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| **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** |
|  Plant Biology and Biotechnology |
| Pere Arús | Researcher IRTA  | Edifici CRAG. Campus de la UAB. 08193 Bellaterra (Cerdanyola del Vallès) – Barcelona | pere.arus@cragenomica.es |  Plant Biology and Biotechnology | Plant and Animals Genomics/ Centre de Recerca en Agrigenòmica CSIC - IRTA - UAB - UB (CRAG)  | Genetics and genomics of fruit quality and disease resistance in peach | The objective is to develop new molecular marker-based methods for mining genes of interest from exotic lines and for their fast-track introgression in elite peach lines. New genes will be characterized and cloned. |
| David Caparrós | Researcher CRAG  | Edifici CRAG. Campus de la UAB. 08193 Bellaterra (Cerdanyola del Vallès) – Barcelona | david.caparros@cragenomica.es |  Plant Biology and Biotechnology | Plant metabolism and metabolic engineering/ Centre de Recerca en Agrigenòmica CSIC - IRTA - UAB - UB (CRAG)  | Bioengineering lignocellulosic biomass in maize | Maize is one of the major crops worldwide. During the last years, maize has started to be used as source for the production of bioethanol. To avoid a direct competition with fields traditionally dedicated to food and feed production, the maize stover (lignocellulosic biomass) has acquired special interest as energetic resource. However, in many cases the huge amount of polysaccharides (the source of energy) that is present in the stover is discarded due to its interaction with lignin. Thus, understanding how lignin polymer is synthesized in grasses is essential to further undertake new biotechnological approaches aimed to produce new maize lines with improved nutritional and energetic values. Our main interests are addressed to understand the role of different lignin genes in the production of this polymer (including when plants are submitted to different stresses) using natural varieties, mutants and transgenic maize plants produced in our laboratory.  |
| Advanced Immunology |
| Francesc E, Borràs Serres | Adjunct Lecturer | Institut Germans Trias i PujolCrta Can Ruti Edifici MAR 08916 Badalona  | feborras@igtp.cat | Advanced Immunology | Cellular Biology, Physiology and Immunology/IGTP | Extracellular Vesicles  | Study the interaction of Evs with different cell types to evaluate their potential as cell modifiers in renal relates diseases. |
| Nerea Roher Armentia | Tenure-track lecturer | Institut de Biotecnologia i Biomedicina, Universitat Autònoma de Barcelona | nerea.roher@uab.cat | Advanced Immunology | Institut de Biotecnologia i Biomedicina | Development of protein based-nanovaccines against viral diseases for fish species of commercial interest | Development of vaccines against nodavirus (NNV) and IPN virus for fish of commercial interest such as turbot, seabream, seabass or salmon. The vaccines are designed using protein nanoparticles and antigenic viral sequences. |
| Animal Medicine and Health |
| Francesc Accensi (FA), José Ignacio Núñez (JIN), Ayub Darji (AD) | FA: UAB professor, JIN: Researcher IRTA-CReSA, AD: Researcher IRTA-CReSA | Faculty of Veterinary Medicine, UAB. Campus UAB, Edifici CReSA, Bellaterra 08193 | Francesc.Accensi@uab.cat; joseignacio.nunez@irta.cat; ayub.darji@irta.cat | Animal Medicine and Health | Departament de Sanitat i d'Anatomia Animals. CReSA-IRTA | viral evolution | Swine influenza virus evolution associated to vaccination |
| Aquacultura  |
| Nerea Roher Armentia | Tenure-track lecturer | Institut de Biotecnologia i Biomedicina, Universitat Autònoma de Barcelona | nerea.roher@uab.cat | Aquacultura  | Institut de Biotecnologia i Biomedicina | Development of protein based-nanovaccines against viral diseases for fish species of commercial interest | Development of vaccines against nodavirus (NNV) and IPN virus for fish of commercial interest such as turbot, seabream, seabass or salmon. The vaccines are designed using protein nanoparticles and antigenic viral sequences. |
| Biochemistry, Molecular Biology and Biomedicine |
| Assumpció Bosch Merino | Tenured lecturer | C/ de la Vall Moronta, Edifici H, UAB | assumpcio.bosch@uab.es | Biochemistry, Molecular Biology and Biomedicine | Biochemistry and Molecular Biology | Animal models and gene therapy | Study of the neurodegeneration caused by lysosomal storage diseases |
| Assumpció Bosch Merino | Tenured lecturer | C/ de la Vall Moronta, Edifici H, UAB | assumpcio.bosch@uab.es | Biochemistry, Molecular Biology and Biomedicine | Biochemistry and Molecular Biology | Animal models and gene therapy | Peripheral neuropathies, mechanisms of development and therapeutic approaches |
| Fumiichiro Yamamoto | Researcher IGTP | IGTP. Ctra. Can Ruti, Cami de les Escoles, s/n, Badalona 08916, Spain | fyamamoto@carrerasresearch.org | Biochemistry, Molecular Biology and Biomedicine | IGTP-IJC | Immunohematology and Glycobiology | Molecular biological analysis of altered glycosylation in cancer |
| David Reverter | Tenure-track lecturer | IBB-MRB Campus UAB | david.reverter@uab.cat | Biochemistry, Molecular Biology and Biomedicine | Biochemistry and Molecular Biology/ Institute of Biotechnology and Biomedicine | Characterization of structure and function of proteins. Protein crystallography and X-ray diffraction. | Structural characterization of SUMO modification in DNA damage repair processes. Regulation of the E3 SUMO ligase activity of the SMC5-SMC6 complex. |
| Marcus Buschbeck | Researcher | Crta. Can Ruti, Cami de les Escoles sn, 08916, Badalona, Spain. | mbuschbeck@carrerasresearch.org | Biochemistry, Molecular Biology and Biomedicine | Josep Carreras Leukaemia Research Institute (IJC), Campus ICO - Germans Trias i Pujol, | Chromatin Biology and Cancer | Chromatin regulators as drug targets and biomarkers for cancer |
| Sonia Forcales | Researcher (IGTP) | IGTP. Ctra Can Ruti, Camí de les escoles s/n, 08916 Badalona, Spain. | sforcales@igtp.cat | Biochemistry, Molecular Biology and Biomedicine | Program of Predictive and Personalized Medicine of Cancer/ Institut Germans Trias i Pujol. | Genetics and Epigenetics of Cancer | Identification of chromatin factors as novel targets to overcome chemoresistance in cancer. |
| Sergio Alonso | Researcher (IGTP) | IGTP. Ctra Can Ruti, Camí de les escoles s/n, 08916 Badalona, Spain. | salonsou@igtp.cat | Biochemistry, Molecular Biology and Biomedicine | Program of Predictive and Personalized Medicine of Cancer/ Institut Germans Trias i Pujol. | Genetics and Epigenetics of Cancer | Identification of genomic variants associated to multiple cancer development |
| Mireia Jordà | Researcher IGTP  | IGTP. Campus de Can Ruti, Ctra. Can Ruti, Camí de les Escoles s/n, 08916 Badalona (Barcelona), SPAIN | mjorda@igtp.cat | Biochemistry, Molecular Biology and Biomedicine | Program for Predictive and Personalized Medicine of Cancer (PMPPC) / Germans Trias i Pujol Research Institute (IGTP) | Biochemistry and molecular biology form an essential part of basic training for professionals working in many widely-differing fields, all related to molecular-level biological systems, and they also form a very productive area of scientific and technical development, with important applications in different areas of great social impact. The application of basic science to medicine is currently needed for furthering knowledge, diagnosis and treatment of human diseases. Thus, biomedicine is intimately related to biochemistry and molecular biology. In this field there is a great need for innovative approaches. | The proposal aims at understanding the epigenetic molecular mechanisms involved in metastatic thyroid cancer and at identifying biomarkers and therapeutic targets to improve the management of patients.  |
