Name	UAB Academic Position	Address	e-mail	Doctoral Programme	Department/Institute	Research line of the Doctoral Pr.	Topic Description Proposal related to the Research Line
Animal Medicine and Health							
Fernando Rodríguez / Francesc Accensi	Researcher / Tenure-Track Lecturer	Centre de Recerca en Sanitat Animal (CReSA-IRTA), Edifici CReSA, Campus UAB	fernando.rodriguez@irta.cat; francesc.accensi@uab.cat	Animal Medicine and Health	Department of Animal Health and Anatomy	African swine fever virus vaccine development	African Swine Fever (ASF) is devastating pig disease reportable to OIE affecting many countries, including western-Europe. There is no treatment neither a vaccine alvailable against ASF. The objective of this PhD proposal is to collaborate in the development of a vaccine against ASFV from a multidisciplinary point of view (our strategy is based on subunit vaccines and also in attenuated recombinant vaccines).
Enrique M Mateu de Antonio	Professor	UAB-Fac. Veterinària	enric.mateu@uab.cat	Animal Medicine and Health	Animal Health and Anatomy	Sanitat Animal, Malalties Infeccioses i Epidemiologia Veterinària	Development of a biotechnological vaccine for infectious bursal disease
Joaquim Segalés	Full professor	Centre de Recerca en Sanitat Animal (CReSA-IRTA), Edifici CReSA, Campus UAB	joaquim.segales@uab.cat	Animal Medicine and Health	Animal Health and Anatomy	Zoonotic coronaviruses	SARS-CoV-2 vaccine development and antiviral testing
Emmanuel Serrano Ferron	Ramón y Cajal fellowship	Dept. Medicina i Cirurgia Animals Wildlife Ecology & Health group Servei d'Ecopatologia de Fauna Salvatge (SEFaS) Ed V. Despatx V0-339 Facultat de Veterinària Campus UAB, 08193, Bellaterra Cerdanyola del VAllès, Barcelona, Spain +34 935819123 www.weh.cat	emmanuel.serrano@uab.cat	Animal Medicine and Health https://www.uab.cat/web/postgraduate/phds/all-phd-programmes/general-information/animal-medicine-and-health-1345467765430.html?param2=1345657423130	Animal Medicine and Surgery	Global assessment of increasing wild ungulate numbers on the microbiome	Wild ungulate populations are rising worldwide due to major socio-economic changes, such as rural abandonment, land use change and the increase of environmental awareness. Ungulate overabundance results in environmental deterioration with consequences on the health and welfare of the own ungulates involved in the overabundance process. To date, no work has fully evaluated impacts of the agonistic encounters among individuals (social stress), and long-term food shortages on the health, welfare and potential susceptibility to infectious diseases of these group of mammals. There is a strong need to fill these gaps not only to gain knowledge on consequences of increasing wild ungulate numbers on animal health and welfare but also to develop easy and accurate health indicators that help define and early detect ungulate overabundance. This is particularly important not only for disease prevention programmes, but also to improve welfare of wildlife. This proposal aims to uncover the consequences of a progressive increase of wild ungulate abundance on the health and welfare of the herds involved in the overabundance process. Our hypothesis is that changes in wild ungulate abundance will drive food availability resulting in health (low nutritional condition, immunosuppression, oxidation and senescence) and welfare (corticosterone) impairment. To test this hypothesis, we will conduct a manipulative experiment to evaluate the effects of increasing red deer (Cervus elaphus) populations on the health (immune response, oxidation, telomere shortage, haematology, biochemical profile) and welfare (corticosterone) of the herds involved in the overabundance process. The commensal gastrointestinal microbiota is a dynamic ecosystem that adjusts to the repeated disturbance exerted by external factors (Lozupone, C. A., et al. 2012. Nature. 489:7415). This microbiome interacts with the host and plays a very important role in metabolic, nutritional, physiological, and immunological processes (Flint, H. J., et al. 2012. Nat. Rev. Gastroenterol. Hepatol. 9: 577–589). Dietary changes, mainly represented by nitrogen and carbohydrate availability, are known to alter the composition, abundance and function of the gut microbial communities and can lead to chronic disorders (Holmes, A. J., et al. 2017. Cell. Metabolism. 25: 140-151). However, the impact of malnutrition on gut microbiota is poorly known, highlighting the importance of such studies in order to understand the complex and intricate interactions between intestinal microbiome, nutrition and health.
Animal Production							
Marcelo Amills Eras	Associate professor (professor agregat)	Veterinary Faculty, Campus Universitat Autonoma Barcelona	marcel.amills@uab.cat	Animal Production	Department of Animal and Food Science	Conservation and improvement of animal genetic resources	Molecular analysis of goat lactation through epigenetic and transcriptomic methods. Identification of deleterious mutations in goat populations
Aquaculture							
Nerea Roher Armentia	Associate professor	IBB-MRB Campus Bellaterra UAB	nerea.roher@uab.cat	Aquaculture	IBB	Design and development of novel antiviral vaccines for aquaculture based on nanostructured recombinant proteins	Design and preindustrial development of a vaccine against white spot virus using biotechnological tools, mainly expression of nanostructured recombinant highly stable protein/s aimed to be orally administered
Biochemistry, Molecular Biology and Biomedicine							
Joaquin Ariño	Full Professor (Catedrático)	Ed. IBB, Campus UAB	joaquin.arino@uab.es	Biochemistry, Molecular Biology & Biomedicine	Dept. Biochemistry & Mol. Biol. / Institute of Biotecnology & Biomedicine	Genomics, Proteomics and Bioinformatics	Protein phosphorylation and stress response in yeasts- transcriptional responses to salt al alkaline pH stresses: Design, construction and testing of novel yeast expression vectors based on pH-responsive promoters for heterologus protein expression (drugs, vaccines, food additives,..)
Ester Boix	Associate professor	Fac. Biosciences, Edifici Cs, campus UAB	Ester.Boix@uab.cat	Biochemistry, Molecular Biology and Biomedicine	Dpt. Biochemistry and Molecular Biology	Gene regulation, structure and function of macromolecules	Role of host defense ribonucleases during infection. Structure-based design of novel antimicrobial agents.
Ana Paula Candiota (1) and Carles Arús (2)	(1) Lecturer (*Professor Associat*) and (2) Full professor	Edifici Cs Campus UAB, Dept Bioquimica i Biologia Molecular	AnaPaula.Candiota@uab.cat	Biochemistry, Molecular Biology and Biomedicine	Biochemistry and Molecular Biology	Molecular pathology	Non-invasive MR-based biomarkers for evaluating response to conventional and novel therapeutic strategies in preclinical glioblastoma (see https://pubmed.ncbi.nlm.nih.gov/31926117/)
Marc Torrent Burgas	Associate Professor	Facultat de Biociències, Edifici C	marc.torrent@uab.cat	Biochemistry, Molecular Biology and Biomedicine	Biochemistry and Molecular Biology	Genomics, Proteomics and Bioinformatics	Investigation of new mechanisms of infection in bacteria. We will use a combination of dual-sequencing technology and proteomics to discover new targets for antibiotic therapy.
Salvador Ventura Zamora	Full Professor Catedràtic Contractat	Institute of Biotechnology and Biomedicine Parc de Recerca UAB, Mòdul B Universitat Autònoma de Barcelona E-08193 Bellaterra (Barcelona)	salvador.ventura@uab.es	Biochemistry, Molecular Biology and Biomedicine	Institute of Biotechnology and Biomedicine/Department of Biochemistry, Molecular Biology	Gene regulation, structure and function of macromolecules	**Novel Protein-based Nanomaterials to Fight COVID-19:** Vaccines are the most promising solution to mitigate the spread of the coronavirus SARS-CoV-2. Nanomaterials play an important role in all aspects of vaccine design, delivery and administration. Nanoparticles enable multivalent antigen presentation and stabilization of antigens upon administration, they can serve as adjuvants to boost the immune response, and they can act as carriers for the targeted delivery of antigens. The project intends to exploit our knowledge on protein design and protein self-assembly to build up a platform of protein-based nanostructures able to improve the clinical efficacy of SARS-CoV-2 directed vaccines and therapeutic proteins.
