models for Artificial Vision	**Color image and video enhancement by leveraging physical priors and deep learning.** Color image and video enhancement is a traditional problem. Historically, enhancement methods were rooted in tailor-made priors (either physics or statistically-based), but since the appearance of deep learning approaches, the trend has switched. However, the black-box component of current deep learning methods, which does not allow the user to know what is happening in the failure cases, has hindered its wide deployment in some core imaging processes in which understanding of what the algorithms are performing is paramount. A possible solution to address this problem is the introduction of both i) physics-based training objectives and regularization, and ii) architectural designs that enforce physical behaviors within the deep model. Thus, in this PhD project we will propose enhancement frameworks that take advantage of methods based on physical priors and combining them with current state-of-the-art deep learning architectures. This approach will provide models that are both more robust and easier to understand, aiming at their adoption by camera manufacturers for the wide deployment in consumer cameras, as well as post-processing software applications. This PhD. Thesis will be carried out in the Computer Vision Center, a thriving institute with +100 researchers in sunny Barcelona.
Javier Vazquez Corral	Javier.Vazquez.Corral@uab.cat	Computer Science	Dept. of Computer Science & Computer Vision Center	Computational Models for Artificial Vision	**Explainable image and video restoration.** Deep generative models have revolutionized the field of visual enhancement and restoration. These models can transform old and degraded images into realistic reconstructions with vivid colors (even from black and white content). However, the underlying decisions in the restoration process are rarely understood, since they are simply based on implicit knowledge learned from observing large amounts of high-quality images. This drawback is paramount, since visual enhancement problems are ill-conditioned, in some cases very severely. Explainability is the ability of the model to communicate to a human why a particular decision or solution was taken. In this PhD project we aim at endowing image/video restoration systems with the ability to explain their restoration decisions to humans in an intuitive and easily understandable format, who in turn can interact with the system in a more effective way. Ultimately, the system should act as a recommender, and the user should have the final decision on the multiple suggestions provided by the system. Thus, the thesis project has three main objectives: i) studying image editing deep learning architectures to improve their explainability; ii) investigating rich and intuitive human-system interaction techniques in the context of image and video enhancement; iii) extending the results to videos, where the temporal dimension may pose additional challenges. This PhD. Thesis will be carried out in the Computer Vision Center, a thriving institute with +100 researchers in sunny Barcelona.