| Monica Suelves Esteban | Researcher IGTP  | IGTP. Crta de Can Ruti, camí de les escoles s/n | msuelves@igtp.cat | Biochemistry, Molecular Biology and Biomedicine | PMPPC-IGTP | Epigenetic mechanisms in skeletal muscle physiopathology | Epigenetic regulation is crucial for the establishment and maintenance of cell identity, and the appropriated control of cellular functions. Post-translational modifications of histones and DNA methylation are epigenetic marks, placed by epigenetic modifiers, that modulate chromatin compaction and gene transcription. Epigenetic alterations have profound effects on human pathologies, since histone modifications and DNA methylation extensively influence gene expression. Skeletal muscle is the tissue accounting for the largest percentage of body mass and contributes to multiple body functions including voluntary movements. Skeletal muscle is a plastic and dynamic tissue, which has a remarkable ability to regenerate after injury being the satellite cells (SCs) the muscle stem cells responsible for postnatal muscle growth, muscle homeostasis and muscle regeneration upon injury or disease. In the lab, we are analyzing the dynamics of the histone modification profiles and DNA methylation patterns during the myogenic differentiation process in physiological and pathological conditions, using in vitro and in vivo models. Recently, we have identified an epigenetic modifier which expression is highly induced during skeletal muscle differentiation, and we are investigating its role in skeletal muscle growth and regeneration. Our results show an advanced muscle regeneration process in deficient mice for this epigenetic factor, although the molecular mechanisms are still unknown. In addition, we have preliminary results showing altered expression of this epigenetic regulator in rhabdomyosarcoma cells. Rhabdomyosarcoma is an aggressive soft sarcoma tumor, mainly diagnosed during childhood, and extensive research is being done to improve the poor outcome of most of the patients. Our group keeps a solid collaboration with the group of Dr. Keller (Scientific Director of the Children’s Cancer Therapy Development Institute in Oregon-USA) regarding the contribution of epigenetics to rhabdomyosarcoma progression. Globally, our research is focused to better understand the epigenetic mechanisms underlying muscle cell identity, muscle growth and muscle regeneration with biomedical and therapeutic purposes in chronic muscle pathologies, as well as in cancer. |
| Carles Arús  | Full professor | Edifici Cs Campus UAB, Biochemistry and Molecular biology Dept.  | Carles.Arus@uab.es | Biochemistry, Molecular Biology and Biomedicine | Biochemistry and molecular biology  | Biomedical applications of nuclear magnetic resonance | MR- Based molecular imaging of brain tumours and therapy response |
| Carles Arús  | Full professor | Edifici Cs Campus UAB, Biochemistry and Molecular biology Dept.  | Carles.Arus@uab.es | Biochemistry, Molecular Biology and Biomedicine | Biochemistry and molecular biology  | Biomedical applications of nuclear magnetic resonance | Signal processing and statistical analysis of MR- Based molecular imaging data of brain tumours and therapy response |
| Salvador Ventura Zamora | full professor | Institute of Biotechnology and BiomedicineParc de Recerca UAB, Mòdul BUniversitat Autònoma de BarcelonaE-08193 Bellaterra (Barcelona) | salvador.ventura@uab.es | Biochemistry, Molecular Biology and Biomedicine | Institute of Biotechnology and Biomedicine/Department of Biochemistry, Molecular Biology  | Amyloid assemblies for nanotechnology applications | The extraordinary stability and tunable assembly of amyloid fibrils make them very attractive targets in nanotechnology. Most efforts so far have been focused on the use of short synthetic peptides as the bioactive components of such materials, and an analogous approach for inducing globular proteins to assemble into functional nanofibres has been much less explored. The main limitations to create mono- or multi-component nanofibres that contain functional globular proteins come from the requirement to prevent their aggregation during expression, to maintain them in a soluble state during purification and storage, and to be able to induce their assembly at a desired time and place. We aim to exploit our combined computational/experimental expertise to design and produce new molecules fulfilling these properties for a range of biomedical and biotechnological applications, including enzyme catalysis, biosensors, electronics, tissue engineering, drug delivery and immunotherapy. |
| Bioinformatics |
| Lorenzo Pasquali | Researcher Ramon y Cajal | IGTP. Carretera de Can Ruti, camí de les escoles s/n, Campus de can Ruti, 08916 Badalona, Spain | lpasquali@igtp.cat | Bioinformatics | Endocrinology department, Endocrine Regulatory Genomics, Institut Germans Trias i Pujol | Study of the genomic and epigenetic regulation of the insulin-producing pancreatic beta cells | Unmask the regulatory changes that underlie different forms of diabetes and loss of cell fate in neoplastic conditions such as in the neuroendocrine tumors. |
| Xavier Daura | Researcher and Adjunct Lecturer | Mòdul B del Parc de Recerca UAB, Campus UAB | xavier.daura@uab.cat | Bioinformatics | Institut de Biotecnologia i de Biomedicina | Antimicrobials with new modes of action against MDR Gram-negative bacteria | Development of methods for the identification of new targets in nosocomial multidrug resistant Gram-negative bacteria, with focus on pathogenesis, virulence or resistance factors. Virtual screening of compounds against the targets identified and validated for the development of new antimicrobials. |
| Tanya Vavouri | Researcher  | PMPPC-IGTP, IJC, Ctra de Can Ruti, Cami de les escoles s/n, Badalona, 08916  | tvavouri@carrerasresearch.org | Bioinformatics | Program for Predictive and Personalised Medicine of Cancer (PMPPC) - IGTP, IJC | Regulation of gene expression in the germline and epigenetic inheritance in animals. | Regulation of gene expression in the germline and epigenetic inheritance in animals. |
| Biotechnology |
| Arben Merkoçi | ICREA Research Professor and Head of Nanobioelectronics and Biosensors Group | Campus UAB, building ICN2, 08193 Bellaterra, Barcelona, Spain | arben.merkoci@icn2.cat | Biotechnology | Nanobioelectronics and Biosensors Group / Catalan Institute of Nanoscience and Nanotechnology | Designing microbial sensors for biotechnological, clinical and environmental applications | The idea of this PhD Thesis project is to develop innovative nanobiosensors for diagnostics (environment and health). 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 |