Alex Peralvarez-Marin	Assistant Professor	Biophysics Unit / School of Medicine	alex.peralvarez@uab.cat	Biochemistry, Molecular Biology, and Biomedicine	Biochemistry and Molecular Biology / Biophysics Unit	Molecular Biophysics and Biomedical Applications	We are characterizing the structure-function relationships of mammalian neuropeptides to try to understand the membrane-peptide interaction processes of neuroscience-related neuropeptides. At the computational level, we are using full-atom and coarse grain molecular dynamics to understand how these peptides can form pores in cellular membranes, to design mammalian neuropeptide-based antimicrobial peptides to fight against specific microbial pathogens. Our approach uses a combination of biochemistry, cell biology, biophysics and bioinformatics methods. For latest publications check: https://scholar.google.es/citations?user=jP4TJKkAAAAJ&hl=en ORCID: 0000-0002-3457-0875
Bioinformatics							

Margarida Julià-Sapé	Part-time lecturer and associate researcher	Institut de Biotecnologia i Biomedicina (IBB) and Biochemistry Department, Biosciences faculty	Margarita.Julia@uab.cat	Bioinformatics	Institut de Biotecnologia i Biomedicina (IBB) and Biochemistry Department, Biosciences faculty	Omics and Molecular Bioinformatics	Machine learning coupled to magnetic resonance spectroscopy data of brain tumours- biomarker discovery for prognostic stratification of patients with glioblastoma
Biotechnology							
Gregorio Álvaro Campos	Associate professor (Professor Agregat)	Engineering School. Campus UAB. 08193- Bellaterra (Barcelona) Spain	gregorio.alvaro@uab.cat	Biotechnology	Department of Chemical, Biological and Environmental Science	Enzyme technology, biocatalysts engineering, Biocatalysis, enzymatic reactions.	CO2 is a pollutant and one of the main greenhouse gases. Applying knowledge in biocatalysis we can reduce the presence of this compound in the atmosphere through its biotransformation into other compounds. Furthermore, thanks to the great versatility of biocatalysts, we can design reactions that make it possible to transform CO2 into compounds that may be of interest to the chemical industry, giving CO2 the category of raw material. Under this concept, the research group participates in two European projects, BIOCON-CO2 (www.biocon-co2.eu) and RECYCLES, funded with 7 and 1.2 million euros respectively, in which universities, research centers participate. and large and small companies both in Europe and outside them (Chile, Thailand, Canada). In the case of BIOCON-CO2, the objective is to transform the CO2 from the steel industry into lactic acid, which is used in the synthesis of polymers (PLA) or as a preservative in animal feed. The RECYCLES project proposes the transformation of the CO2 obtained in the synthesis of biogas into formic acid. The doctoral thesis will be registered within these projects.The specific objective of the thesis is the study of the multi-enzymatic synthesis of lactic acid or formic acid from CO2 using multi-enzymatic systems composed of several enzymes that allow the regeneration in situ of the cofactor NAD + / NADH during the synthesis process . The effect of several process variables (pH, enzyme ratio, substrate addition systems, etc.) will be studied, as well as the effect of working at pressures higher than atmospheric pressure. The use of immobilized enzymes will also be evaluated to compare the process metrics with those obtained through the use of soluble enzymes.
Arben Merkoçi	Professor ICREA and main researcher in Nanobioelectronics and Biosensors grup	Campus UAB, building ICN2, 08193 Bellaterra, Barcelona, Spain	arben.merkoci@icn2.cat	Biotechnology	Nanobioelectronics and Biosensors Group / Catalan Institute of Nanoscience and Nanotechnology	Nanobiosensors design and applications	The idea of this PhD Thesis project is to develop innovative nanobiosensors for clinical diagnostics. This is a multidisciplinary project that will involve the research and study of new nanomaterials (ex. graphene and other 2D materials etc.) with interest to design and fabricate new (bio)sensing platforms. The candidate with experience in experimental science and engineering (ex. in material science, chemistry, electronics, communication systems & IoT, biotechnology or related fields) will be working in a multidisciplinary group with the idea to innovate and further strengthen the biosensing technologies developed in the group. For more info see: www.nanobiosensors.org
Cell Biology							
Ignasi Roig Navarro	Professor Agregat	office C2/107, Fac. Biociències, Campus UAB, Cerdanyola del Vallès 08193, Spain	ignasi.roig@uab.cat	Cell biology	Genome Integrity and Instability group, Institut de Biotecnologia i Biomedicina (IBB)	Identification of novel genes required for gametogenesis in mammals.	The project aims to identify novel genes required for the proper development of mammalian gametogenesis. Our previous investigations have uncovered unannotated genes that are preferentially expressed in the gonads. Using in vivo transfection of tagged-versions of these genes, we have demonstrated that their proteins localize in the nuclei of spermatocytes. Using CRISPR-Cas9, genetics, molecular biology, and cell biology tools we will reveal the functions of these novel genes in spermatogenesis and oogenesis. The success of this project will help to better understand the origins of human aneuploidy and infertility.
Chemistry							
Gregori Ujaque	Professor	Dep. Chemistry, UAB, Cerdanyola del Valles, 08193, Barcelona, Catalonia, Spain	gregori.ujaque@uab.cat	Chemistry	Chemistry Department, Science Faculty	Nanocatalysis	(a) Design of nanodevices for catalysis and molecular recognition (Supramolecular catalysis). (b) New catalysts generation for adressing synthetic challenges.
Manel del Valle	Full Professor	Department of Chemistry, Faculty of Sciences	manel.delvalle@uab.es	Chemistry	Chemistry	Nanobiosensors	Electrochemical sensors modified with nanocomponents (graphene and nanoparticles) to build electronic tongue analysis systems.
Maria Isabel Pividori Gurgo	Full Professor/ Catedrática d'universitat	Departament de Química/Unitat de Química Analítica Edifici Cn · despatx C7-245 · carrer dels Til·lers Campus de la UAB · 08193 Bellaterra (Bellaterra) · Barcelona · Spain https://isabelpividori.net T +34 93 581 1976	isabel.pividori@uab.cat	Chemistry	Chemistry	i) bioanalytical chemistry, electrochemistry, rapid diagnostic tests ii) analytical bioinstrumentation, biosensors, genosensors, immunosensors, DNA chips, lateral flow assays iii) nanobiomaterials, metallic nanoparticles, magnetic nanoparticles, oriented immobilization of biomaterials in nanomaterials iv) food safety, biomedical analysis, global health Further details about research lines can be found in https://isabelpividori.net/research/	Rapid Diagnostic Tests for the early diagnosis of communicable and non-communicable diseases 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 infections diseases, in the framework of the current pandemia. Besides, it will be exploit novel biomarkers as is the exosomes 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.
Daniel Maspoch	ICREA Research Professor and Head of the Supramolecular NanoChemistry & Materials Group (NANO^{UP})	Edifici ICN2 - Campus UAB 08193 Bellaterra	daniel.maspoch@icn2.cat	Chemistry	Institut Català de Nanociència i Nanotecnologia (ICN2)	NanoChemistry and Nanomaterials - Metal-Organic Frameworks	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).
Arantzazu Gonzalez-Campo	Ramon y Cajal Researcher	CSIC-ICMAB (Institut de Ciència de Materials de Barcelona) Campus Bellaterra, Phone: +34 935 801 853 - 243 (extension) Fax: +34 935 805 729	agonzalez@icmab.es	Chemistry	Institut de Ciència de Materials de Barcelona (ICMAB-CSIC)	Synthesis and immobilization on surfaces of bifunctional curcumin-based molecular probes for theranostic materials	The project consists on the synthesis of fluorescent molecules based on curcumin derivatives. Furthermore, the study of their properties and their immobilization on surfaces/particles in order to develop new bifuncional molecular probes. The properties of the bifunctional probes will be studied for bioimaging applications as well as for the development of new theranostic materials.

José Giner	Tenured Scientist	Carrer dels Til3lers s/n, Bellaterra	jginerplanas@icmab.es	Chemistry	Institut de Ciència de Materials de Barcelona (CSIC)	Highly Stable and Flexible Carba-MOFsfor energy Applications	The PhD work will seek to prepare porous and functional Metal-Organic Frameworks (MOF) and to tune their structures and properties. Unprecedented carborane-based building blocks will be synthesized and combined with suitable transition metals to provide ultrastable MOFs for energy and environmental applications. See an example at J. Am. Chem. Soc. 142 (2020) 8299–8311. https://doi.org/10.1021/jacs.0c01008
Rosario Núñez	Investigador Cientific CSIC	Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Campus UAB, 08193 Bellaterra (Barcelona)	rosario@icmab.es	Chemistry	Materials Moleculars y Supramoleculars	Efficient light emitters based on icosahedral boron clusters for optical and biological applications	Icosahedral boron clusters are very robust compounds characterized by a rigid structure, (3D)-aromaticity, high thermal and chemical stability, electron-withdrawing capacity, hydrophobicity and low toxicity in biological systems. Due to their unique structural and electronic properties, carborane clusters are excellent entities when applying them to tailor the fluorescence emission of any fluorophore group (Chem. Rev. 2016, 116, 14307 and Chem.Soc.Rev. 2016, 45, 5147). The PhD thesis will deal with the development of a new generation of boron clusters-organic fluorophores as luminescent materials of high efficiency both in solution and solid state. These systems will have potential application in molecular electronic and bioimaging. One of the major challenges of the project is to establish the structure–property relationships of a specific material, and understand how small changes in the molecular structure allows to tune the final photophysical properties. The PhD student will work to decipher the relationship between the structure and electronic properties of the boron clusters with the photophysical properties of the luminescent materials (see: J. Mater. Chem. 2018, 6, 11336; Biomat. Sci., 2019, 7, 5324-5337; Inorg. Chem Front. 2020, 7, 2370). The student will synthesize new molecular materials and characterize them by different spectroscopy techniques: Infrared Spectroscopy (IR-ATR), Nuclear Magnetic Resonance (RMN), as well as X-Ray diffraction, Mass Spectrometry (MALDI-TOF), Thermogravimetric analysis (TGA), TEM, SEM, among others. The photophysical properties will be studiend by UV-vis, fluorescence, fluorescence life-time. The PhD student will be integrated in a multidisciplinary group and will have to interact with other expert groups (physics, biologists ands theoreticians) to evaluate the incorporation of the molecules into devices or to explore as fluorescence dyes for bioimaging.