Javier Vazquez Corral	Javier.Vazquez.Corral@uab.cat	Computer Science	Dept. of Computer Science & Computer Vision Center	Computational Models for Artificial Vision	**Leveraging Foundational Models for Visual Enhancement.** Large Visual Models (also termed Foundational models) have become a cornerstone in computer vision as they are equipped with tons of information from their learning paradigms and data. However, this information is usually difficult to extract and convert into useful priors for problems such as visual restoration and enhancement, in which we aim to improve the images we capture and display. In this PhD thesis, we aim to tackle this issue by leveraging the knowledge of foundational models for these tasks. We will study i) how to obtain priors from foundational models (for example, SD3, LBM, or FluX) that are useful for visual enhancement and ii) how to condition these models for adapting them directly for visual enhancement problems. In this way, we will derive new image enhancement and restoration models that aim to outperform the state-of-the-art in various problems, such as white balance, tone mapping, or color enhancement, to name a few. This PhD. Thesis will be carried out in the Computer Vision Center, a thriving institute with +100 researchers in sunny Barcelona.
Javier Vazquez Corral	Javier.Vazquez.Corral@uab.cat	Computer Science	Dept. of Computer Science & Computer Vision Center	Computational Models for Artificial Vision	**User-friendly Video editing** Video editing plays a crucial role in today's creative industries, powering applications in film-making, advertising, social media content creation, and virtual reality. However, current video editing methods face several limitations. Many approaches struggle with maintaining consistency in dynamic scenes, especially when dealing with complex motions, non-rigid deformations, and occlusions. Additionally, most techniques require significant manual intervention, lack precise control over localized edits, and are computationally intensive, making them difficult to scale for real-world applications. These issues hinder the creative process and limit the flexibility and efficiency of video editing tools. In this thesis, we aim to address these challenges by developing new frameworks for video editing; integrating compact video representations with advanced AI models, such as flow matching, diffusion models, or unified models. In this way, we will enable smoother, more consistent video editing for higher quality, and capable of performing various kinds of local edits of the content on the specific objects or the scenes, including style transfer, elements removal or insert, and other high-level concept-driven edits. This PhD. Thesis will be carried out in the Computer Vision Center, a thriving institute with +100 researchers in sunny Barcelona.
Gabriel Villalonga Pineda Antonio M. López Peña	gvillalonga@cvc.uab.cat AntonioManuel.Lopez@uab.cat	Computer Science	Dept. of Computer Science & Computer Vision Center	Computational Models for Artificial Vision	**Using deep sensorimotor drving models trained by imitation learning**, we want to improve their training accross worldwide locations using federated learning, moreover, we aim at incorporating cooperative driving capabilities to them. The team not only uses CARLA simulator (developed at CVC), but also a real robotized vehicle that is usally tested at the UAB campus.
Ernest Valveny Llobet	Ernest.Valveny@uab.cat	Computer Science	Dept. of Computer Science & Computer Vision Center	Computational Models for Artificial Vision	**Towards Explainable and Scalable Large Multimodal Models for Document Understanding**: Recently, Large Multimodal Models have become the de facto standard for Vision and Language tasks, achieving impressive results in a large variety of benchmarks. However, many challenges remain open. Among them, explainability, data privacy, robustness, scalability or computational efficiency. The prospective PhD student will work on these challenges, addressing, as a first step, the definition and implementation of methods to understand the behaviour and explain the output of Large Multimodal Models. This should serve as the basis to develop new models more robust, transparent, and interpretable. The PhD student will also work on proposing more efficient models that require less resources in terms of data, model parameters, and computational cost, leading to more scalable solutions that could be applied to bigger contexts and input sequences. The project will focus on applying the resarch results to the area of document understanding, defined as the task of extracting any relavant semantic information about a document image. The host group of this PhD proposal was pioneer in reformulating document understanding as a generic task of answering questions on documents, proposing the series of DocVQA challenges (rrc.cvc.uab.es) that have become a reference for the evaluation of many Large Multimodal Models. In this project, special emphasis will be made on the ability of the models to provide realiable and grounded answers requiring complex multi-hop reasoning across long contexts spanning multiple pages and sources of evidence, on different types of heterogeneous documents.
Lluís Gómez Bigordà	Luis.Gomez@uab.cat	Computer Science	Dept. of Computer Science & Computer Vision Center	Computational Models for Artificial Vision	**Mechanistic Insights for Large Vision–Language Models: Interpretability, Privacy & Control** This PhD project will explore how to audit, understand, and steer large multimodal (vision–language) models so they can be used safely and responsibly. We will connect mechanistic interpretability with practical tools for bias analysis, uncertainty estimation, membership inference attacks, machine unlearning, data provenance, and model steering/controllability. Building on our recent work on membership inference and uncertainty estimation, plus an ongoing participatory AI project on model auditing and benchmarking with stakeholders, the student will (i) probe and visualize internal representations to see how sensitive attributes and spurious correlations are encoded, (ii) design methods to debias models and "forget" specific data while maintaining performance, and (iii) develop controllability mechanisms and provenance-aware pipelines to enforce privacy and fairness constraints. More info: https://lluisgomez.github.io/
Maria Vanrell Martorell	Maria.Vanrell@uab.cat	Computer Science	Dept. of Computer Science & Computer Vision Center	Computational Models for Artificial Vision	**Understanding Deep Networks using adaptors for specific tasks.** Deep architectures achieve visual tasks with high performance. However, the level of understanding on how these tasks are internally implemented is low but crucial to trust these results. In this PhD project we pursuit to use new advances in adding adaptors to track the network behaviours for specific tasks that allow us to better understand the internal representations and being able to dissect the paths of specific tasks. We will pay special attention to color-based visual tasks.
Maria Vanrell Martorell	Maria.Vanrell@uab.cat	Computer Science	Dept. of Computer Science & Computer Vision Center	Computational Models for Artificial Vision	**Intrinsic Image decomposition**. Intrinsic decomposition of images into albedo, shading amongst others is an ill-posed problem. In Computer Vision, it is currently addressed using generative AI models, which produce results that appear to meet expectations. However, upon closer examination, these results fail to satisfy the physical constraints of the underlying real-world model. In this PhD project, we propose leveraging the strengths of foundation models not only for image generation but also for incorporating additional information, such as depth or semantic segmentation, to achieve a more accurate decomposition and generate reliable representations of the intrinsic components fulfilling real constraints of the physical world.
Daniel Ponsa Mussarra Robert Benavente Vidal	Daniel.Ponsa@uab.cat Robert.Benavente@uab.cat	Computer Science	Dept. of Computer Science & Computer Vision Center	Computational Models for Artificial Vision	In some fields, such as precision agriculture or environmental monitoring, multi-spectral images from satellites have become an essential source of information. In many applications, the resolution of the images provided by the available satellites is not sufficient for providing a reliable result. To overcome this limitations, super-resolution techniques aim to exploit the information in the images and in additional sources to obtain a higher resolution version of the original image. The goal of this project is to develop super-resolution models for multi-spectral satellite images within applications to precision agriculture.
Bartlomiej Twardowski Alexandra Gomez Villa	btwardowski@cvc.uab.cat Alexandra.Gomez@uab.cat	Computer Science	Dept. of Computer Science & Computer Vision Center	Computational Models for Artificial Vision	**Efficient Knowledge Accumulation and Adaptation** The student will join our LAMP group, directed by Dr. Joost van de Weijer, and work on one of the following topics: (1) Continual Learning: Knowledge accumulation and retention in deep learning models, with a focus on parameter and energy efficiency, (2) Test-Time Adaptation: Methods for quickly adjusting models during the inference time; (3) Visual LLMs: Efficient fine-tuning in a continual manner, correct model alignment, and multi-modality aspect during tuning the models. Candidates interested in working on these research topics are encouraged to contact me directly at btwardowski@cvc.uab.es for further inquiries.
Alicia Fornés Bisquerra Xavier Porter	alicia.fornes@uab.cat xavier.otazu@uab.cat	Computer Science	Dept. of Computer Science & Computer Vision Center	Modelos Computacionales para la Visión Artificial	SNNs-Docs: Spiking Neural Networks (SNNs) are a hot-topic in the intersection of Artificial Intelligence and Computational Neuroscience. This type of networks are strongly based on Neuroscience biological mechanisms and reproduce the behaviour of biological systems, being able to solve typical deep learning limitations such as catastrophic forgetting and energy efficiency (using neuromorphic chips). This PhD will focus on proposing NeuroAI Spiking architectures for the recognition of handwritten documents (including text, symbols or music scores).
Alicia Fornés Bisquerra Lei Kang	alicia.fornes@uab.cat lkang@cvc.uab.cat	Computer Science	Dept. of Computer Science & Computer Vision Center	Modelos Computacionales para la Visión Artificial	SNNs-LLMs: Spiking Neural Networks (SNNs) are a hot-topic in the intersection of Artificial Intelligence and Computational Neuroscience. This type of networks are strongly based on Neuroscience biological mechanisms and reproduce the behaviour of biological systems, being able to solve typical deep learning limitations such as catastrophic forgetting and energy efficiency (using neuromorphic chips). This PhD will focus on designing NeuroAI Spiking architectures capable of supporting large-scale multimodal models (LLMs: Large Laguange Models) that match or surpass the performance of conventional LLMs while using significantly fewer parameters and training data.
Alicia Fornés Bisquerra	alicia.fornes@uab.cat	Computer Science	Dept. of Computer Science & Computer Vision Center	Modelos Computacionales para la Visión Artificial	Handwriting: The recognition of historical handwritten documents with uncommon scripts or alphabets is challenging. Examples include handwritten music scores, ciphered documents (used in diplomatic correspondence, secret societies, religious groups), hieroglyps, cuneiform, etc. In this context, typical deep learning methods are unsatisfactory, because they need huge amounts of training data that is not available. For this reason, this PhD will be focused on designing novel deep-learning based methods for the recognition of this type of documents, including few-show learning, continual learning, and synthetic data generation.
Debora Gil Resina	Debora.Gil@uab.cat	Computer Science	Dept. of Computer Science & Computer Vision Center	Modelos Computacionales para la Visión Artificial	**Integrative Models for new diagnostic biomarkers.** The student will join the Interactive and Augmented Modelling group (IAM , iam.cvc.uab.es), a multidisciplinary research group of the Computer Vision Centre specialized in the treatment and analysis of biomedical images. One of the main research lines of the group is the development of specific Deep Learning Systems providing a múltiple diagnosis of lesions from the fusion of multimodal data (scanners, clinical, demographic). The goal is to construct a DL integrative algorithm based on the scanned images to find a new biomarker with which to stratify different types of cancer from the analysisi of histopathological images Histopathological images are the only confirmation for a wide range of pathologies, including pathogen identification and cancer diagnosis. Though specific staining (like immunohistochemical) highlights target tissues, visual inspection of Whole Slide Images (WSI) is highly time consuming due to the huge size (gigabytes) of WSI. Such gigapixel sizes are also a challenge for the application of AI methods for the analysis of WSI. The candidate will have to develop new architectures for the integration of visual information, pathological reports and clinical information for the computation of biomarkers associated to specific types of cancer and risk of metastasis. To obtain visual biomarkers, new domain adaptation techniques will be developed for the extraction of features from a collection of tissue image patches based on foundational models. This local content will be aggregated to obtain a global visual context of tissue samples using new developed aggregation strategies. These strategies will include DL approaches based of attention mechanisms and contrastive learning, statistical models and topological descriptions of the representation space of patches in order to encode tissue structure heterogeneity (associated to tumour aggressiveness). Clinical and pathological information will be also included using LLMs and attention mechanisms for its integration with the visual information. Models will be leveraged to two specific problems: early lung cancer diagnosis in radiomics (in collaboration with Hospital Germans Trias i Pujol) and detection of pathogens and risk of methastasis in immunohistochemical staining and H&E WSI (in collaboration with Hospital General-Quiron Salut-Fundació Josep Carreras)