| Salvador Ventura Zamora | full professor | Institute of Biotechnology and BiomedicineParc de Recerca UAB, Mòdul BUniversitat Autònoma de BarcelonaE-08193 Bellaterra (Barcelona) | salvador.ventura@uab.es | Biotechnology  | Institute of Biotechnology and Biomedicine/Department of Biochemistry, Molecular Biology  | Amyloid assemblies for nanotechnology applications | The extraordinary stability and tunable assembly of amyloid fibrils make them very attractive targets in nanotechnology. Most efforts so far have been focused on the use of short synthetic peptides as the bioactive components of such materials, and an analogous approach for inducing globular proteins to assemble into functional nanofibres has been much less explored. The main limitations to create mono- or multi-component nanofibres that contain functional globular proteins come from the requirement to prevent their aggregation during expression, to maintain them in a soluble state during purification and storage, and to be able to induce their assembly at a desired time and place. We aim to exploit our combined computational/experimental expertise to design and produce new molecules fulfilling these properties for a range of biomedical and biotechnological applications, including enzyme catalysis, biosensors, electronics, tissue engineering, drug delivery and immunotherapy. |
| Cellular Biology |
| Aurora Ruiz-Herrera Moreno | Tenure-track lecturer |  Campus UAB, 08193, Cerdanyola del Vallès | aurora.ruizherrera@uab.cat | Cellular Biology | Dept.Cell Biology, Fisiology and Immunology | Unravelling the chromatin architecture of mammalian germ cells | The main goal of this project is to unravel the 3D organization of mammalian genomes and generate a new biological atlas of the chromatin interactions and functional genomic characteristics. Specific objectives will include the investigation of the genome-wide physical chromatin interactions of mammalian genomes to establish an integrative model of the chromatin interactions and the epigenetic features of mammalian genomes. This will be achieved by implementing a novel multidisciplinary approach (including “in silico” whole-genome comparisons and cutting-edge high-throughput experimental methods such as Hi-C and germ cell flow sorting) taking into account structural, evolutionary and functional aspects of mammalian genomes.  |
| Ignasi Roig Navarro | Tenure-track lecturer | office C2/107, Fac. Biociències, Campus UAB, Cerdanyola del Vallès 08193, Spain | ignasi.roig@uab.cat | Cellular Biology | Genome Integrity and Instability group, Institut de Biotecnologia i Biomedicina (IBB) | Study of the mechanisms regulating meiotic recombination and their effect on fertility in mammals. | Meiosis is the cell division that generates haploid cells by coupling two rounds of chromosome segregation preceded by a single round of replication. Genome reduction occurs in the first chromosome segregation when the homologous chromosomes are separated to each of the poles of the cell. During prophase of the first meiotic division, double-strand breaks (DSBs) occur throughout the genome of the cells. Following the repair of these breaks, the homologous chromosomes pair, synapse and exchange genetic material in a process called meiotic recombination. Repair DSBs can lead to formation of non-crossovers (when a small region of the homologous chromosomes is used as a template to repair the damage) or crossovers (when regions around DSBs are exchanged between homologous). The formation of crossovers is crucial to generate the proper tension that allows the correct segregation of then homologs in the first meiotic division. Although meiotic recombination has some particularities relative to the homologous recombination, much of the protein machinery required to repair the DSBs is the same as the ones used in somatic cells. In 2010, our group found that the AAA ATPase TRIP13 is essential for proper repair of DSBs during meiosis. However, the mechanism by which TRIP13 regulates homologous recombination is still unknown. In this project we intend to use biochemical, genetic and pharmacological methods to understand how TRIP13 interacts with other proteins and how this affects the progression homologous recombination during meiosis. |
| Aurora Ruiz-Herrera Moreno | Tenure-track lecturer |  Campus UAB, 08193, Cerdanyola del Vallès | aurora.ruizherrera@uab.cat | Cellular Biology | Dept.Cell Biology, Fisiology and Immunology | Unravelling the chromatin architecture of mammalian germ cells | The main goal of this project is to unravel the 3D organization of mammalian genomes and generate a new biological atlas of the chromatin interactions and functional genomic characteristics. Specific objectives will include the investigation of the genome-wide physical chromatin interactions of mammalian genomes to establish an integrative model of the chromatin interactions and the epigenetic features of mammalian genomes. This will be achieved by implementing a novel multidisciplinary approach (including “in silico” whole-genome comparisons and cutting-edge high-throughput experimental methods such as Hi-C and germ cell flow sorting) taking into account structural, evolutionary and functional aspects of mammalian genomes.  |
| CAROLINA ARMENGOL | Head of Childhood Liver Oncology group (cLOG) , IGTP | IGTP. Ctra. de Can Ruti. Camí de les Escoles, s/n 08916 Badalona, Spain | carmengol@igtp.cat | Cellular Biology | Cell Biology, Physiology and Immunology Department | Towards an improvement of childhood liver cancer management through the incorporation of biological biomarkers | The candidate will participate in the European Project ChiLTERN; specifically, he/she will be involved in the main research line of the group focussed on delving into molecular knowledge of the underlying mechanisms responsible of hepatocarcinogenesis and tumour progression with the latest "omic" technologies in order to identify diagnostic/prognostic biomarkers and key molecular pathways for improving the clinical management and treatment of children suffering of liver cancer. The main objectives of this thesis are: (1) to perform phospho-proteomic profiling of highly aggressive pediatric liver tumors in order to identify new biomarkers and targets for therapy; (2) to prospectively validate previously identified biomarkers (16- and 300Kb-gene expression and 3-protein signatures) in > 200 samples from childhood patients with liver cancer included in the PHITT Trial and (3) to establish the first in vivo collection of organoids (tridimensional cell cultures) from these tumors as a model to test new drug based on molecular tagets. The final aim of this research is to improve current CHIC clinical stratification with biological parametres and provide the basis for new therapeutic interventions. |
| Chemistry |
| Adelina Vallribera | Full professor | Department of Chemistry | adelina.vallribera@uab.cat | Chemistry | Chemistry/Faculty of Science |  Compuestos organofluorados y nanomateriales para aplicaciones en catálisis, tratamiento de superficies y biomedicina  | New highly enantioselective methodologies for the electrophilic fluorination, trifluoromethylation and cyanation of b-ketoesters derivatives |
| Manel del Valle | Tenured lecturer | Department of Chemistry, Faculty of Sciences | manel.delvalle@uab.es | Chemistry | Chemistry | Nanobiotechnology | Electrodes modified with nanocomponents (graphene and nanoparticles) to build electronic tongue analysis systems |