Manuel Valiente Malmagro	Full professor CATEDRATIC	UAB. DEPARTAMENT DE QUIMICA. CAMPUS DE LA UAB. EDIFICI CN. CENTRE GTS	gestio.postgrau.quimica@uab.cat	CHEMISTRY	Chemistry	Chemical Speciation applied to Biomasterials	Characterization of dental tissues, DT, by determining the related chemical species playing the role on dental remineralization/demineralization and the relationships with dental care, e.g, hypersensivity, dental whitening, …
Manuel Valiente Malmagro	Full professor CATEDRATIC	UAB. DEPARTAMENT DE QUIMICA. CAMPUS DE LA UAB. EDIFICI CN. CENTRE GTS	gestio.postgrau.quimica@uab.cat	CHEMISTRY	Chemistry	Recovery of Environmental Pharmaceutical Persistant Pollutants (EPPP).	Reagentless processes for the removal, separation and recovery of EPPP (Environmental Pharmaceutical Persistent Polutants) by nanostructured adsorbants.
Laia Francàs Forcada	Ramon y Cajal Fellow	Edifici C, C/ dels Til·lers, 08193 Bellaterra	Laia.Francas@uab.cat	Chemistry	Chemistry	Catalysis for solar fuels applications	The use of hybrid molecular materials (anchored molecular catalysts, nanoparticles decorated with organic ligands or bulk metal oxides modified with organic ligands) offers the possibility to tune selectivity and activity of redox catalytic processes. In here we will use spectroscopic techniques to depict the mechanism of action of this type of materials and rationally improve their performance. All the studied processes are relevant to improve solar fuels production: Proton reduction, water oxidation, glycerol oxidation and furfural oxidation.
Montserrat López Mesas	Associate Professor (Tenure Professor)	Departament de Química, Facultat de Ciències, Edifici Cn, Campus UAB	montserrat.lopez.mesas@uab.cat	Chemistry	Chemistry	Chemical speciation	Micronutrients are essential for maintaining a good human health even though they are only required in trace amounts. One of such micronutrients is selenium (Se). The proposed thesis will be focused on the speciation of selenium compounds in some physiological human processes as in the urine for its role in the formation of kidney stones and in breast or skin cancer. Developed in collaboration with Hospitals of Barcelona and International institutions. Will learn and use techniques in Synchrotron facilities and in laboratory as ICP-MS, HPLC, UV... as needed.
Carolina Gimbert Suriñach (Adelina Vallribera	Ramón y Cajal Researcher and Professor (Professor)	Chemistry Department, Edifici C, Campus UAB 08193 Bellaterra (Cerdanyola)	cgimbertsurinach@gmail.com	Chemistry	Chemistry	Functional materials and organic reactivity	Hybrid materials for CO_2 uptake and reactivity
Albert Rimola	Ramón y Cajal Researcher	C5/421, Edifici C, Campus UAB, 08193 Bellaterra, Spain	albert.rimola@uab.cat	Chemistry	Chemistry	Computational simulations of surface-induced primordial chemical evolution in Space and Earth	Formation of Solar-type systems is intrinsically associated with a chemical evolution, in which at each step more complex molecules are formed. In Space this evolution involves the formation of essential molecules (e.g., H2, H2O, NH3) and the simplest organic compunds (e.g., CH3OH, CH3CHO NH2CHO), while on Earth formation of biomolecules (e.g., amino acids, nucloebases, sugars) and their polymerization (e.g., formation of peptides or nucleotides). In some of such chemical processes the presence of naturally-occurring surfaces is mandatory. This thesis will investigate paradigmatic cases of these surface-induced chemical reactions by means of state-of-the-art quantum chemical simulations. The thesis topic is grounded on the QUANTUMGRAIN ERC Consolidator Grant project.
Computer Engineering							
Mercè Villanueva Gay	Professor Titular d'Universitat	Edifici Q, Escola d'Enginyeria, Universitat Autònoma de Barcelona	merce.villanueva@uab.cat	Computer Engineering	Dep. of Information and Communications Engineering	Security, coding, and compression	Error correcting codes and their applications: Hadamard codes, codes over rings, quantum codes over finite fields, codes for distributed storage. Software in Coding Theory
Computer Science							
Joost VAN DE WEIJER	CVC Senior Researcher/ IVU UAB Professor computer science programme UAB	Centre de Visió per Computador Edifici O - Campus UAB 08193 Bellaterra	joost@cvc.uab.es	Computer Science	Computer Science Department / Computer Vision Center	Computational Models for Artificial vision	**Continual learning**: Continual learning is one of the desired characteristics for future artificial intelligence. Rather than learning deep neural networks from scratch, in continual learning, the objective is to sequentially learn new tasks. The main problem is the danger of catastrophic forgetting, which refers to the forgetting of previously learned tasks by the network. Because of its importance, the field of continual learning is gaining much traction in the machine learning community. The LAMP group in the computer vision center in Barcelona is one of the leading groups in Europe on this topic. We are interested in any candidates which are passionate to investigate artificial intelligence and are excited to push forward the continual learning research field.
Xavier OTAZU	Associate Professor / Head of the Computer Science Department at Universitat Autonoma de Barcelona	Centre de Visió per Computador Edifici O - Campus UAB 08193 Bellaterra	xotazu@cvc.uab.es	Computer Science	Computer Science Department / Computer Vision Center	Computational Models for Artificial vision	**Computational Neuroscience and Machine Learning**. The main crticism to present Deep Learning and particulary to Convolutional Neural Networks (CNN) widely used in the Artifical Intelligence field is that they do not reflect the true biological architecture of the human brain. Nowadays, interest to incorporate knowledge from Neuroscience into Machine Learning architectures is increasing. On the other hand, Computational Neuroscience field is firmly based on the computational reproduction of the real biological mechanisms presents in our brain. Particularly, Spike Time Dependent Plasticity (STDP) is the biological neural process present in biological neurons that allow neuronal plasticity (that is, learning). In this project we will define biologically plausible Deep Learning architectures by defining Spinking Neural Networks (SNN) that use STDP as the learning process. It will show that Machine learning can be performed using exclusively real neuronal processes present in in our brain, hence bridging the gap between Computational Neuroscience and Computer Vision.

Antonio M. LÓPEZ PEÑA	Associate Professor	Centre de Visió per Computador Edifici O - Campus UAB 08193 Bellaterra	antonio@cvc.uab.es	Computer Science	Computer Science Department / Computer Vision Center	Computational Models for Artificial vision	**Developing semi-supervised and/or action-based CNN-models to address perception tasks in the context of autonomous driving**. Today data is driving the advances in AI and so in autonomous driving. While collecting sufficient amounts of on-board raw sensor data is relatively doable, this is not sufficient since these data require associated ground truth to be consumed during the training of the CNNs. Usually this is achieved after a manual annotation protocol. For instance, if the goal is to detect vehicles and pedestrians using a new camera, images must be collected with this camera and bounding boxes framing each imaged vehicle and pedestrian must be provided, which is very cumbersome and costly. In the context of this PhD ways of minimizing such annotation effort will be explored. We foresee solutions in the intersection of virtual words, domain adaptation, semi-supervised learning and action-based representation learning. Some examples of papers are "Co-Training for On-Board Deep Object Detection" (IEEE Access 2020) and "Action-Based Representation Learning for Autonomous Driving" (CoRL'2020), which are works from our group that can be found here <<< https://scholar.google.com/citations?user=3LYW1zMAAAAJ&hl=en >>> together with more.
Mikhail MOZEROV	CVC Senior Researcher/ IVU UAB Professor computer science programme UAB	Centre de Visió per Computador Edifici O - Campus UAB 08193 Bellaterra	mozerov@cvc.uab.es	Computer Science	Computer Science Department / Computer Vision Center	Computational Models for Artificial Vision	**Developing fully convolutional mesh autoencoder to address the 3D object compression and generation task**. Motivated by the success of deep learning in computer vision, many works aimed in developing similar models for 3D geometric data. Consequently, deep learning approaches have been extended to arbitrary topological structures through graph convolution networks (GCNs) and geometric deep learning. We consider the problem of representation learning for mesh data. For taking advantages of deep neural networks, autoencoders are deemed as an appropriate selection since its hierarchical structure. However, existing methods for constructing autoencoders on mesh data drop the features of vertices directly in pooling procedure. Not same as in image domain, these features are hard to be compensated since the irregular structure of mesh and the intrinsic property of graph convolution. In this project, we aim simplifying method with merging module (MSM) to address this through encoding the features of dropped vertices into the remained ones.