Electronic and Telecommunication Engineering

Name	e-mail	Doctoral Programme	Department/Institute	Research line of the Doctoral Pr.	Topic Description Proposal related to the Research Line
Laura Calvet Liñán & Javier Panadero Martinez	laura.calvet.linan@uab.cat	Electronic and Telecommunication Engineering	Telecomunicacions i Enginyeria de Sistemes	Sistemes de Transport Intel·ligent	Learning and Optimization Approaches for Intelligent Decision-Making in Autonomous Drone Systems
Albert Crespo Yepes & Carme Martínez Domingo	albert.crespo@uab.cat; carme.martinez@imb-cnm.csic.es	Electronic and Telecommunication Engineering	Departament d'Enginyeria Electrònica	Fiabilitat de Dispositius i Circuits Micro i Nanoelectrònics	Design, fabrication, characterization and reliability assessment of solution-based memristors and flexible devices.
Jordi Verdú Tirado	jordi.verdu@uab.cat	Electronic and Telecommunication Engineering	Telecomunicacions i Enginyeria de Sistemes	Wireless Technologies	Investigation of advanced design methodologies for gallium nitride (GaN) power amplifiers tailored to contemporary and emerging satellite communication platforms, with particular focus on broadband performance enhancement and the development of sophisticated efficiency-oriented architectures. This research encompasses the exploration of extended-bandwidth matching networks, linearity-preserving wideband techniques, and state-of-the-art load-modulation frameworks to achieve substantial improvements in power-added efficiency (PAE) while maintaining stringent requirements for linearity, reliability, and operation under the environmental constraints of spaceborne systems.
Raimon Casanova Mohr	raimon.casanova@uab.cat	Electronic and Telecommunication Engineering	Department of Microelectronics and Electronic Systems	Design of Integrated Circuits and Systems	The PhD. advisor has a strong background in design of ASICs for high energy experiments as the Large Hadron Collider (LHC) at CERN and the future Circular Electron-Positron Collider (CEPC) in China. The research line will be focused on the design of monolithic pixelated detectors, which are like small cameras but detect particles instead of light This kind of detectors are a hot topic inside the community with a lot of R&D going on. The candidate will work on the design of a new generation of pixelated detectors with gain and high radiation tolerance. His/her tasks will be focused on the design of the readout electronics of the pixel's sensors, as well as characterization in the laboratory of the fabricated devices. The thesis will be carried out within a coordinated project between the Department of Microelectronics and Electronic Systems (UAB), Institute of High Energy Physics (IFAE) and the National Microelectronics Center (CNM) which all are located in the UAB campus. The candidate will have the opportunity to travel to CERN and do stays with other groups in Europe. A collaboration with the Institute of High Energy Physics (IHEP) in Beijing might be possible.
Gonzalo Seco-Granados	gonzalo.seco@uab.cat	Electronic and Telecommunication Engineering	Department of Telecommunications and Systems Engineering	Signal Processing for Communications and Navigation	**Design and Optimization of Fused LEO-PNT and Sensing Solutions Using 6G Non-Terrestrial Networks and GNSS** The thesis will investigate advanced signal design in a variety of bands, time-frequency synchronization methods, and estimation strategies tailored to large LEO constellations that offer communication and positioning services (which is known as Fused LEO-PNT), with emphasis on mitigating Doppler dynamics, time-varying geometry, and interference in dense multi-orbit scenarios. Self-interference at the LEO satellite between the GNSS reception and the signal transmission will be studied. It will develop hybrid one-way and two-way ranging schemes that jointly exploit 6G NTN waveforms, terrestrial network anchors, and GNSS, while integrating radio sensing modalities to improve robustness, integrity, and situational awareness. The work will also propose scalable receiver, tracking and filtering algorithms that fuse communication, navigation, and sensing functions, enabling highly accurate and reliable PNT services based NTN–TN infrastructures envisioned for next-generation 6G systems together with modernized GNSS. The coexistence with communication signals will be addressed. Authentication and protection to ensure that the signals are robust againsts spoofing attacks will also be addressed.
Sergio López Soriano	sergio.lopez.soriano@uab.cat	Electronic and Telecommunication Engineering	Telecommunication and System Engineering Department	Wireless technologies	This PhD thesis aims to advance the fundamental understanding and practical design of passive, batteryless electromagnetic sensors capable of operating in lossy and heterogeneous biological media. The research focuses on the development of miniaturized antennas and resonant structures that enable efficient backscatter communication and electromagnetic sensing in environments such as the gastrointestinal tract.The work will combine computational electromagnetics, experimental prototyping, and analytical modeling to describe the mechanisms governing wave propagation, coupling, and modulation in complex biological materials. The results will provide a comprehensive framework for designing next-generation IoT and implantable sensing devices, contributing to both theoretical electromagnetics and biomedical engineering.