| Manuel Valiente | full professor | Departament de Química | Manuel.Valiente@uab.cat | Chemistry | Química | Biomaterials  | Chemical speciation applied to the development of novel materials for dental care. |
| Cristina Palet | Tenured lecturer | UAB, Facultat de Ciències, Edifici Cn, Dept,. Química, Despatx C7-251.1, 08193 Bellaterra | cristina.palet@uab.cat | Chemistry | Chemistry | BIOCHAR use for the regulation of the nitrogen cycle in soils and in new generation fertilisers | Biofilms influence onto Biomass/Biochar used for crops ammedment, and also for adsorption of contaminants (such as heavy metals and/or PAHs) |
| Rosario Núñez | Researcher-CSIC | Institut de Ciència de Materials de Barcelona (CSIC), Campus UAB, 08193 Bellaterra (Cerdanyola del Vallès) | rosario@icmab.es | Chemistry | Molecular and Supramolecular Materials (ICMAB-CSIC) | **Development of new luminescent boron clusters-based dyes for photooptical applications**  | The PhD thesis will deal with the preparation and characterization of novel boron cluster-based derivatives linked to highly conjugated systems to construct a new generation of dyes. These systems will have potential application in optoelectronic and bioloimaging, as well as in two photon absorption microscopy. Our group has provided new insights into the role of the boron clusters in the photoluminescence properties of molecular systems (Chem. Rev. 2016, 116, 14307 and Chem,.Soc.Rev 2016, 45, 5147 ). The PhD student will work to establsih the relationship between the structure and electronic properties of the boron clusters with the photophysical properties of the luminescent materials. Changes in the structure and substituents of the cluster will permit to tune these properties in order to improve the emission intensity or produce low emission energy in the new materials (see: Chem. Eur. J. 2016, 22, 13588, J. Mater. Chem. C 2017, 5, 10211). The main advantages of incorporating boron clusters would be improved hydrophobicity, low toxicity, thermal and chemical stability, among others. These compounds might be regarded as potential candidates for anticancer agents for boron neutron capture therapy (BNCT).The student will synthesize new materials and charcterize them by different techniques: Infrared Spectroscopy (IR-ATR), Nuclear Magnetic Resonance (RMN), Mass Spectrometry (MALDI-TOF), UV-vis, fluorescence, Thermal Gravimetric Analysis (TGA), X-Ray diffraction, among others. The PhD student will be integrated in a multidisciplinary group and will have to interact with other expert groups (physics and biologists) to evaluate the incorporation of the molecules into devices or to explore their biomedical applications. |
| Teixidor, Francesc | Researcher | Institut de Ciencia de Materials de Barcelona-ICMAB-CSIC | teixidor@icmab.es | Chemistry | ICMAB-CSIC | Light harvesting in Solar Cells and H2 electrochemical production with the aid of redox tunable electrolytes | Light conversion into electrical energy in an efficient, inexpensive, environmentally friendly and easily applicable way is a challenge, but necessary research to be done to not deteriorate the environment, to not alter the climate and to not hamper the health of people while still providing the necessary energy requiraments for a high quality of life. With this in mind we propose a research topic for a PhD to produce Dye Sensitized Solar Cells (DSSC) in which the redox electrolyte will have a tunable redox potential to match the potential requirements to optimize the solar cell output voltage and intentsity.In parallel the topic will be complemented by electrochemical production of H2 using best accessible electrode materials and altering the electrolytes by using tunable redox active electrolytes. |
| Viñas, Clara | Researcher CSIC | Institut de Ciencia de Materials de Barcelona-ICMAB-CSIC | clara@icmab.es | Chemistry | ICMAB-CSIC | On the verge of Bioinorganic and Inorganic chemistry: Heteroboranes in Nanomedicine | PhD thesis will deal in the fascinating field of the pharmacological uses of boron compounds. Synthesis, purification and characterization of multifunctional-boron-cluster-based compounds to be investigated for diverse medicinal applications ranging from therapies to biomaterials and sensors/biosensors will be investigated during the PhD thesis. This thesis’ objectives are based on previous goals into the group that can be better seen in better detail in the following publications: Chem. Commun. 2014, 50, 3370–3372; Chem. Commun. 2014, 50, 6700–6703; Chem. Commun. 2014, 50, 11415-11417; Chem. Commun. 2014, 50, 12325–12328; Biomaterials 32 (2011) 6389-6398 and J. Am. Chem.Soc. 2012, 134, 212−221. The candidate should be a talented chemist enjoying synthetic chemistry that will cooperate with biologists and physicians. |
| Jordi García-Antón Aviñó / Nuria Romero Fernández | Tenured lecturer /Researcher | Department of Chemistry, Faculty of Sciences, University Autonoma of Barcelona | jordi.garciaanton@uab.cat; nuria.romero@uab.cat | Chemistry | Department of Chemistry | Nanostructured Materials for Energy | Study of the applicability of inorganic nanoparticles (transition metals and metallic oxydes) anchored to semiconductor materials for energy challenges: hydrogen production from light-triggered water splitting. https://seloxcat.wordpress.com/ |
| Jordi Hernando Campos | Tenure-track lecturer | Departament de Química, Facultat de Ciències, Edifici C/n | jordi.hernando@uab.cat | Chemistry | Chemistry | Electrochemistry, Photochemistry and Organic Reactivity | Preparation and characterization of smart nanostructured photoactive materials. The thesis project will be carried in collaboration with the group of Prof. Daniel Ruiz-Molina from the Catalan Institute for Nanoscience and Nanotechnology (ICN2) at the "Esfera UAB".  |
| Prof. Monica Lira-Cantu | Researcher CISC | ICN2, Building ICN2, Campus UAB, Bellatrra, Barcelona (Spain) E-08193 | monica.lira@icn2.cat | Chemistry | Chemistry | Halide perovskite solar cells | Interface engineering for highly efficient and highly stable Perovskite Solar Cells. |
| Montserrat López Mesas | Tenure lecturer | Departament de Química, Facultat de Ciències, Edifici Cn, Campus UAB | montserrat.lopez.mesas@uab.cat | Chemistry | Chemistry | Characterization of Kidney Stones and identification of inhibitors and promoters of kidney stone formation. | In our group we work in the characterization of kidney stones by spectroscopic techniques, as Synchrotron, in order to stablish the formation of the stone to avoid further stone growing episodes. Also we characterize inhibitors and promoters in order to find solutions to this very painful disorder. The student will focus on the development of a device for the characterization of kidney stones so will learn to apply tools as machine learning, deep learning and Phyton. Will work in a multidisciplinary and international group and in contact with the Computer Vision Center. |