Daniel PONSA Felipe LUMBRERAS Robert BENAVENTE	Tenure-track lecturers		daniel@cvc.uab.es	Computer Science	Computer Science Department / Computer Vision Center	Computational Models for Artificial Vision	**Automatic design of multisensor/multispectral spectro-selective vision systems.** Most computer vision systems are developed based on conventional RGB cameras, processing information contained just in the visible spectrum. However, for many problems, the key information to robustly solve a given task remains in other areas of the electromagnetic spectrum. Due to that, new sensors are being developed which are sensitive beyond the visible spectrum. These so-called hyperspectral sensors capture spectral information in multiple narrow bands, providing very rich data of the environment. However, they are expensive, and in many cases just processing a small subsets of the bands provided is enough to develop high-performing vision systems. In this thesis we aim to develop a novel methodology devoted to the automatic design of multisensor/multispectral spectro-selective vision systems, optimal for the resolution of objective tasks. Provided multispectral/hyperspectral data in a given application domain, the goal is to develop a system that automatically determines the low cost multispectral camera that optimizes the resolution of a particular problem, and the computer vision system that will process its data. This will involve doing research in areas like deep learning, band and feature selection, object detection, image segmentation and working in application domains like quality assessment in industrial products.
Dimosthenis KARATZAS Lluís GÓMEZ	Associate professor CVC Senior Researcher/ IVU UAB Professor computer science programme UAB	Centre de Visió per Computador Edifici O - Campus UAB 08193 Bellaterra	dimos@cvc.uab.es	Computer Science	Computer Science Department / Computer Vision Center	Computational Models for Artificial Vision	**Reading Systems for Scene Text Visual Question Answering (ST-VQA):** The prospective PhD student will focus on the integration of reading capability into visual question answering models. Reading systems is the area of research that aims to replicate the ability to extract and interpret written communication from images. Visual Question Answering has become a key task in the "vision and language" field over the past decade. As the field matured, it became clear that there were numerous questions of common interest which could not be answered unless the text that appears in the image could be read and understood in the context provided by the visual information. The prospective student will work on developing new methods for a specific VQA branch: "Scene Text VQA", introduced by the host group of this PhD candidature. The aim of Scene Text VQA is to properly incorporate scene text information in the VQA process. Unlike traditional VQA tasks, scene text VQA requires an open dictionary for answers, and joint reasoning of visual and textual information extracted from the image.
Dimosthenis KARATZAS Lluís GÓMEZ	Associate professor CVC Senior Researcher/ IVU UAB Professor computer science programme UAB	Centre de Visió per Computador Edifici O - Campus UAB 08193 Bellaterra	dimos@cvc.uab.es	Computer Science	Computer Science Department / Computer Vision Center	Computational Models for Artificial Vision	**Reducing Bias in Image Captioning Systems:** Most machine learning methods are susceptible to biases in training data, which can hinder their performance in certain situations. Image captioning is a research area where human introduced biases are important and have significant effects. This PhD research will explore ways to reduce the bias in image captioning systems at training time.
Dimosthenis KARATZAS Ernest VALVENY	Associate professors	Centre de Visió per Computador Edifici O - Campus UAB 08193 Bellaterra	dimos@cvc.uab.es	Computer Science	Computer Science Department / Computer Vision Center	Computational Models for Artificial Vision	**Reading Systems for Document Visual Question Answering (DocVQA):** The prospective PhD student will focus on the development of novel methods for Document Visual Question Answering. Research in document analysis and recognition is typically focused on generic information extraction tasks from document images (OCR, table understanding, key-value pair extraction) that aim to convert imagery information into machine readable form. Such algorithms tend to be designed as generic blocks, blind to the end-purpose the extracted information. This PhD research will question the above viewpoint, by moving towards purposeful document exploitation, using the document content to respond to high-level tasks defined by the human consumers of this information. Document Visual Question Answering, as introduced by the host group over the past few years, will provide the driving paradigm.
Ernest VALVENY Dimosthenis KARATZAS	Associate professors	Centre de Visió per Computador Edifici O - Campus UAB 08193 Bellaterra	ernest@cvc.uab.es	Computer Science	Computer Science Department / Computer Vision Center	Computational Models for Artificial Vision	**Multilingual and Contextual Reading Systems:** Text recognition is a mature field with many methods developed over the last years. However, there are still important challenges to address. In this project we aim to address some of these challenges related to multilingual recognition and leveraging contextual information to improve recognition. Most methods only focus on a single language and need to be retrained or adapted somehow in order to work in a multilingual scenario. There is a need for end-to-end systems able to recognize text in multiple languages with a single pipeline. On the other hand, contextual information provided, for instance, by surrounding semantic visual or textual information or by adjacent frames in a video sequence is usually not taken into account in order to improve recognition. The prospective PhD student will work on developing new methods for text recognition that could advance current state-of-the-art by adressing these challenges on multilingual and contextual text reading.

Josep LLADÓS Pau RIBA	Associate professor CVC Researcher	Centre de Visió per Computador Edifici O - Campus UAB 08193 Bellaterra	josep.llados@uab.es priba@cvc.uab.es	Computer Science	Computer Science Department / Computer Vision Center	Computational Models for Artificial Vision	**Rediscovering the cultural heritage in historical photography with Computer Vision** Every society has its own cultural heritage which tells its history and defines how these societies looks like nowadays. However, the biggest part of this knowledge is currently stored in archives. With the current efforts on digitalization, the images are accessible, but new challenges appear related to their access by content and interpretation. The prospective PhD student will focus on the development of computer vision techniques to foster the accessibility to historical photography archives. Therefore, it must deal with weakly-supervised data for tasks such as image retrieval, photography dating, style transfer or geolocalization. The host group has a large experience collaborating with historical archives in tasks such as word spotting, handwriting text recognition or network analysis of population records. Lately, historical photographs have become a new paradigm with lots of potential contributions. In addition, the local archives will closely contribute with the prospective PhD student with their data and knowledge. The PhD work will be part of the big EU Time Machine initiative.
Josep LLADÓS, Pau RIBA	Associate professor CVC Researcher	Centre de Visió per Computador Edifici O - Campus UAB 08193 Bellaterra	josep.llados@uab.es priba@cvc.uab.es	Computer Science	Computer Science Department / Computer Vision Center	Computational Models for Artificial Vision	**Visual parsing and image generation with program learning.** The great advances on Generative Adversarial Networks (GAN) have demonstrated the potential of Deep Learning to model real images. However, this powerful approach lacks interpretability on how the final image is generated. The prospective PhD student will focus its research on the development of program synthesis techniques in order to decompose graphical image generation into meaningful visual terms and constructive commands. Certain types of images can be interpreted as being generated according to some syntactical rules, that are inferred after parsing sample instances. Use cases range from sketches, handwritten text, diagrams or snapshots of graphical user interfaces. These images have been generated by human beings in a meaningful way to be read by humans and, therefore, are good candidates for this research. The host institution has a large experience working on such images in problems like sketch-based image retrieval, graphics recognition, handwritten text recognition or handwritten text generation
Luis HERRANZ	CVC Senior Researcher/ IVU UAB Professor computer science programme UAB	Centre de Visió per Computador Edifici O - Campus UAB 08193 Bellaterra	lherranz@cvc.uab.es	Computer Science	Computer Science Department / Computer Vision Center	Computational Models for Artificial Vision	**Efficient deep architectures for image generation and translation**. Generative models are at the core of the new generation of deep learning and computer vision applications. Efficient architectures are required to reduce the memory and computational requirements to run these models in resource-limited scenarios (e.g. mobile phones). We are looking for candidates who are interested in theoretical aspects of deep learning, on subjects such as generative adversarial networks and image translation and multimodal representations. The candidate will join the LAMP group at the Computer Vision Center in Barcelona; the center offers an exciting research environment with over 100 scientists working in computer vision.
Electronic and Telecommunication Engineering							
Miquel Angel Piera	Professor Titular d'Universitat	c/ dels Emprius nº 2. 08202 Sabadell	miquelangel.piera@uab.es	Electronic and Telecommunication Engineering	Telecommunicatio and Systems Engineering	Air Transport Logistics	Modeling and Simulation of Socio-Technological systems: Design of decision support tools in complex and very demanding systems. Application to flight-deck in a Single Pilots Operation framework (more information in http://www.e-pilots.eu/)
Dr. Pedro de Paco Sánchez	Principal Researcher and Engineering School Professor	Escola Enginyeria - Edifici Q - Campus UAB. 08193 Cerdanyola del Vallès. Telf: 0034 93 581 47 35	pedro.depaco@uab.es	Electronic and Telecommunication Engineering	Telecommunications and System Engineering	Microwaves Engineering. Filters and Multiplexers for 5G/6G based on AW piezoresonators.	Development of advanced RF-Filter synthesis techniques to cope with new spectrum requirements for 5G/6G through advanced responses and the entanglement with functional materials. Train creative and innovative early-stage researchers through an intersectorial and interdisciplinary excellence and outstanding research programme.