Environmental Science and Technology

Name	e-mail	Doctoral Programme	Department/Institute	Research line of the Doctoral Pr.	Topic Description Proposal related to the Research Line
Ernest Marco Urrea & Paqui Blánquez Cano	ernest.marco@uab.cat	Environmental Science and Technology	Departament of Chemical, Biological and Environmental Engineering	Tratamiento biológico y valorización de efluentes líquidos y gaseosos.	This project aims to develop and implement advanced bioprocesses for the remediation of groundwater contaminated with chlorinated compounds such as trichloroethylene, chloroform, and dichloromethane. Conducted within the framework of the BIODECLOR project funded by the Catalan Water Agency, the work will integrate complementary strategies including bioelectrochemical systems, bioaugmentation, and biostimulation. The research will encompass both controlled laboratory studies and an in situ pilot-scale demonstration to evaluate the feasibility and efficiency of these innovative approaches under real environmental conditions.
Ernest Marco Urrea & Paqui Blánquez Cano	ernest.marco@uab.cat	Environmental Science and Technology	Departament of Chemical, Biological and Environmental Engineering	Tratamiento biológico y valorización de efluentes líquidos y gaseosos.	This PhD project will explore the potential of Shewanella species as biocatalysts in hybrid bio-Fenton and bioelectrochemical systems (BES) for the sustainable degradation of persistent organic pollutants. Shewanella's remarkable ability to transfer electrons to multiple acceptors, including metals and electrodes, makes it an ideal model organism to couple biological Fe(II) regeneration with Fenton-like oxidative reactions. The work will focus on elucidating how electron flow is distributed among different acceptors and how this influences pollutant degradation efficiency. Through proteomic analyses under varying redox conditions, the project aims to identify the key enzymes and pathways that enable Shewanella to mediate both reductive and oxidative processes, providing mechanistic insight for the development of next-generation bioelectrochemical remediation technologies.
Ernest Marco Urrea & Paqui Blánquez Cano	ernest.marco@uab.cat	Environmental Science and Technology	Departament of Chemical, Biological and Environmental Engineering	Tratamiento biológico y valorización de efluentes líquidos y gaseosos.	Metal–organic frameworks (MOFs) are of growing interest for remediation of pollutants due to their exceptionally high surface area, tuneable pore structures, and chemical versatility, which enable efficient adsorption and catalytic transformation of pollutants. Their hybrid organic–inorganic composition is suitable for interactions with microbial cells and enzymes (i.e. providing a surface for biofilm formation and subsequent transformation of the adsorbed pollutants). However, the synergistic interaction between MOFs and microorganisms has been poorly studied in the literature. In this project we aim to explore the effect and potential synergy between MOFs and bacteria relevant for bioremediation (e.g. organohalide-respiring bacteria) to improve and design efficient bioreactors to treat polluted groundwaters.
Antonio Javier Moral Vico	AntonioJavier.Moral@uab.cat	Environmental Science and Technology	Departament d'Enginyeria Química, Biológica i Ambiental	Composting and Bioconversion of Organic Waste and Environmental Remediation	The sustainable management of organic waste is a critical global challenge, due to greenhouse gas emissions, nutrient and carbon losses, and inefficient resource utilization. This proposal aims to address these issues by developing nanomaterial- and biochar-enhanced technologies within a zero-waste strategy and circular-economy framework, integrating biotechnological, catalytic, and environmental engineering approaches. The main objectives of this proposal are to: (1) Develop multifunctional biochars tailored for organic waste valorization and process intensification; (2) Optimize the use of nanomaterials and biochar in anaerobic digestion (AD) to enhance methane production, improve biogas purification, and promote catalytic CO2 conversion into methanol or methane, thereby increasing overall system efficiency and sustainability; (3) Valorize biochar-containing digestate through solid-state fermentation to produce biopesticides and biostimulants; and (4) Develop decision-support tools and sustainability assessment frameworks to guide the implementation of circular economy strategies in organic waste management. This work plan includes the synthesis and characterization of different types of nanomaterials including metallic nanoparticles (Fe, Co, Ni,...), and biochars. These materials will be tested in continuous AD systems at 5-L scale and pilot scale (100 L). Additionally, the project will explore the catalytic conversion of residual CO2 from biogas into valuable products.

Genetics

Name	e-mail	Doctoral Programme	Department/Institute	Research line of the Doctoral Pr.	Topic Description Proposal related to the Research Line
Manel Esteller Badosa & Jordi Surrallés Calonge	mesteller@santpau.cat	Genetics	Genética/Institut de Recerca de Sant Pau	Medicina/Genètica	Epigenetic studies of cancer
Maria Pilar García Guerreiro & Marta Coronado Zamora	mariapilar.garcia.guerreiro@uab.cat; marta.coronado@uab.cat	Genetics	Genètica i Microbiologia	Comparative Genomics and Evolution	Role of Transposable Elements in Adaptive Regulatory Responses under Climate Change: Integrative Transcriptomic and Functional Analyses in Drosophila.
Sònia Casillas & Antonio Barbadilla	sonia.casillas@uab.cat antonio.barbadilla@uab.cat	Genetics	Genètica i Microbiologia	Genòmica comparada i evolució	We offer a PhD position in evolutionary and population genomics within the Bioinformatics of Genome Diversity group, working on PopLife and genomic signatures of adaptation across species. The project integrates large-scale sequencing data, 3D genome architecture, and comparative genomics to uncover mechanisms of adaptation and genome evolution.

Jaime Martínez Urtaza	jaime.martinez.urtaza@uab.cat	Genetics	Genètica i Microbiologia	Genòmica comparada i evolució	Pathogen Genomics & Evolution. Interplay of Genomics, Climate, and Disease Dynamics: The project will be focus on: • Whole-Genome Sequencing of Diverse Isolates.
Alba Hernández Bonilla	alba.hernandez@uab.cat	Genetics	Genètica i Microbiologia	Mutagenesis	Impact of micro/nanoplastics on human health
Israel Fernández Cadenas & Jordi Surrallés Calonge	ifernandezc@santpau.cat	Genetics	Genètica i Microbiologia	Mutagenesis	Genetics and epigenetics present risk factors for complex diseases such as stroke, myocardial infaction, Alzheimer's disease and many others. Genetic variations and DNA methylations are related. Genetic variants modulate DNA methylation. However this regulation is different in healthy situationscomparing to the acute or cronic phase in complex diseases. In this project we will analyze this different regulation in order to understand the biolgical mechanisms of complex diseases with the final objective to find new drug targets and treatments using bioinformatic integration analysis.

Health and Sports Psychology

Name	e-mail	Doctoral Programme	Department/Institute	Research line of the Doctoral Pr.	Topic Description Proposal related to the Research Line
Daniel Pacheco Estefan	daniel.pacheco@uab.cat	Health and Sports Psychology	Psicología Básica	Estrés, Afrontamiento y Salud (Stress, Confrontation, and Health)	Characterizing the representational dynamics of aversive memories during encoding, consolidation and retrieval has significant public-health value, as it may clarify the origins of maladaptive memories associated with stress-related disorders. This PhD project aims to investigate how emotional experiences shape human long-term memory representations using behavioral, computational, and neurophysiological approaches. The work will focus on how emotional arousal alters associative memory, with particular emphasis on how amygdala–hippocampal interactions can strengthen representations of aversive items while weakening the representations of their associated context during the retrieval of emotional memories.