| Daniel Maspoch | ICREA Research Professor and Head of the Supramolecular NanoChemistry & Materials Group (NANOUP) | Edifici ICN2 - Campus UAB 08193 Bellaterra | daniel.maspoch@icn2.cat | Chemistry | Institut Català de Nanociència i Nanotecnologia | 1) Supramolecular Chemistry2) Nanochemistry3) Metal-Organic Frameworks (MOFs)4) Porous Materials | The Group's research interests are focused on controlling the supramolecular assembly of molecules, biomolecules, metal ions and nanoscale building blocks at the nanometer scale for the design of novel functional architectures and devices based on Metal-Organic Frameworks (MOFs). The Group is therefore interested in using supramolecular chemistry as the underlying approach for exploring new methodologies that enable the synthesis of bulk and nanoscale MOFs with unprecedented structures and with interesting chemical and physical properties and applications (in close collaboration with several private companies) in diverse areas, including energy (e.g. gas storage), environment (e.g. pollutant removal), sensors, and biomedicine (e.g. drug-delivery systems and contrast agents). Within eight years of life, the group has published more than 50 scientific papers in prestigious international journals (Chem. Soc. Rev., Nature Chemistry, Nature Communications, Adv. Mater., Angew. Chem. Int. Ed., among others). |
| José Giner Planas | Researcher CSIC | Institut de Ciència de Materials de Barcelona (CSIC), Carrer dels Tillers, Campus de la UAB, 08193, Bellaterra, Spain. UAB | jginerplanas@icmab.es | Chemistry | Institut de Ciència de Materials de Barcelona (CSIC) | Functional Flexible Porous Materials incorporating Carboranes | The PhD work will seek to correlate structural features with physical properties and to design synthetic methods 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 MOFs and then use a wide variety of techniques to study their structure and properties with emphasis in energy and environmental applications. |
| Computer Science |
| Joan Serra-Sagristà | Tenured lecturer | Edifici Q, Escola d'Enginyeria, Universitat Autònoma de Barcelona | joan.serra@uab.cat | Computer Science | Dep. of Information and Communications Engineering | Security, coding, and compression | Data compression: inpainting-based data coding, graph wavelet signal processing, light field image coding, deep learning compression, high throughput coding, GPU compression. |
| Joan Serra-Sagristà | Tenured lecturer | Edifici Q, Escola d'Enginyeria, Universitat Autònoma de Barcelona | joan.serra@uab.cat | Computer Science | Dep. of Information and Communications Engineering | Security, coding, and compression | Data compression: inpainting-based data coding, graph wavelet signal processing, light field image coding, deep learning compression, high throughput coding, GPU compression. |
| Dolores Rexachs | Tenured lecturer | Department of Computer Architecture and Operating SystemsEdifici QCarrer de les Sitges08193 Bellaterra (Cerdanyola del Vallès) Barcelona. Spain | dolores.rexachs@uab.cat | Computer Science | Department of Computer Architecture and Operating Systems | High Performance Computing (HPC) | Parallel I/O for High Performance Computing and Cloud, in the age of "Big Data": To facilitate a quick and efficient access to significant and critical data, in today applications, it is necessary to improve the parallel I/O system. The purpose of this research is to design methods and tools to identify the causes of the "bottlenecks" in the I/O of a system and provide the most efficient solutions to eliminate them. |
| Dolores Rexachs | Tenured lecturer | Department of Computer Architecture and Operating SystemsEdifici QCarrer de les Sitges08193 Bellaterra (Cerdanyola del Vallès) Barcelona. Spain | dolores.rexachs@uab.cat | Computer Science | Department of Computer Architecture and Operating Systems | High Performance Computing (HPC) | Fault tolerance (Resilience) for HPC, Cluster and Cloud Computing: With the growing scale of High Performance Computing applications, comes an increase in the number of interruptions as a consequence of hardware failures. As the tendency is to scale parallel executions to hundred of thousands of processes, fault tolerance is becoming an important matter. This research is oriented to develop Fault Tolerance (Resilience) solutions for HPC, Cluster and Cloud Computing, in numerical (technical-scientific) and transactional applications |
| Remo Suppi | Tenured lecturer | Department of Computer Architecture and Operating SystemsEdifici QCarrer de les Sitges08193 Bellaterra (Cerdanyola del Vallès) Barcelona. Spain | Remo.Suppi@uab.cat | Computer Science | Department of Computer Architecture and Operating Systems | High Performance Computing (HPC) | High Performance Computing on GPUs: On the one hand GPUs have become a basic resource (with a high computing power) on the supercomputers and interest to the researchers in HPC. On the other hand the agent-based simulation is a technique increasingly used for research and implementation of complex models involving mathematical modeling and supercomputing. This research is aimed to developing methods, models to create decision-making tools using Agents and running on GPUs. This research will be applied to models of emergency evacuations and disease spread by mosquitoes |
| Remo Suppi | Tenured lecturer | Department of Computer Architecture and Operating SystemsEdifici QCarrer de les Sitges08193 Bellaterra (Cerdanyola del Vallès) Barcelona. Spain | Remo.Suppi@uab.cat | Computer Science | Department of Computer Architecture and Operating Systems | High Performance Computing (HPC) | Distributed Agent Based Simulation: One of the main challenges at parallel and distributed agent based simulation is the communication between agents. Many processes communication is required in this type of simulation in order to keep the coherence of the simulation. Therefore many simulations do not get efficiency because its processes communication is not appropriate. The idea is optimize the communication at parallel and distributed agent based simulation with developing strategies, heuristics and algorithms taking in account specific characteristics of this kind of simulation. This research will be applied to models of emergency evacuations and disease spread by mosquitoes. |
| Emilio Luque | Emeritus lecturer | Department of Computer Architecture and Operating SystemsEdifici QCarrer de les Sitges08193 Bellaterra (Cerdanyola del Vallès) Barcelona. Spain | emilio.luque@uab.es | Computer Science | Department of Computer Architecture and Operating Systems | High Performance Computing (HPC) | Information Technology for Smarter Health Services: Through the use of Agent-Based Simulation (ABS), Big Data and High Performance Computing (HPC), in this research we propose to develop methods and tools to improve the quality of the health and wellness of the citizens with the aim to provide better medical services to patients and healthy citizens, promoting holistic models with measurable outcomes, implementing innovative, user-friendly technologies to enable self-management and monitoring. |
| Mercè Villanueva Gay | Tenured lecturer | Edifici Q, Escola d'Enginyeria, Universitat Autònoma de Barcelona | merce.villanueva@uab.cat | Computer Science | Dep. of Information and Communications Engineering | Security, coding, and compression | Error correcting codes and their applications: completely regular and Hadamard codes. Software in Coding Theory  |
| Mercè Villanueva Gay | Tenured lecturer | Edifici Q, Escola d'Enginyeria, Universitat Autònoma de Barcelona | merce.villanueva@uab.cat | Computer Science | Dep. of Information and Communications Engineering | Security, coding, and compression | Error correcting codes and their applications: completely regular and Hadamard codes. Software in Coding Theory  |