Dr. Pedro de Paco Sánchez	Principal Researcher and Engineering School Professor	Escola Enginyeria - Edifici Q - Campus UAB. 08193 Cerdanyola del Vallès. Telf: 0034 93 581 47 35	pedro.depaco@uab.es	Electronic and Telecommunication Engineering	Telecommunications and System Engineering	Design and development of RF devices based on emerging functional materials (III-V Nitrides and LiNbO3) for 5G/6G.	Study of the performance of AW resonators based on new operation modes (electrical performance, methodologies to improve the quality factor, linear and non-linear behaviour). Train creative and innovative early-stage researchers through an intersectorial and interdisciplinary excellence and outstanding research programme
Dr. Pedro de Paco Sánchez	Principal Researcher and Engineering School Professor	Escola Enginyeria - Edifici Q - Campus UAB. 08193 Cerdanyola del Vallès. Telf: 0034 93 581 47 35	pedro.depaco@uab.es	Electronic and Telecommunication Engineering	Telecommunications and System Engineering.	Microwaves Engineering. GaN PA and circulators for RF Front-End Very High Throughput Satellites.	5G is expected to operate at a very high data rate, which entails the need of a strong backhaul behind the base stations to transmit all the traffic generated by the user to the network. One of the better solutions to support this traffic as a complement to terrestrial networks (specially for large areas with less population) is to operate in the Ka band (26.5 to 40GHz), but also the use of Q/V band (30 to 75GHz) to increase the bandwidth offered by Ka bands, required at fixed infrastructure such the case of Gateways. Train creative and innovative early-stage researchers through an intersectorial and interdisciplinary excellence and outstanding research programme
Gonzalo Seco-Granados	Professor, Director of the Research Group on Signal Processing for Communications and	Engineering School Campus UAB 08193 Bellaterra	gonzalo.seco@uab.cat	Electronic Engineering and Telecommunications	Telecommunications and Systems Engineering	Communications, navigation and networking	Localization and Sensing with 5G and GNSS Systems
Enviromental Science and Technology							
Xavier Font	Lecturer	C/ de les Sitges, s/n, 08193 Bellaterra, Barcelona	xavier.font@uab.cat	Environmental Science and Technology	Department of Chemical, Biological and Environmental Engineering	Composting of organic solid waste	Production of biosurfactants in a Circular Bioeconomy strategy.
Montserrat Sarra	Associate professor	School of Engineering. Campus Bellaterra	Montserrat.Sarra@uab.cat	Environmental Science and Technology	Chemical, Biological and Environmental Engineering	Biodegradation of industrial pollutants and waste valorisation	Bioremediation of organo-phosphorus flame retardants in biorector by immobilized white-rot fungi
Antoni Rosell-Melé	ICREA Research Profes	Edifici Z· Carrer de les Columnes Campus de la UAB · 08193 Bellaterra, Barcelona (Spain)	antoni.rosell@uab.cat	Environmental Science and Technology	Institute of Environmental Science and Technology (ICTA-UAB)	Global and Climate Change	Tropical precipitation and wildfires in extreme climates: a paleoclimatic perspective using marine sediments
Antoni Rosell-Melé	ICREA Research Professor	Edifici Z· Carrer de les Columnes Campus de la UAB · 08193 Bellaterra, Barcelona (Spain)	antoni.rosell@uab.cat	Environmental Science and Technology	Institute of Environmental Science and Technology (ICTA-UAB)	Global and Climate Change	Soil carbon sequestration potential and the feasibility of agricultural land abandonment as a climate mitigation strategy
Antoni Rosell-Melé	ICREA Research Professor	Edifici Z· Carrer de les Columnes Campus de la UAB · 08193 Bellaterra, Barcelona (Spain)	antoni.rosell@uab.cat	Environmental Science and Technology	Institute of Environmental Science and Technology (ICTA-UAB)	Global and Climate Change	Development of stable isotopes in aminoacids and sugars as tracers of diets in ecological and archeological research
Albert Guisasola Canudas	Tenure-track lecturer	Departament d'Enginyeria Química, Biológica i Ambiental Escola d'Enginyeria	albert.guisasola@uab.cat	Environmental Science and Technology	Department of Chemical, Biological and Environmental Engineering	Biolectrochemical hydrogen production from wastewater	Improvement of energy recovery from wastewater through the use of bioelectrochemical systems.
Juan Antonio Baeza Labat	Full professor	Departament d'Enginyeria Química, Biológica i Ambiental Escola d'Enginyeria	JuanAntonio.Baeza@uab.cat	Environmental Science and Technology	Department of Chemical, Biological and Environmental Engineering	Enhanced Biological Phosphorus Removal from wastewater	Improvement of nutrient removal in Enhanced Biological Phosphorus Removal Water Resource Recovery Facilities by using novel side-stream configurations
David Gabriel Buguña	Full Professor	Escola d'Enginyeria	david.gabriel@uab.cat	Environmental Science and Technology	Departament d'Enginyeria Química, Biològica i Ambiental	Biological treatment of liquid and gas effluents. Elimination of nutrients, odours and volatile organic compounds	Development, monitoring and modelling of a process for the biological recovery of elemental sulfur from flue gases: experimental analysis, use of microsensors and mathematical modelling of sulfidogenesis and autotrophic denitrification
Antoni Sánchez Ferrer	Full Professor	Dept. of Chemical, Biological and Environmental Engineering, Escola d'Enginyeria, UAB, 08193-Bellaterra (Barcelona, Spain)	antoni.sanchez@uab.cat	Environmental Science and Technology	Dept. of Chemical, Biological and Environmental Engineering	Environmental Engineering is not distant to nanotechnology and there is an increasing interest on the use of nanomaterials in environmental remediation. We are investigating the use of nanoparticles for the reduction of metals, nutrients and pesticides in water and, also, for the reduction of Green House Gases (CH4 and N2O) present in air.	Capture of CO2 and CH4 from biogas and other sources to tranform them into methanol using nanomaterials and MOFs

Victoria Reyes Garcia	ICREA Research Profes	ICTA-UAB, Cerdanyola del Valles, 08193, Barcelona	victoria.reyes@uab.cat	Environmental Science and Tecnology	Institut of Environmental Science and Technology	Global Change	Perceptions of climate change impacts on local productive systems and livelihoods
Geology							
Mercè Corbella	Associate Professor	c/ de la Vall Moronta, Facultat de Ciències	merce.corbella@uab.cat	Geology	Departament of Geology	Ore Deposits and Magma fertilisation with REE	The thesis will focus on the formation minerals with Rare Earth Elements (REE) in the Variscan Belt of the Iberian Peninsula, in the areas of the Catalan Coastal Ranges and Central System, where they have been found within altered lamprophyres and hosting rocks. The principal method of study will be numerical modeling with computers considering the geological and geochemical data gathered from field and laboratory work. The thesis will involve simulations of mixing and contamination of magma originated in the mantle during its ascent through the crust and interaction of hydrothermal fluids with igneous and metamorphic rocks. These models will incorporate REEs, with their partition coefficient, thermodynamic and kinetic data when available, to track their mobility and concentration in the different processes.
Materials Science							
Dr. J Raul Herance	Senior Researcher - Head of Medical Imaging Group	Pg. De la Vall d'Hebron 119-129	raul.herance@vhir.org	Material Science	Vall d'Hebron Research Institute	Medical Molecular Imaging and Theranostics	We have currently on going 2 topics: 1) Development of diagnostic and theragnostic agents based on biomolecules and/or nanomedicine for using in cancer, ulcerative colitis, multiple esclerosis, among other fields. 2) Type 2 diabetes physiological studies (clinical and pre-clinical) based on molecular imaging studies to unravelling patophysiologycal processes related with insulin resistance and development of threatments based on precision medicine
Dr. J Raul Herance	Senior Researcher - Head of Medical Imaging Group	Pg. De la Vall d'Hebron 119-129	raul.herance@vhir.org	Material Science	Vall d'Hebron Research Institute	Medical Molecular Imaging and Theranostics	We have currently on going 2 topics: 1) Development of diagnostic and theragnostic agents based on biomolecules and/or nanomedicine for using in cancer, ulcerative colitis, multiple esclerosis, among other fields. 2) Type 2 diabetes physiological studies (clinical and pre-clinical) based on molecular imaging studies to unravelling patophysiologycal processes related with insulin resistance and development of threatments based on precision medicine
Judith Guasch	Ramón y Cajal researcher (ICMAB-CSIC)	Til·lers, s/n	jguasch@icmab.es	Material Science	Química	Dynamic Biomimetics for Caner Immunotherapy	Biomimetic tissues based on bionanomaterials for cancer immunotherapy
Xavier Torrelles / Felip Sandiumenge	Researcher	ICMAB-CSIC, C/ Til·lers s/n, Campus UAB	torrelles@icmab.es. / felip@icmab.cat	Material Science	Crystallography	RL1	**Investigation of ferroelectric films for optimizing water splitting process.** Sunlight induced photocatalytic water splitting is receiving nowadays a lot of interest as a clean energy production technology. However, the efficiency of one of the most promising catalysts, TiO2, is largely reduced by fast recombination velocities of the electron-hole pairs produced during illumination. In this context, ferroelectric (FE) BaTiO3 and BiFeO3 films with spontaneous polarization perpendicular to the film, exhibiting an open-circuit photovoltage under illumination, can drive charge carriers to opposite surfaces (bulk photovoltaic effect). The direction of the spontaneous polarization component can be modified depending on the lattice mismatch between the substrate and the film, so, in-plane, out-of-plane or a combination of both components are achievable. The FE-field can thus be used in TiO2/FE heterostructures to create spatially separated sites for the reduction and oxidation water reactions yielding H2 and O2, respectively. In this way, the recombination of the photogenerated carriers can be reduced, thus enhancing the photocatalytic efficiency. The main objective of this proposal is the analysis of the influence of the FE-polarization on the enhancement of the photo-catalytic efficiency and correlate catalytic effects with structural and electronic surface/interface cross-properties. To this end, special interest will be paid the domain configuration of the FE substrate, and to catalyst/FE interfacial effects, such as formation of screening charges, structural distortions and defect chemistry.