Materials Science

Name	e-mail	Doctoral Programme	Department/Institute	Research line of the Doctoral Pr.	Topic Description Proposal related to the Research Line
Ángel Pérez del Pino & José Peral Pérez	aperez@icmab.es, Jose.Peral@uab.cat	Materials Science	Institute of Materials Science of Barcelona (ICMAB, CSIC)	Inorganic materials and nanomaterials, functional surfaces and crystallographic structures.	Laser synthesis of nanostructured supercapacitor electrodes for high power energy storage
Cristian Rodriguez Tinoco	cristian.rodriguez@uab.cat	Materials Science	Física	Micro- y nanoelectrónica y micro- y nanosistemas	2D materials offer exceptional electronic, optical, and magnetic behaviors, especially when combined in Van-der-Waals heterostructures. Pairing them with tunable, biocompatible organic semiconductors can strongly reshape their properties through interfacial processes, but reliance on crystalline organics limits practicality. This project instead leverages giant surface potentials in PVD-grown organic films, where spontaneous orientation polarization produces large built-in fields (100–200 mV/nm). These amorphous films are uniform, tunable through growth conditions, and do not require crystallinity. We will study how such oriented layers alter electronic states and transport in 2D materials. By controlling organic orientation locally, we aim to engineer targeted changes in the 2D layer, enabling new concepts for memristors and high-density, energy-efficient memory devices.
Jorge Francisco Suñé Tarruella (UAB) & Anna Palau Masoliver (ICMAB)	jordi.sune@uab.cat	Materials Science	Dep. Enginyeria Electrònica / Institut de Ciència de Materials de Barcelona (ICMAB)	Microelectronics and Nanoelectronics, Microsystems and Nanosystems	**Cryogenic memristors for next-generation Information and Communication Technologies:** Cryogenic electronics required for some applications such as superconductor electronics, space applications and quantum computing would strongly benefit from memristors working at very low temperatures. These memristors are intended for multi-bit non-volatile memories and for neuromorphic circuits aiming at implementing neural networs in hardware for AI applications. In this thesis we will work on memristors based on homogeneous resistive switching in superconductor materials such as YBCO and/or BSCCO. Devices will be designed, fabricated and characterized at ICMAB. Based on the results of electrical characterization, compact models will be developed with two goals, suggesting ways to close the loop to improve the fabrication process and to allow circuit simulation. Finally, small neuromorphic circuits will be simulated in SPICE.
Dr. Jose Muñoz & Dr. Arántzazu González Campo	josemaria.munoz@uab.cat /agonzalez@icmab.es	Materials Science	Departament Química UAB/Materials Science Institute of Barcelona (ICMAB-CSIC)	Design of (Bio)Functional 2D Materials for (Bio)Electronic Devices	Emerging 2D materials will be i) (bio)functionalized on-demand with prominent molecular moieties and ii) subsequently integrated on electronic devices for iii) their implementation as biomedical systems. The candidate will join the SelOxCat group (currently integrates 3 CSC students) and will work in close collaboration with FUNNANOSURF group. See more info: www.seloxcat.com & www.funnanosurf.icmab.es.
Fernando Novio Vázquez (UAB) & Daniel Ruiz-Molina (ICN2)	fernando.novio@uab.cat dani.ruiz@icn2.cat	Materials Science	Química	Organic, Molecular and Supramolecular Materials. Synthesis of Multifunctional Nanomaterials for Biomedical Applications	Development of new nanodrugs based on coordination polymers for the treatment of brain diseases: The aim of this research line is to develop the synthesis and characterizacion of novel nanoparticles based on coordination polymers as a drug delivery systems and contrast agents for bioimaging in the treatment of brain diseases, specially glioblastoma (GB) and Parkinson Disease (PD). The research proposal will include: 1) The synthesis and physicochemical characterization of coordination polymer nanoparticles containing specific anticancer drugs (single drug or combined drugs) active against GB, or dopamine-based drugs for PD treatment; 2) The in vitro analysis (cellular uptake, cytotoxicity, therapeutic effect) of the resulting nanoparticles; 3) The analysis in vitro of the therapeutic effectivity of the final selected nanodrugs by collaboration of specialized research institutions.
Gonzalo Guirado Lopez & Josep Nogues	gonzalo.guirado@uab.cat; josep.nogues@icn2.cat	Materials Science	Chemistry/Catalan Institute of Nanoscience and Nanotechnology	Inorganic materials and nanomaterials, functional surfaces, and crystallographic structures.	Topic: Multi-Stimuli-Responsive Transition metal dichalcogenide (TMD) based nanoplatforms for Environmental Remediation and Advanced Biomedical Therapies Description:This project develops multi-stimuli-responsive TMD nanoreactors that combine photocatalytic, photothermal, piezoelectric, magnetic, and magnetoelectric properties. These synergistic activations will be exploited for dual applications: (i) efficient degradation of pollutants and toxins in real water environments, and (ii) advanced biomedical therapies through controlled ROS generation and NIR-driven photothermal/photodynamic effects. The goal is to create a versatile platform capable of operating in both environmental and biological settings with high efficiency and precision

Mathematics

Name	e-mail	Doctoral Programme	Department/Institute	Research line of the Doctoral Pr.	Topic Description Proposal related to the Research Line
Joachim Kock	joachim.kock@uab.cat	Mathematics	Department of Mathematics	Topologia Algebraica	Higher Category Theory and Homotopy Theory applied to Combinatorics and Quantum Algebra
Roberto Rubio	roberto.rubio@uab.cat	Mathematics	Department of Mathematics	Differential Geometry	Generalized geometry is a novel approach to geometric structures that strongly relates to and expands open questions in topology and classical differential geometry. The PhD candidate will join the research group GENTLE (https://mat.uab.cat/gentle) and work in the line more suitable to her/his expertise.
Joan Mateu Bennassar	joan.mateu@uab.cat	Mathematics	Departament de Matemàtiques	Analysis and PDEs	With this project we propose to study boundary regularity problems for a transport equation with a vortex patch initial condition in the case of divergence free velocity fields. To solve this type of questions the student will have to study techniques coming from transport equations and also from harmonic analysis. A solid foundation in harmonic analysis and partial differential equations will be essential for the student, as these areas provide the core analytical tools required to tackle the problem.