| Antonio M. López Peña | Tenured lecturer | Centre de Visió per Computador Edifici O - Campus UAB 08193 Bellaterra | antonio@cvc.uab.es | Computer Science | Ciències de la Computació / Centre de Visió per Computador | Computational Models for Artificial vision | **Domain Adaptation of End-to-End Self-driving Models**. The global objective consists of training and testing Artificial Navigation Agents (ANAs), specialized on vision-based self-driving and relying on CNNs (in general, models from the realm of Deep Leaning), by using realistic virtual driving scenarios and domain adaptation (DA) techniques. In particular, we are interested in the so-called end-to-end self-driving paradigm, where a deep model processes the raw data (images) and directly outputs the maneuver commands for the self-driving vehicle, i.e. without explicit intermediate 3D representations of the driving scenario and without explicit control equations. Performing domain adaptation in this case is specially challenging since not only perception (vision) must be adapted, but also the control commands must be adapted from a virtual to a real vehicle; all, perception and control simultaneously.The PhD will focus then on domain adaptation of end-to-end self-driving models. The student will be able to work with our simulator CARLA (www.carla.org) and a robotized vehicle at scale, which has a counterpart virtual model within CARLA. The student will have also access to the appropriate computational resources in terms of GPU-based computation. |
| Oriol Ramos Terrades | Tenure-track lecturer | Centre de Visió per Computador Edifici O - Campus UAB 08193 Bellaterra | oriolrt@cvc.uab.cat | Computer Science | Ciències de la Computació / Centre de Visió per Computador | Computational Models for Artificial vision | **Probabilistic graphical model learning on Deep learning architectures**. In this project, the PhD student will explore end-to-end learning algorithms that will combine the strength of current state-of-the-art deep learning architectures together with the expressivity of probabilistic graphical models. Moreover, the application field (mainly document image analysis) lacks of enough annotated images to properly train these methods. Consequently, the PhD candidate should develop methods able to train with partially annotated data. In summary, the PhD student will have the challenge of improving the existing theoretical framework to allow this kind of learning. |
| Josep Lladós Canet | Tenured lecturer | Centre de Visió per Computador Edifici O - Campus UAB 08193 Bellaterra | josep@cvc.uab.es | Computer Science | Ciències de la Computació / Centre de Visió per Computador | Computational Models for Artificial vision | **Recognition of document images with Deep Learning and Contextual information**. There is a trend in Computer Vision at large in recognizing objects in their context. Since documents are created by humans to be read by humans, their structure offers an important visual cue. A first level of contextual information is given by the spatial relations between elements. A second level of contextual information is given at semantic level, like for instance time period and historical context of documents. The use of this knowledge will boost the performance of recognition systems. In this thesis, we plan to investigate the incorporation of contextual (structural) information to Deep Learning techniques in order to improve the performance of recognition systems on historical handwritten documents. Image captioning approaches will be investigated. As application scenario, population records will be used, in the framework of the called "social network of the past". However, it does not exclude other types of document images as administrative documents in digital mail room applications. |
| Alicia Fornés Bisquerra | Researcher Ramón y Cajal | Centre de Visió per Computador Edifici O - Campus UAB 08193 Bellaterra | afornes@cvc.uab.es | Computer Science | Ciències de la Computació / Centre de Visió per Computador | Computational Models for Artificial vision | **Optical Music Recognition of handwritten music score images**. Optical Music Recognition (OMR) is a classical research field of Document Image Analysis and Recognition, which consists in the understanding of information from images of music scores and their conversion into a machine readable format. It allows a huge number of applications, such as the edition and renewal of scores, the conversion into Braille code, the creation of collecting databases to perform musicological analysis, and the production of audio description files (e.g. MIDI, MusicXML). Contrary to printed scores, the recognition of handwritten music scores is still considered an open problem, mainly because of the variability of the handwriting style. Therefore, the PhD research work will be focused on the recognition of handwritten music scores. First, we will investigate the most suitable decomposition of hand-drawn music symbols into graphical primitives in order to propose graph-based representations for the recognition of music symbols. Secondly, we will focus on the incorporation of syntactical analysis to the recognition of music scores. Since music notation follows the rules of music theory, it can effectively guide the recognition of music symbols and solve ambiguities. For this purpose, we will investigate the adaptation of 2-dimensional grammars (e.g. graph-grammars). As experimental framework, we will apply the research in a cultural heritage project on historical handwritten musical scores from the Liceu (Barcelona Opera House). Web page of the Archive of the Liceu's Opera House: http://www.bib.uab.cat/human/arxiusocietatliceu/publiques/indexeng.php |
| Ernest Valveny Llobet | Tenured lecturer | Centre de Visió per Computador Edifici O - Campus UAB 08193 Bellaterra | ernest@cvc.uab.es | Computer Science | Ciències de la Computació / Centre de Visió per Computador | Computational Models for Artificial vision | **Semantic image understanding and the role of scene text recognition**. The research project will focus on concrete ways to model the mutual relation between textual and visual information in images, aiming to provide image understanding models with scene text reading capabilities. Basically, the project will explore ways to integrate scene text with visual features in order to create new models for semantic image understanding tasks, such as tagging, visual question answering, image captioning, retrieval, etc. For that, we also aim to push forward current state-of-the-art on end-to-end text recognition by leveraging context information about the scene in order to build specific attention models that can be used to boost the performance in challenging situations not solved yet by the current-state-of-the-art, such as multi-script, curved or non-straight text, very small font size, highly degraded backgrounds, etc.  |