Lluís Balcells Argemí	Scientist Research at ICMAB-CSIC	ICMAB-CSIC. Carrer Til·lers S/N Campus UAB. Bellaterra 08193	balcells@icmab.es	Materials Science	Instituto de Ciencia de Materiales de Barcelona	Thin films and nanostructures: Basic research and potential technological applications	**Thin films and nanostructures beyond the computer science, the new generation of non volatile memories:** The use of resistive switching is expected to provide a new generation of non-volatile memory that will allow the implementation of newer and more energy efficient electronic devices with improved capabilities. The development of this technology requires the generation of new thin films and nanostructures with optimal electonic properties and low dimensionality. This thesis is dedicated to the growth of functional oxides and the implementation of resistive devices.
BENJAMIN MARTINEZ PEREA	Research Professor at ICMAB-CSIC	ICMAB-CSIC. Carrer Til·lers S/N Campus UAB. Bellaterra 08193	ben.martinez@icmab.es	Materials Science	Instituto de Ciencia de Materiales de Barcelona	Complex functional oxide thin films: Basic research and potential technological applications	Spin dynamics and spin pumping in functional oxides: The use of the electrons' spin as a control variable is expected to allow the implementation of new and more energy-efficient electronic devices with enhanced capabilities. The development of this technology requires the generation, handling and detection of spin currents. Spin pumping is one of the most efficient methods to generate pure spin currents. This thesis is devoted to the study of spin pumping processes in functional oxides and the implementation of oxide-based spintronic devices.
Mariano Campoy Quiles y Sebastian Reparaz	NA	ICMAB-CSIC, Campus UAB, Bellaterra	mcampoy@icmab.es	Materials Science	ICMAB-CSIC	Designing thermal conductivity landscapes with carbon materials	The student will work on the fabrication of carbon based materials and composites with controlled thermal properties for energy applications, including thermoelectric generators and heat managment systems. This will be achieved by controlling structural anisotropy, inducing alloying effects and nanostructuration. Novel thermal imaging methods will be developed.
Prof. Jordi Arbiol	ICREA Research Profes	Institut Català de Nanociència i Nanotecnologia (ICN2), Campus UAB, Edifici ICN2, Bellaterra, 08193 Barcelona, Catalonia, Spain	arbiol@icrea.cat	Materials Science	Institut Català de Nanociència i Nanotecnologia, ICN2	Advanced Electron Nanoscopy	Correlation of the structure and composition of nanomaterials at atomic scale with their electrocatalytic properties at the nanoscale. The nanomaterials and nanostructures studied will be related to new nanomaterials for energy applicattions: e.g.: 2D nanostructures, nanoparticles,...
Prof. Josep Nogués, Dr. Alejandro Gómez	Profesor ICREA, Post-doc Senior	Intitut Català de Nanociencia i Nanotecnologia, Campus UAB, 08193 Bellatrra	josep.nogues@icn2.cat; alejandro.gomez@icn2.cat	Materials Science	Magnetic Nanostructures Group / Intitut Català de Nanociencia i Nanotecnologia	Theragnostic magnetic and magneto-plasmonic nanostructures	The PhD project will be focused on the rational design and nanofabrication of multifunctional magnetic and magnetoplasmonic nanostructured materials, and in their biomedical application for advanced diagnosis and targeted treatments. The goal will be the development of diffrent nanostructures combining magnetic and optic functionalities to produce diffrent types of treatments like photo/magnetic hyperthermia, controlled reactive oxygen species production or in-situ electric fields generaton, to treat diverse types of illnesses, like cancer or neurrodegenerative deseases. Moreover, the PhD student will also be involved in the design portable devides for magntic/optic actuation and in-situ, real time, monitoring of the treatments.
Aitor Mugarza	Research Professor at ICN2	Edifici ICN2 UAB Campus, Bellaterra (Barcelona) 08193, Spain	aitor.mugarza@icn2.cat	Materials Science	Institut Català de Nanociència i Nanotecnologia (ICN2)	Nanoarchitectonics with atomic precision for sensing and nanoelectronics	In this project, we bring architecture down to the atomic level by assembling molecular building blocks into atomically perfect, two-dimensional crystal structures. The covalently interconnected molecular modules proposed in this project can be conceived as a new class of 2D materials that combine the benefits of molecular frameworks (sensitivity, selectivity), covalent organic frameworks (rigidity, electronic connectivity), graphene (high mobility), and 2D semiconductors (gate modulation). The activities of the student in the project span across the whole value chain, form the design of molecular building blocks, to the synthesis and characterization of the nanoarchitectures, the device fabrication and the proof of concept tests in chemical sensing and optoelectronics. The synthesis will done on metallic surfaces in ultra high vacuum conditions, and the characterization will be carried out by combining scanning tunneling microscopy and spectroscopy (STM/STS) with photoemission (XPS/UPS)

Marta González Silveira	Associate Professor	Physics Department, Science Faculty, Universitat Autònoma de Barcelona, 08197 - Bellaterra (Spain)	marta.gonzalez@uab.cat	Materials Science	Physics Department	The Materials Science Doctoral Programme includes a wide range of reasearch lines, all of them focused on the study of new materials and characterization techniques. Three Departments are part of this doctoral programme: Physics, Chemistry and Geology, showing the multidisciplinarity of such a research topic.	The emergence of organic electronics in the last years has revolutionized the electronics industry. Now it is possible, for instance, to think about flexible screens or low-cost electronics. Still, organic electronics present many drawbacks, as can be the limit in temperature and time operation due to degradation or the low efficiency in some cases. There is however some options to increase the stability and improve the behaviour of the organic thin film glassy layers that integrate a device. For instance, it is possible to increase the stability of the glassy material increasing its relaxation time in several orders of magnitude just changing the deposition conditions of the thin film or the efficiency can improve considerably by orienting in the proper direction the molecules during the preparation. Our group has worked on the topic for several year, a sample can be found in the following publications: •Nucleation and Growth of the Supercooled Liquid Phase Control Glass Transition in Bulk Ultrastable Glasses. A. Vila-Costa, J. Ràfols-Ribé, M. González-Silveira, A. F. Lopeandia, Ll. Abad-Muñoz, and J. Rodríguez-Viejo Phys. Rev. Lett. 124, 076002 (2020) •High-performance organic light-emitting diodes comprising ultrastable glass layers. Joan Ràfols-Ribé1, Paul-Anton Will2, Christian Hänisch, Marta Gonzalez-Silveira, Simone Lenk, Javier Rodríguez-Viejo, Sebastian Reineke. Science Advances Vol. 4, no. 5, eaar8332 (2018) The phD student would work first on a more fundamental part, were he/she would study the stability of these organic glasses and afterwards, the work would be focused on the manipulation of the properties of the glass to improve the efficiency of organic electronic devices.
Agustín Mihi	Tenured Scientist at ICMAB	Institute of Materials Science of Barcelona ICMAB-CSIC, Campus UAB 08193, Barcelona	amihi@icmab.es	Materials Science	Institute of Materials Science of Barcelona ICMAB- CSIC	Plasmonics, Colloidal chemistry, photonics	Study of the template induced self-assembly of gold colloids into plasmonic crystals for sensing, light emission and light trapping. See more about us here: https://enlightment.icmab.es/
Núria Crivillers	Científic Titular CSIC	Campus UAB, 08193 Bellaterra	ncrivillers@icmab.es	Materials Science	ICMAB	Novel organic materials for memories and energy storage	Electroactive organic materials show great potential for the fabrication of energy storage devices as well as memories. For this purpose we plan to design, prepare and characterise a wide range of organic and hybrid materials (i.e., covalent organic frameworks (COF), self-assembled monolayers, etc) based on electroactive building blocks. Organic radicals (OR) have awakened much interest for its wide applicability such as magnetic materials, imaging agents, catalyst, electrochemical active materials, among others. For this, OR will be investigated for the purpose of the project.