Methodology of Biomedical Research and Public Health

Name	e-mail	Doctoral Programme	Department/Institute	Research line of the Doctoral Pr.	Topic Description Proposal related to the Research Line
Dr. María José Martinez Zapata (director) & Dr. Gerard Urrútia Cuchí (co-director)	mmartinezz@santpau.cat	Methodology of Biomedical Research and Public Health	Department of Paediatrics, Obstetrics, Gynaecology and Preventive Medicine and Public Health / Sant Pau Research Institute	Clinical Epidemiology and Health Service Research	The objective of the thesis will be to assess health interventions to prevent postoperative adverse events, using synthesis methods as systematic reviews, overviews, or scoping reviews. This work is related to a Spanish competitive public grant (PI24/00914), which aims to assess the efficacy and safety of digital health technologies that support patients during the postoperative period after cardiac surgery.
Dr. Pablo Alonso Coello (director) & Dr. Gerard Urrútia Cuchí (co-director)	palonso@santpau.cat	Methodology of Biomedical Research and Public Health	Department of Paediatrics, Obstetrics, Gynaecology and Preventive Medicine and Public Health / Sant Pau Research Institute	Clinical Epidemiology and Health Service Research	Incorporation of values and preferences in guidelines and decision-making: This research line explores how patients' values and preferences can be systematically captured, synthesized, and integrated into clinical and public health guidelines. The PhD will examine methodological innovations—such as preference elicitation techniques and decision aids—and evaluate their impact on shared decision-making. The goal is to contribute to more patient-centred, transparent, and equitable recommendations.
Dr. Pablo Alonso Coello (director) & Dr. Gerard Urrútia Cuchí (co-director)	palonso@santpau.cat	Methodology of Biomedical Research and Public Health	Department of Paediatrics, Obstetrics, Gynaecology and Preventive Medicine and Public Health / Sant Pau Research Institute	Clinical Epidemiology and Health Service Research	Incorporation of economic and modelling evidence in guidelines and decision-making: This PhD focuses on methods to integrate economic evaluations, decision models, and real-world data into guideline development. Students will study how model-based evidence informs priority setting, resource allocation, and the strength of recommendations. The project aims to advance methodological standards and create practical tools that support guideline panels and health-policy decision-makers.
Dr. Pablo Alonso Coello (director) & Dr. Gerard Urrútia Cuchí (co-director)	palonso@santpau.cat	Methodology of Biomedical Research and Public Health	Department of Paediatrics, Obstetrics, Gynaecology and Preventive Medicine and Public Health / Sant Pau Research Institute	Clinical Epidemiology and Health Service Research	Guideline adaptation, implementation, and overcoming barriers: This research line focuses on improving the efficiency, quality, and scalability of guideline adaptation processes across diverse health systems. The PhD will analyse current barriers to adaptation and implementation—such as contextual constraints, resource limitations, or methodological gaps—and develop strategies to streamline and optimise these processes. The aim is to produce practical methods and tools that make guideline adaptation faster, more consistent, and more responsive to local needs.
Dr. Pablo Alonso Coello (director) & Dr. Gerard Urrútia Cuchí (co-director)	palonso@santpau.cat	Methodology of Biomedical Research and Public Health	Department of Paediatrics, Obstetrics, Gynaecology and Preventive Medicine and Public Health / Sant Pau Research Institute	Clinical Epidemiology and Health Service Research	Development of cancer screening recommendations: This PhD will work within ongoing European initiatives to develop evidence-based cancer screening recommendations across several cancer types. Students will contribute directly to assessing benefits, harms, equity, feasibility, modelling, and environmental impacts, while also helping advance methodological innovations embedded in this effort. The aim is to support high-quality, methodologically robust recommendations that can guide screening policies across Europe.
Dr. Pablo Alonso Coello (director) & Dr. Gerard Urrútia Cuchí (co-director)	palonso@santpau.cat	Methodology of Biomedical Research and Public Health	Department of Paediatrics, Obstetrics, Gynaecology and Preventive Medicine and Public Health / Sant Pau Research Institute	Clinical Epidemiology and Health Service Research	Decision-making processes in guideline panels - This research line investigates how guideline panels integrate the different GRADE Evidence-to-Decision criteria and how cognitive biases influence deliberations and final recommendations. The PhD will develop methodological guidance and a practical toolkit to support panels in making clearer, more consistent, and more transparent decisions. The project seeks to strengthen the science of panel decision-making and improve the rigor of guideline development globally.

Microbiology

Name	e-mail	Doctoral Programme	Department/Institute	Research line of the Doctoral Pr.	Topic Description Proposal related to the Research Line
Esther Julián Gómez	esther.julian@uab.cat	Microbiology	Departament Genetics and Microbiology	Study of non-tuberculous mycobacteria as therapeutic tools and models of pathogenicity	The use of bacteria to treat cancer is one of the open forefronts, being a raising issue. There is a successful cancer therapy using bacteria: the case of M. bovis BCG, that is the first treatment option for non-muscle-invasive bladder cancer. Although efficacious, BCG is not a perfect therapy. Nontuberculous mycobacteria have arisen as a strong alternative to BCG treatment. We aim to understand the immunomodulatory and antitumor capacity of different species of non-pathogenic mycobacteria and BCG, both in the treatment and prevention of cancer progression and in other immune dysregulated diseases. For latest publications see: https://sites.google.com/view/mycobacteriaresearchlabuab/publications

Neurosciences

Name	e-mail	Doctoral Programme	Department/Institute	Research line of the Doctoral Pr.	Topic Description Proposal related to the Research Line
Daniel Pacheco Estefan	daniel.pacheco@uab.cat	Neurosciences	Institut de Neurociències de la UAB	Neurociencia cognitiva y circuitos neuronales	This PhD project will integrate methods from artificial intelligence and cognitive neuroscience to investigate how human memories are represented during naturalistic experiences. By combining multilayered representations extracted from deep neural networks (DNNs) models trained on complex, real-world tasks with the millisecond precision of intracranial EEG and single-unit recordings in human epilepsy patients, the project will model the representational structure and temporal dynamics of human memory with unprecedented detail. Using advanced DNN models of natural behavior, we will characterize the neurophysiological mechanisms that support rich, ecologically relevant memory processes and establish principled correspondences between representational states in AI systems and the human brain.
Alfredo Jesús Miñano Molina	alfredo.minano@uab.cat	Neurosciences	Institut de Neurociències	Molecular Biology of Synaptic Dysfunction in Neurodegenerative Diseases	Synapses are affected by both synaptic AMPAR removal and impairment of mitochondrial function, leading to cognitive failure associated with Alzheimer's disease (AD). No direct relationship has been found between them, although synaptic function is a high bioenergetic demand process. A-kinase anchoring proteins (AKAPs) are multivalent scaffolding proteins that sequester combinations of signaling enzymes within subcellular microdomains. Postsynaptic AKAP150 regulates AMPAR function associated with LTP and LTD. Outer mitochondrial membrane (OMM) D-AKAP1 coordinates fusion/fission events, altered in AD leading to bioenergetic failure. Our proposal is to decipher using in vitro and in vivo models (primary neurons, genetic approaches, mitochondrial dynamics by confocal imaging, metabolic function, hiPSCs, AD-transgenic mice and bioinformatics), whether AKAPs degradation in AD is pivotal on synaptic/metabolic dysfunction exploiting them as platforms for precision pharmacology.
Elena Martín García & Jordi Mayneris Perxachs	elena.martin@uab.cat; jmayneris@idibgi.org	Neurosciences	Psicobiologia/Institut de Neurociències	Neurociencia cognitiva y circuitos neuronales	Role of the microbiome-gut-brain axis in the mechanisms of food addiction
Gemma Guillazo-Blanch & Anna Vale Martínez	Gemma.Guillazo@uab.cat ; Anna.Vale@uab.cat ;	Neurosciences	Institute of Neurosciences (UAB)	Aging and Neurodegenrative Diseases	This topic aligns with the research line focused on preventive and mechanistic approaches to neurodegenerative diseases, particularly Alzheimer's disease (AD). The project explores how caloric restriction (CR) modulates synaptic plasticity, metabolism, neuroinflammation, and cognitive vulnerability in the TgF344-AD rat model, assessing its effects across generations. The study integrates behavioral, molecular, and epigenetic analyses to determine whether CR can delay AD progression and influence heritable biological mechanisms. By identifying early biomarkers and stage-specific responses to CR, the topic contributes to developing personalized preventive strategies and reducing the societal impact of neurodegenerative diseases.
Jordi Bové & Miquel Vila	jordi.bove@vhir.org	Neurosciences	Vall d'Hebron Institut de Recerca (VHIR)	Aging and Neurological Diseases	Role of CD8 T cells in the initiation and progression of neurodegeneration in Parkinson's disease, aiming to enable personalized therapeutic and preventive strategies and to identify early peripheral biomarkers.
Laura Cutando Ruiz & Emma Puighermanal Puigvert	laura.cutando@uab.cat / emma.puighermanal@uab.cat	Neurosciences	Department Biologia Cel·lular, Fisiologia i Immunologia / Institut de Neurociències (Inc-UAB)	Aging and Neurological Diseases	Dechiphering cerebellar alterations in Rett Syndrome