| Robert Benavente VidalRamon Baldrich Caselles | Tenure-track lecturerTenured lecturer | Centre de Visió per Computador Edifici O - Campus UAB 08193 Bellaterra | robert@cvc.uab.catramon@cvc.uab.cat | Computer Science | Ciències de la Computació / Centre de Visió per Computador | Computational Models for Artificial vision | **Description of colors and materials on images with deep learning techniques**. This proposal is framed in the field of computer vision. In the task of scene interpretation in images, the description of properties of the objects in the scene is a crucial part. Such properties can be related to the reflectance of the surfaces (i.e. the color of the objects), the materials in the scene (stone, wood, metal, plastic, etc) or the physical state (wet, dry, smooth, etc). The correct identification in images of such properties is highly desirable in many computer vision applications such as automatic image annotation, and autonomous systems.The use of deep-learning techniques has provided a huge improvement on performance on some of these tasks. Following the research lines of the color in context group , the goal of this PhD proposal is to study how different visual cues from images can be incorporated on deep convolutional neural networks to provide accurate descriptions of the content of an image in terms of color, material, and materials' properties. The project will be developed in the Computer Vision Center where around 150 researchers investigate on topics related to computer vision. |
| Dimosthenis Karatzas | Tenure-track lecturer | Centre de Visió per Computador Edifici O - Campus UAB 08193 Bellaterra | dimos@cvc.uab.es | Computer Science | Ciències de la Computació / Centre de Visió per Computador | Computational Models for Artificial vision | **Multimodal joint embedding for machine comprehension**. Learning joint visual and textual embedding spaces is at the heart of many current day computer vision algorithms including captioning, visual-question answering, and multi-modal indexing and retrieval. Through this PhD work we aim to investigate techniques and methods for efficiently learning multimodal joint embedding spaces between visual, variable-length textual and structural (graph based) data. We will look into both the encoding and the decoding pipelines, and will study ways to learn spaces where specific arithmetic operations carry predefined semantic meanings. Large scale data (e.g. weakly annotated data sourced from the Web and/or synthetic data) will be employed. Some of the application areas we will look into are semantic image retrieval, image captioning and eventually multimodal machine comprehension (e.g. textbook question answering). |
| Tomàs Margalef | full professor | Carrer de les Sitges. School of Engineering. Universitat Autònoma de Barcelona. 08193 Cerdanyola del Vallés. | tomas.margalef@uab.es | Computer Science | Computer Architecture and Operating Systems | High Performance Computing Applications for science and engineering (http://grupsderecerca.uab.cat/hpca4se/en) | Performance Engineering of computational science applications: The goal is to design and develop environmental applications (forest fire, meteorology, climate modeling) exploiting advanced HPC architectures (Multi/many core processors, accelerators, GPUs, ...). |
| Miquel Angel Senar | full professor | Carrer de les Sitges. School of Engineering. Universitat Autònoma de Barcelona. 08193 Cerdanyola del Vallés. | miquelangel.senar@uab.es | Computer Science | Computer Architecture and Operating Systems | High performance computing and bioinformatics (http://grupsderecerca.uab.cat/hpca4se/en) | Data management challenges in genomic applications. This topic relates to the study and design of mechanisms and strategies that can be applied in advanced HPC systems by genomic applications with large demands of data processing. Target computing systems will consist in heterogeneous platforms, combining multicore processors and accelerators (Xeon Phi, GPUs), combined with parallel file systems; and target applications will focuss on genome analysis tools that are applied to metabarcoding problems. |
| Ana Cortés | Tenured lecturer | Carrer de les Sitges. School of Engineering. Universitat Autònoma de Barcelona. 08193 Cerdanyola del Vallés. | ana.cortes@uab.es | Computer Science | Computer Architecture and Operating Systems | High Performance Computing Applications for science and engineering (http://grupsderecerca.uab.cat/hpca4se/en) | Real time perception of natural hazards evolution based on airborne remote sensing. |
| Ana Cortés | Tenured lecturer | Carrer de les Sitges. School of Engineering. Universitat Autònoma de Barcelona. 08193 Cerdanyola del Vallés. | ana.cortes@uab.es | Computer Science | Computer Architecture and Operating Systems | High Performance Computing Applications for science and engineering (http://grupsderecerca.uab.cat/hpca4se/en) | Coupling multiscale models for natural hazard evolution prediction. |
| Juan Carlos Moure | Tenured lecturer | Carrer de les Sitges. School of Engineering. Universitat Autònoma de Barcelona. 08193 Cerdanyola del Vallés. | juancarlos.moure@uab.es | Computer Science | Computer Architecture and Operating Systems | High performance computing (http://grupsderecerca.uab.cat/hpca4se/en) | Design, development and optimization of Autonomous driving vehicles using embedded systems with CPU, GPU ad FPGA resources.  |
| Juan Carlos Moure | Tenured lecturer | Carrer de les Sitges. School of Engineering. Universitat Autònoma de Barcelona. 08193 Cerdanyola del Vallés. | juancarlos.moure@uab.es | Computer Science | Computer Architecture and Operating Systems | High performance computing and bioinformatics (http://grupsderecerca.uab.cat/hpca4se/en) | Performance Engineering of Next-Generation Sequencing bioinformatics algorithms for advanced computing platforms (NVIDIA GPU's, intel Xeon Phi coprocessors,…). |
| Antonio Espinosa | Researcher | Carrer de les Sitges. School of Engineering. Universitat Autònoma de Barcelona. 08193 Cerdanyola del Vallés. | antoniomiguel.espinosa@uab.cat | Computer Science | Computer Architecture and Operating Systems | High performance computing and bioinformatics (http://grupsderecerca.uab.cat/hpca4se/en) | Bioinformatics in the Big Data era: challenges on data management problems in bioinformatic workflow engines. |
| Eduardo César | Tenured lecturer | Carrer de les Sitges. School of Engineering. Universitat Autònoma de Barcelona. 08193 Cerdanyola del Vallés. | [eduardo.cesar@uab.cat](file:///C%3A%5CUsers%5Cecesar%5CLibrary%5CContainers%5Ccom.apple.mail%5CData%5CLibrary%5CMail%20Downloads%5C6FDE5E0F-2069-4F39-9DAC-E7F59B1DF5FA%5Ceduardo.cesar%40uab.cat) | Computer Science | Computer Architecture and Operating Systems | High Performance Computing Applications for science and engineering (http://grupsderecerca.uab.cat/hpca4se/en) | Parallel Agent Based Modeling and Simulation of Bilogical Systems. |
| Joan Sorribes | Tenured lecturer | Carrer de les Sitges. School of Engineering. Universitat Autònoma de Barcelona. 08193 Cerdanyola del Vallés. | [joan.sorribes@uab.cat](file:///C%3A%5CUsers%5Cecesar%5CLibrary%5CContainers%5Ccom.apple.mail%5CData%5CLibrary%5CMail%20Downloads%5C6FDE5E0F-2069-4F39-9DAC-E7F59B1DF5FA%5Cjoan.sorribes%40uab.cat) | Computer Science | Computer Architecture and Operating Systems | High Performance Computing Applications for science and engineering (http://grupsderecerca.uab.cat/hpca4se/en) | Tools for dynamic tuning of parallel applications. |