Dino Tonti	Cientif. Tit. ICMAB-CSIC	campus UAB	dino@icmab.es	Materials Science	Department of Chemistry	Materials for energy	**Materials and characterization of redox-flow batteries for improved kinetics, durability and economical viability.** This electrochemical storage technology is being developed to overcome the cost of Li-ion batteries particularly for large scale applications, and in practice still needs more cost effective and sustainable materials. This project will include the preparation of multifunctional collectors and electrolytes, and the development of cells and operando methods to study material interactions and kinetics
Ignasi Fina	Ramon y Cajal (CSIC)	Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), CampusUAB, Bellaterra 08193, Spain	ifina@icmab.es	Materials Science	Institut de Ciència de Materials de Barcelona (ICMAB-CSIC)	Energy efficient electronics for wearable devices	Internet of Things is requiring more and more versatile electronics, new mechanically robust materials and portable batteries. Any of these aims must be accomplished keeping low or even decreasing the devices power consumption. The aim of the project is to open and explore new materials to be integrated in future wearable technologies capable to perform computing operations in an energy efficient manner. Very recently, complex proof-of-concept devices based on oxide materials have been developed demonstrating a significant reduction of the energy consumption for basic computing operations. However, the growth process of these materials is not compatible with industrial processing and these are grown mostly on rigid substrates. These two facts limits their industrial production and their application in wearable electronics. Thus, the project will focus on the development of materials on flexible platforms potentially compatible with industrial processing. The student will join an international group (MULFOX, www.mulfox.icmab.es/), actively working on state of the art oxide materials. The student will develop skills on materials growth, nanofabrication and functional characterization. The student will be supervised by Ignasi Fina (Google Scholar: https://scholar.google.com/citations?user=e0qqw3YAAAAJ&hl=ca)
Florencio Sánchez	Tenured Scientist (CSIC)	Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), CampusUAB, Bellaterra 08193, Spain	fsanchez@icmab.es	Materials Science	Institut de Ciència de Materials de Barcelona (ICMAB-CSIC)	Ferroelectric HfO2 thin films	The recent discovery of ferroelectricity in doped HfO2 has been a breakthrough in the quest for nonvolatile memories. Epitaxial films are needed for understanding the ferroelectric properties of this material and for prototyping devices having nanometric dimensions, but they have been still scarcely investigated. The objective of the thesis is developing doped-HfO2 epitaxial films with improved ferroelectric properties (polarization, endurance against fatigue, and retention time) by tailoring film microstructure and lattice strain via substrate and electrodes selection, and by thin film growth kinetics control. Nanolaminates and superlattices will be also investigated aiming to enhance ferroelectricity in thick films and improve endurance. The films will be grown by pulsed laser deposition, on perovskite oxide substrates and Si(001), and the thesis will involve exhaustive structural and functional characterization of the ferroelectric HfO2 films. The PhD student will join the Materials Science Institute of Barcelona (ICMAB-CSIC), www.icmab.es. The host research group, formed by researchers and students from different countries, investigates actively epitaxial growth and properties of ferroelectric thin films. The thesis will be supervised by Dr. F. Sanchez. Google scholar: https://scholar.google.es/citations?hl=es&user=DSHxiTkAAAAJ&view_op=list_works&sortby=pubdate
Imma Ratera	Professor	Institut of Materials Science of Barcelona (ICMAB-CSIC) Campus UAB, 08193, Cerdanyola del Vallès	iratera@icmab.es	Materials Science	Chemistry	Funcional Molecular Materials	Biofunctionalized surfaces for biomedical and electronic applications
Marta Mas-Torrent	Investigador CSIC	Campus UAB, 08193 Bellaterra	mmas@icmab.es	Materials Science	ICMAB-CSIC	Organic electronics/electrohemical devices for sensing	Organic electronic devices are raising a great deal of interest for low-cost and large area applications. Here, we plan to fabricate organic field-effect transistors and electrochemical field-effect transistors to be applied in sensing applications. The candidates should have a physics, chemistry or materials background.
Maria Isabel Alonso Carmona	Investigadora científica CSIC	ICMAB	isabel@icmab.es	Materials Science	Group of Nanostructured Optoelectronic Materials (ICMAB-CSIC)	Materials for energy	Study of light emitting semiconductor nanostructures based on SiGe
Felip Sandiumenge Ortiz	Research scientist at CSIC	Campus de la UAB, 08193 Bellaterra, Catalonia, Spain	felip@icmab.cat	Materials Science	ICMAB-CSIC	Nanoscience and Nanotechnology	Structure and function of strain-engineered complex oxide 2D membranes by in-situ advanced transmission electron microscopy
Claudio Roscini, Daniel Ruiz-Molina	Daniel Ruiz-Molina: CSIC researcher at ICN2 Claudio Roscini: Senior	Edici ICN2, Campus UAB, 08193, Bellaterra	claudio.roscini@icn2.cat	Materials Science	Institut Català de Nanociència i Nanotecnologia/Nanostructured Functional Materials group	Chromogenic and emissive materials for energy-efficient devices	New generation of solar-light responsive smart windows for energy saving in buildings

Narcís Mestres	CSIC, Research Scientist	Av. dels Til·lers s/n; Campus UAB 08193, Bellaterra (Barcelona)	narcis.mestres@icmab.es	Materials Science	Institut de Ciència de Materials de Barcelona, ICMAB-CSIC	Functional Materials	**Epitaxial growth of complex oxide thin films by green and sustainable chemical solution methods for the next generation spintronics** Complex oxides are materials of strong interest because they present a breadth of functional properties with a huge potential range of applications covering from spintronics to energy harvesting. Complex oxide thin films are usually prepared by high vacuum techniques that are cumbersome and expensive. However, the trend nowadays is the development of chemical solution based processes that are environmental friendly and processes that can be used with low temperature techniques. Chemical routes are much more easy, versatile and environmentally friendly, and allow obtaining high quality thin films. Moreover, for many electronic and spintronic applications epitaxial growth of complex oxide thin films is a must. The objective of this project is to prepare epitaxial complex oxide thin films and heterostructures by Polymer Assisted Deposition (PAD), aimed to investigate its suitability for spintronic applications, and for the integration of functional complex oxide nanomaterials on silicon substrates. Selected publications: Aqueous Chemical Solution Deposition of Functional Double Perovskite Epitaxial Thin Films, Chemistry A European Journal 26, 9338 (2020); Spontaneous cationic ordering in chemical solution-grown La2CoMnO6 double perovskite thin films, NPG Asia Materials 11, 44 (2019); Dynamic magnetic properties and spin pumping in polymer-assisted-deposited La0.92MnO3 thin films, Journal of Materials Chemistry C 7, 12633 (2019). The student will be supervised by Dr. Narcís Mestres, whose activity can be reached through the Researcher ID: B-5305-2013
Medicine							
Antonio Artigas	Director de càtedra de Fi	Parc Taulí 1, Edifici Santa Fe, laboratori de Recerca	aartigas@tauli.cat	Medicine	Medicina UAB	Mechanisms of cell therapies for Acute Respiratory Distress Syndrome	Acute Lung Injury/ Acute Respiratory Distress Syndrome (ALI/ARDS) is a disease with a high incidence and mortality in the intensive care unit and no effective therapy is available yet. The lungs of ARDS patients are characterized by an acute inflammation and an increased procoagulant activity. Recent evidence suggests the beneficial effects of cell therapies and anticoagulants for ALI/ARDS given their action on different pathophysiologycal pathways of this disease. To determine the therapeutic benefit of cell therapies and anticoagulants in different pathways and processes inolved in the pathopysiology of ALI/ARDS is mandatory, in order to improve the mechanisms through which they act.
Neurosciencies							
Antonio Armario García	Full Professor of Physiol	Unitat Fisiologia Animal, Facultat Biociéncies	antonio.armario@uab.cat	Neurociences	Institut de Neurociències	Neurobiology of Stress and related psychiatric diseases	Study of how the brain processes traumatic stressors using combined histological, neuroendocrine and behavioral approaches together with DREADDS,
Raul Andero Gali	ICREA Research Profes	Faculty of Medicine M1-141	raul.andero@uab.cat	Neuroscience	Institute of Neuroscience	Neurobiology	Molecular mechanisms and in vivo calcium imaging in behavioral models of fear memory www.anderolab.com
Àlex Bayés	Group Leader at IIB San	C/Sant Quinti 77-79	abayesp@santpau.cat	Neurosciences	IIB Sant Pau	Molecualr Physiology of the Synapse	**Title:** Unravelling the synaptic molecular mechanisms involved in autism spectrum disorders. **Brief Description:** Although a final picture of the genetic basis of autism spectrum disorders (ASD) is missing, recent genetic studies are uncovering many genes highly associated with these disorders. Interestingly, many of these genes are highly expressed at glutamatergic synapses, which have led to propose a synaptic dysfunction in ASD. Yet, a clear picture of the molecular mechanisms altered at the synapse is missing. In this project we will use biochemical and cellular approaches to investigate these mechanisms in mouse models of ASD.