Mireia Herrando-Grabulosa & Esther Udina Bonet	mireia.herrando@uab.cat esther.udina@uab.cat	Neurosciences	Institut de Neurociències (UAB)	Aging and neurological diseases	Remodeling motor neuron microenvironment by gene therapy in Amyotrophic Lateral Sclerosis
Roser Masgrau Juanola	roser.masgrau@uab.cat	Neurosciences	Institut de Neurociències, i, Departament de Bioquímica i Biologia Molecular, Unitat de Bioquímica de Medicina	Neurotecnologia i Neuroreparació	The doctoral Studies will focus on analysing metabolic fluxes between neurons and astrocytes. Live-cell imaging of metabolite fluorescent probes will be used.

Physics

Name	e-mail	Doctoral Programme	Department/Institute	Research line of the Doctoral Pr.	Topic Description Proposal related to the Research Line
Carles Navau & Ana Maria Palau	carles.navau@uab.cat	Physics	UAB / ICMAB-CSIC	Electromagnetisme	"Development of a reconfigurable hybrid platform combining magneto-ionic (MI) and SC components. The idea is to use MI unit cells as reconfigurable magnetic unit memories that, with electric-field-driven ion migration enable magnetic modulation while SC elements will enhance switching performance and enable low-loss readout. Scalable fabrication of MI/SC devices will support analog memory, neuromorphic computing, and in-memory logic compatible with SC and quantum systems."
María Pilar Casado Lechuga & Thorsten Lux	Pilar.Casado@uab.cat	Physics	Física / IFAE	Física d'Altes Energies	"Neutrino cross-section measurement in T2K and performance studies in ND280++". Summary: T2K (Tokai-To-Kamioka) is a neutrino experiment in Japan which aims to study neutrino oscillations, including matter-antimatter asymmetry in the leptonic sector. It includes a near detector, ND280, which characterizes the neutrino beam close to the production point before it is sent 297km away to the far-detector, Super-Kamiokande. ND280 was upgraded in 2024 with a tremendous increase in physics capabilities, namely enlarged kinematical accessible regions and improved use of transverse nuclear variables. This new detector is providing unique data to perform new cross-section measurements in the coming years. It is being used for Super-Kamiokande as a far-detector but will also be part of the new generation of neutrino experiments Hyper-Kamiokande, for which ND280++ is being developed.