Jesús Giraldo	Associate Professor	Universitat Autònoma de Barcelona, Faculty of Medicine, Room M3-207, Campus de Bellaterra, 08193 Bellaterra (Spain)	Jesus.Giraldo@uab.cat	Neurosciences	Institute of Neurosciences	Mathematical modeling - GPCR binding kinetics - Ordinary differential equations (ODE)	Developement of mathematical equations for the description of the kinetics of ligand binding to GPCRs. These equations are aimed at providing a mechanistic explanation of hot topic pharmacological properties such as residence time and agonist efficacy.
Physics							
Riccardo Rurali	Tenured Scientist at CSIC	ICMAB-CSIC, Campus de Bellaterra	rrurali@icmab.es	Physics	Theory and Simulation of Materials, ICMAB-CSIC	Theory and simulation of the behaviour of materials / Materials physics	PHONON TRANSPORT IN NANOSTRUCTURED MATERIALS - The goal of this project is providing a theoretical framework aimed at understanding and controlling the manipulation of heat flux within nanostructured materials, for application in phonon logic and for novel materials for clean and sustainable energy. The student will perform quantum numerical simulations in order to devise realistic approaches for the engineering of thermal diodes and thermal transistors, the fundamental building block of phononics. In electronics information is transferred with charge carriers, whose motion can be easily controlled with external fields. This is not the case of phononics, where phonons —the basic particles that carry heat— have no mass or charge: this is why we live in a world of electronic devices and heat is normally regarded as a source of loss. The goal of this project is reversing this viewpoint and move to a new paradigm where heat can be actively used to transfer energy, thus information, in a controllable way. This approach allows envisaging a truly zero-power analog of electronics, as in our world heat is indeed ubiquitous and phononics circuits will effectively need no power supply. Additionally, learning how to modulate the heat flow will have also important consequences in conventional electronics —where heat dissipation at the nanoscale is a major issue— or in devising efficient thermoelectric materials —where materials with low thermal conductivities must be engineered. The student will interact closely with experimental groups of the Institute that work on thermal transport in 2D materials and nanostructured semiconductors.
M. Pilar Casado Lechuga	Professor Agregat	IFAE, Facultat C, UAB, E-08193 Cerdanyola del Vallès, Barcelona	Pilar.Casado@uab.cat	Physics	Física	High Energy Physics	This thesis will be carried out in the framework of the ATLAS experiment at the LHC proton-proton collider at CERN. The accelerator will be improved in the next few years and ATLAS needs to upgrade its detector to be able to cope with the high number of collisions that the High-Luminosity LHC will present. In particular, the High Granularity Timing Detector (or HGTD, based on silicon sensors) will perform timing measurements with respect to the collision time to mitigate the effect of pile-up (background). In this project the student will work on the development of the LGAD technology as well as on studies of the physics performance of HGTD. Timing measurements and its impact on the physics performance of the experiment is also relevant for future accelerators, like the CEPC.
Jordi Mompart	University Professor Titular University	Science Faculty. Physics Dept. Campus UAB, E-08193, Cerdanyola del Vallès, Spain	jordi.mompart@uab.cat	Physics	Physics	Optics	Design of novel photonic devices for quantum technologies
Gervasi Herranz Casabona	Tenured Scientist at ICMAB	Institute for Materials Science of Barcelona ICMAB-CSIC, Campus UAB, Bellaterra, E-08193	gherranz@icmab.cat	Physics	Multifunctional Oxides and Complex Structures at ICMAB-CSIC	Nanophotonics	TOPOLOGICAL METAMATERIALS FOR ACTIVE NANOPHOTONIC DEVICES. The student will develop computational design, nanofabrication and advanced optical characterization of nanophotonic devices with edge propagation modes with topological protection due to the symmetry properties of the metamaterials. For more information about the acttivities at the host lab, visit https://gervasi-herranz.blog/

Gervasi Herranz Casabona	Tenured Scientist at ICMAB	Institute for Materials Science of Barcelona ICMAB-CSIC, Campus UAB, Bellaterra, E-08193	gherranz@icmab.cat	Physics	Multifunctional Oxides and Complex Structures at ICMAB-CSIC	Spintronics and Quantum Transport	SPINTRONIC DEVICES BASED ON OXIDE QUANTUM WELLS. The student will study spin-charge conversion efficiency in 2D-Oxide interfaces, with the aim of investigating the efficiency of spin-orbit coupling to inject spin-polarized currents in quantum well devices. The candidate will develop device nanofabication (optical and e-beam lithography) and quantum transport characterization. For more information about the acttivities at the host lab, visit https://gervasi-herranz.blog/
Juan Campos Coloma	University Professor	Edifici de Ciencies, Av. De l'Eix Central, 08193, Bellaterra, Spain.	juan.campos@uab.cat	Physics PhD programme	Physicis Department/ Optics Group	Polarimetric methods applied to biophotonics applications	Development of a polarimetric microscope and polarimetric metrics for the image enhancement of biological tissues (animal and vegetal origin). Application to the early diagnosis of certain human patologies, as melanoma.
Juan Campos Coloma	University Professor	Edifici de Ciencies, Av. De l'Eix Central, 08193, Bellaterra, Spain.	juan.campos@uab.cat	Physics PhD programme	Physicis Department/ Optics Group	Development of stitching methods for surface shape metrology	In colabboration with the sincrhotron Alba in Barcelona we are developping methods to measure with high accuracy the surface of mirrors of large dimensions
Plant Biology and Biotechnology							
Julia Qüesta	Researcher at CRAG (Centre de Recerca en Agrigenòmica)	Edifici CRAG. Campus de la UAB. 08193 Bellaterra (Cerdanyola del Vallès) – Barcelona	julia.questa@cragenomica.es	Plant Biology and Biotechnology	Plant Development and Signal Transduction / Centre de Recerca en Agrigenòmica CSIC - IRTA - UAB - UB (CRAG)	Elucidating the role of non-coding transcription during early stages of plant development	This PhD project aims at investigating a critical transition in plant development: the seed-to-seedling switch. Successful germination and early seedling establishment are decisive for plants to rapidly enter natural ecosystems and maximize growth under optimal environmental conditions. The transition from a mature embryo (dry seed) to a developing seedling represents a switch from embryonic (heterotrophic) to vegetative (autotrophic) growth that requires several rounds of cellular differentiation. Despite our knowledge on the role of phytohormones and multiple signalling pathways in controlling germination, the role of non-coding transcription in this transition remains poorly investigated. Particularly, this project aims at discovering long non-coding RNAs involved in the epigenetic silencing of the embryonic program during germination. By applying, molecular biology, genetics and epigenomics approaches, this project will elucidate the epigenetic silencing mechanisms that drive cellular differentiation during the seed-to-seedling switch in the model plant Arabidopsis thaliana
Teresa Altabella	UB Full Professor at CRAG (Centre de Recerca en Agrigenòmica)	Edifici CRAG. Campus de la UAB. 08193 Bellaterra (Cerdanyola del Vallès) – Barcelona	teresa.altabella@cragenomica.es	Plant Biology and Biotechnology	Plant Metabolism and Metabolic Engineering / Centre de Recerca en Agrigenòmica CSIC - IRTA - UAB - UB (CRAG)	Unravelling the role of glycosylated sterols in tomato biotic stress responses	Steryl glycosides (SG) are key components of the plant plasma membrane. SG contents differ greatly among plant species and may change significantly in response to developmental and environmental cues. Tomato, unlike other plant species, accumulates very high levels of SGs but the biological significance of this observation is unclear. Our main research interest is to elucidate the role of SG and the sterol glycosyltransferases involved in their synthesis in plant development and the adaptive response to stress using tomato and Arabidopsis as model species. We have recently shown that both tomato and Arabidopsis mutants with reduced levels of SGs are more tolerant to Botrytis cinerea infection than wild type plants. In Arabidopsis this response is mediated through signaling pathways involving the stress hormone jasmonic acid and the tryptophan-derived compounds camalexin and indole glucosinolates. The main goal of this PhD proposal is to elucidate the molecular and cellular mechanisms underlying the enhanced resistance to B. cinerea infection of tomato plants with reduced SG content. To this end, leaves and fruits of different tomato mutants defective in SG biosynthesis will be infected with B. cinerea and analyzed using transcriptomics and metabolomics approaches, including analysis of organ-specific genome-wide expression patterns (RNA-seq), profiles of sterols, phytohormones and specialized defense metabolites, and cell wall composition. Integrated analysis of the obtained data sets will enable to elucidate the mechanisms by which changes in the SG profile mediate the defense response of plants.
Telecommunications Engineering							
Jordi Verdu Tirado	Associate Professor	Campus UAB - Edifici Q (ETSE)	jordi.verdu@uab.cat	Telecommunications Engineering	Telecommunications and Systems Engineering	Advances synthesis techniques for next 5G mobile communications acoustic wave filters.	The stringent requirements of the next generation of acoustic wave filters for 5G communications require from more sophisticated and advanced topologies. On the other hand, the increase in the handling power leads to prominent non-linear behavior. The precise characterization of such effects together with advanced filter synthesis techniques to overcome present limitations will be the main focus of the resarch line