Plant Biology and Biotechnology

Name	e-mail	Doctoral Programme	Department/Institute	Research line of the Doctoral Pr.	Topic Description Proposal related to the Research Line
José Luis Riechmann & Jordi Moreno Romero	joseluis.riechmann@cragenomica.es jordi.moreno.romero@uab.cat	Plant Biology and Biotechnology	Center for Research in Agricultural Genomics (CRAG) CSIC-IRTA-UAB-UB & Department of Biochemistry and Molecular Biology	Plant Molecular Genetics	**The plant non-conventional peptidome and the heat stress response.** The research project aims to address a fundamental question in plant biology: the nature, characteristics, and functions of the plant 'non-conventional' peptidome. sORF-encoded peptides or non-conventional peptides (SEPs/NCPs) are an important but largely uncharacterized component of the eukaryotic proteome. SEPs have already been shown to play critical roles in human biology. The plant peptidome is largely unknown, and so far, only initial experiments in a few plants (e.g., Arabidopsis, maize, moss) have attempted its characterization at a genome-wide scale. The project includes two different but interconnected aims: (i) global characterization of the Arabidopsis non-conventional peptidome using mass spectrometry- and lncRNA-based genome-wide approaches (peptidogenomics), in particular as it relates to the heat-stress response; (ii) functional characterization of novel SEPs potentially involved in Arabidopsis physiology and heat stress response, using genetics, molecular and cell biology methods.
Guiomar Martin & Jordi Moreno-Romero	guiomar.martin@cragenomica.es & jordi.moreno.romero@uab.cat	Plant Biology and Biotechnology	Center for Research in Agricultural Genomics (CRAG) CSIC-IRTA-UAB-UB & Department of Biochemistry an Molecular Biology (UAB)	Plant Molecular Genetics	**Optimizing light signals to enhance plant resilience stress.** Plants perceive and respond to environmental cues, including light, which regulates proteins controlling physiological and molecular stress responses. This PhD project will explore how optimized light treatments can reduce water stress and enhance plant resilience, providing a sustainable, cost-effective alternative to genetic modification. Using Arabidopsis thaliana as a model, the candidate will investigate the molecular interplay between light signaling and abiotic stress pathways, combining molecular biology, physiology, and controlled environment experiments. The project will generate fundamental knowledge applicable to crop species and reveal innovative strategies for improving plant stress tolerance under changing environmental conditions.
Juan José López-Moya (CSIC researcher at CRAG) & Soledad Martos Arias (UAB)	juanjose.lopez@cragenomica.es Soledad.Martos@uab.cat	Plant Biology and Biotechnology	Centre for Research in Agricultural Genomics (CRAG) & Departament de Biologia Animal, de Biologia Vegetal i d'Ecologia (BAVE)	Genètica Molecular de Plantes, Virus de Plantes & Physiology of Plants in Adveres Conditions Biotechnological tools for virus control portalrecerca.uab.cat/ca/persons/soledad-martos-arias/	**Development of virus-like particles and antiviral agents for plant virus management.** Plant pathogenic viruses are major causative agents of diseases that affect numerous crops worldwide. In nature, these viruses are efficiently disseminated by vector organisms and are often found in mixed infections, which lead to more severe disease symptoms. In addition to implementing genetic resistance in host plants through breeding, there is an urgent need for innovative alternative control strategies. Our group focuses on producing Virus-Like Particles (VLPs), which mimic virion structures but lack viral genomes, being intended for use in interfering with vector-mediated transmission. We also work in the development of antiviral compounds targeting members of the family Geminiviridae, one of the most widespread and economically relevant group of plant pathogens. The objectives of this thesis are: 1- To generate and structurally characterize VLPs of an emergent begomovirus for testing in transmission interference ; and 2- To develop candidate antiviral compounds targeting essential viral functions and evaluate delivery systems. We have all the necessary facilities and expertise to successfully carry out this PhD project. Current funding: PID2022-139376OB-C33
Núria Sánchez Coll & Laia Armengot	nuria.sanchez-coll@cragenomica.es laia.armengot@uab.cat	Plant Biology and Biotechnology	Centre de Recerca en Agrigenòmica	Plant Molecular Genetics	The proposed PhD project will investigate the regulation of plant proteostasis, a fundamental process that ensures protein quality control and cellular homeostasis under both normal and stress conditions. Proteostasis encompasses protein synthesis, folding, trafficking, and degradation, and its disruption can profoundly affect plant growth, development, and responses to environmental challenges. This research will focus on the molecular mechanisms that safeguard proteome integrity, including the role of proteases, chaperones, the ubiquitin-proteasome system, and autophagy pathways. By exploring how plants maintain proteostasis during pathogen infection and abiotic stress, the project aims to uncover novel strategies that enhance resilience and adaptability, contributing to a deeper understanding of plant stress biology and potential applications in crop improvement.
Ivan Reyna-Llorens & Isabel Corrales Pinart	ivan.reyna-llorens@cragenomica.es isabel.Corrales@uab.cat	Plant Biology and Biotechnology	Molecular Genetics/CRAG	Plant Synthetic biology and photosynthesis & Physiology of Plants in Adveres Conditions	Using synthetic biology to improve photosynthesis in crop models and to characterize the mechanisms of adaptation to drought stress in C4-CAM species of the genus Portulaca.
Igor Florez Sarasa & Roser Tolra Perez	igor.florez@cragenomica.es / roser.tolra@uab.cat	Plant Biology and Biotechnology	Centre for Research in Agricultural Genomics (CRAG)	Physiology of Plants in Adverse Conditions; (Plant and Animal Genomics)	**Unraveling mitochondrial respiration in fruits under stress.** Mitochondrial alternative respiratory pathways (ARPs) are essential for providing cell metabolic flexibility while avoiding the formation of ROS and RNS, and their regulation is tightly dependent on different posttranslational modifications. However, our knowledge about the role and regulation of mitochondrial respiration under abiotic stress conditions, as those imposed by climate change, is very limited in sink (fruit) as compared to source (leaf) tissues. This project proposes an investigation involving an unprecedented combination of approaches in plant metabolomics and in vivo energy flux combined with protein and transcriptome analyses in gene edited plants to unravel yet open biological questions regarding the role and regulation of fruit primary metabolism. In particular, the mechanisms regulating mitochondrial respiration in vivo during fruit ripening are not fully understood, as well as its roles during the synthesis of health-promoting metabolites and photosynthesis. Therefore, the basic information derived from this project in tomato could be used for industrial applications related to the control of fruit ripening and postharvest shelf life.
Nicolas Bologna & Alicia Roque	nicolas.bologna@cragenomica.es / Alicia.Roque@uab.cat	Plant Biology and Biotechnology	CRAG/Área de Bioquímica i de Biologia Molecular	Plant Molecular Genetics; (Plant Development and Signal Transduction)	Nuclear role of AGO1; & RNA Silencing
Soledad Martos Arias & Albert Gargallo Garriga	soledad.martos@uab.cat ; albert.gargallo@uab.cat	Plant Biology and Biotechnology	Departament de BABVE, Unitat Fisiologia Vegetal, Universitat Autònoma de Barcelona (UAB)	Plant stress physiology	Integrated multi-omics approaches to predict tomato resilience under combined drought, salinity, and Fusarium stress in Mediterranean agroecosystems. The project aims to discover metabolomic and microbiome-based biomarkers of stress tolerance and develop predictive models to optimize sustainable crop management and breeding strategies. Keywords:Plant stress physiology, integrative biology, metabolomics, plant-microbe interactions
Eliana Carolina Bianucci Ovando & Albert Gargallo Garriga	eliana.bianucci@uab.cat; albert.gargallo@uab.cat	Plant Biology and Biotechnology	Departament de BABVE, Unitat Fisiologia Vegetal, Universitat Autònoma de Barcelona (UAB)	Plant stress physiology	Integrative study of PGPB (plant growth-promoting bacteria) consortia to improve crop resilience to abiotic (drought, salinity) and biotic (Fusarium) stress in tomato. The project will combine metabolomics, physiology and multi-omics approaches to dissect the molecular and microbiome-mediated mechanisms of stress tolerance, aiming for practical applications in sustainable Mediterranean agriculture. Keywords:Plant-microbe interactions, PGPB application, metabolomics
Xavier Gabarrell Durany & Albert Gargallo Garriga	xavier.gabarrell@uab.cat; albert.gargallo@uab.cat	Plant Biology and Biotechnology	ICTA; Departament de BABVE, Unitat Fisiologia Vegetal, Departament EQBA,Universitat Autònoma de Barcelona (UAB)	Plant stress physiology	Environmental sustainability of tomato resilience under combined stress (drought, salinity, Fusarium): life cycle analysis (LCA) and material flow analysis (MFA) comparing conventional, organic, and urban production systems. The project will integrate agronomic, metabolomic and physiological data with environmental impact indicators to determine best practices and optimize resilient cropping strategies for Mediterranean food security. Keywords: Sustainability assessment, circular economy, life cycle analysis, urban agriculture

Roser Tolrà Pérez & Eliana Bianucci Ovando	roser.tolra@uab.cat; Eliana.Bianucci@uab.cat	Plant Biology and Biotechnology	UAB/ BABVE/ FV	Plant stress physiology	Bioinputs from Sargassum for resilient and low-input agriculture: physiological, agronomic and biochemical assessment across stress scenarios. This PhD project investigates the potential of Sargassum-derived bioinputs (extracts, hydrolysates, biochar fractions) to partially replace synthetic agrochemicals while enhancing crop performance under abiotic stress. By integrating physiological, biochemical and agronomic data, the project will evaluate how Sargassum amendments influence nutrient uptake, growth dynamics, and stress tolerance in Mediterranean crops. The candidate will work across greenhouse and field-scale trials, linking plant responses to the biochemical fingerprint of each bioproduct to identify the most effective fractions. The ultimate goal is to define robust, circular and scalable bioinput strategies that reduce chemical dependency, improve crop resilience and contribute to climate-smart agriculture.

Spanish Studies

Name	e-mail	Doctoral Programme	Department/Institute	Research line of the Doctoral Pr.	Topic Description Proposal related to the Research Line
Sònia Boadas Cabarrocas	sonia.boadas@uab.cat	Spanish Studies	Departament de Filologia Espanyola	Literatura Española de la Edad Media y Siglo de Oro	China en la producción literaria de Lope de Vega: fuentes para la construcción del mundo oriental en el Siglo de Oro