| Anna Sikora | Tenure-track lecturer | Carrer de les Sitges. School of Engineering. Universitat Autònoma de Barcelona. 08193 Cerdanyola del Vallés. | anna.sikora@uab.cat | Computer Science | Computer Architecture and Operating Systems | High Performance Computing Applications for science and engineering (http://grupsderecerca.uab.cat/hpca4se/en) | Auto-tuning of environmental HPC applications. The goal is to analyze environmental HPC applications and indicate/apply possibilities of their automatic and dynamic tuning. |
| Cultures in Contact in the Mediterranean |
| Agustí Alemany Vilamajó | Tenured lecturer | Office B7/132, Building B (Faculty of Arts and Humanities) | agusti.alemany@uab.cat | Cultures in Contact in the Mediterranean | Department of Ancient and Medieval History | Classical and Oriental sources about Central Asia | Prosopography of Central Eurasian Nomads in Antiquity and the Middle Ages |
| Demography |
| Antonio López Gay | *Researcher* | Carrer de Ca n’Altayó, Edifici E2. Universitat Autònoma de Barcelona. 08193 Bellaterra / Barcelona. Spain | tlopez@ced.uab.es | Demography | Centre d'Estudis Demogràfics (CED) | Residential mobility and urban change | **Demographic behaviors and residential strategies: notes for the development of new social policies** |
| Iñaki Permanyer Ugartemendia | *Researcher Ramón y cajal* | Carrer de Ca n’Altayó, Edifici E2. Universitat Autònoma de Barcelona. 08193 Bellaterra / Barcelona. Spain | ipermanyer@ced.uab.es | Demography | Centre d'Estudis Demogràfics (CED) | Social Stratification | **Equalizing or disequalizing? Opposing socio-demographic determinants of the spatial distribution of welfare (EQUALIZE)** |
| Electrical and Telecommunication Engineering |
| Ferran Martín (**Fellow of the IEEE**) | full professor | GEMMA/CIMITEC, Departament d'Enginyeria Electrònica, Universitat Autònoma de Barcelona, 08193 Bellaterra, Spain | Ferran.Martin@uab.es | Electrical and Telecommunication Engineering | Electronic Engineering | RF/microwave engineering, metamaterials and antennas | **Microwave sensors for medical diagnosis and biosensing**. The aim of this topic activity is to design and fabricate sensors, operating at microwave frequencies, sensitive to the variations experienced by biological substances or organic tissues when they suffer from abnormalities, or damage, such as cancerous tissue, excess sugar in blood, etc. Mainly, such anomalies give rise to dramatic variations in the dielectric constant of the materials under test that can be detected through a proper design of the sensors. Such sensors will be designed by combining transmission lines (for microwave excitation) and resonant particles (acting as sensing elements), and the principle of operation is the variation of the resonance frequency, phase, quality factor, or insertion loss of the sensor structures. Novel strategies for improving sensitivity, linearity and dynamic range, based on symmetry properties and metamaterials will be explored in the project. This research activity clearly fits to the societal challenges defined by the European Union within the Horizon 2020 Research Strategy Plan.  |
| Ferran Martín (**Fellow of the IEEE**) | full professor | GEMMA/CIMITEC, Departament d'Enginyeria Electrònica, Universitat Autònoma de Barcelona, 08193 Bellaterra, Spain | Ferran.Martin@uab.es | Electrical and Telecommunication Engineering | Electronic Engineering | RF/microwave engineering, metamaterials and antennas | **Chipless RFID**. The aim of this topic is to implement radiofrequency barcodes (also called spectrum signature barcodes) on low cost and flexible substrate, including paper, for applications in electronic voting, and secure paper for medical applications. These chipless RFID tags are expected to progressively replace the optical barcodes and are considered to be the barcodes of the future. |
| Ferran Martín (**Fellow of the IEEE**) | full professor | GEMMA/CIMITEC, Departament d'Enginyeria Electrònica, Universitat Autònoma de Barcelona, 08193 Bellaterra, Spain | Ferran.Martin@uab.es | Electrical and Telecommunication Engineering | Electronic Engineering | RF/microwave engineering, metamaterials and antennas | **Angular displacement and velocity sensors for space applications.** The aim of this topic is to develop robust and low cost sensors for the precise measurement of angular displacement and velocity of reaction wheels and servomechanisms, present in space vehicles such as satelites. The idea is to replace the optical encoders by radiofrequency sensors, which are chaper and more robust in front of agressive environmental conditions or aging effects. |
| Gonzalo Seco Granados | Tenure-track lecturer | Escola d'Enginyeria, Campus UAB, 08193 Cerdanyola del Valles | gonzalo.seco@uab.cat | Electrical and Telecommunication Engineering | Department of Telecommunications and Systems Engineering | Research Group on Signal Processing for Communications and Navigation (http://spcomnav.uab.cat)Communications, navigation and networking | Title: Localization using 5G mmW and massive MIMO technologies Some technologies are emerging that promise to lead to a major improvement of 5G communications systems, namely the use of millimeter-wave (mm-wave) signals and massive MIMO. These technologies can also revolutionize positioning systems thanks to their extraordinary ranging and directional accuracies. Moreover, they can also provide intrinsic positioning security thanks to the confinement of the transmission. However, research in this topic is still in very early stages. One key objective of this task is to develop techniques to estimate the position and orientation of a mobile device using 5G systems in urban and indoor environments, and using only one link, and with a very small latency. Another objective is to perform environment sensing&mapping simultanously to the localization, and then to exploit the geometrical properties of the environment to achieve localization with one-way ranging and angular measurements. |
| Marc Porti Pujal | Tenured lecturer | Departament d'Enginyeria Electrònica. Edifici Q, Campus Universitat Autònoma de Barcelona, 08193. Bellaterra, Barcelona, Spain | 　 | Electrical and Telecommunication Engineering | Electronic Engineering Department | Nanoscale and device level variability and reliability of emergent devices based on Resistive Switching and/or 2D materials (as graphene) for nanoelectronics. | The PhD student's work will be focused on the electrical properties (both at the nanoscale and device level), variability and reliability of emergent devices as those based on resistive switching (a hot topic for the fabrication of RRAM new generation memory cells and neuromorphic systems) or alternative 2D materials as graphene (others could also be considered), which are of paramount importance for the nanoelectronics industry. To do that, standard characterization techniques at wafer level and nanoscale resolution tools as Atomic Force Microscope based techniques will be combined. In case of the graphene based devices, fabrication could also be a task of the PhD student. The PhD student will work in one of the hottest topics in nanoelectronics in a group with extensive collaborations with worldwide (USA, Germany, China...) research institutions and companies in the field of micro/nanoelectronics and will adquire extensive experience in characterization techniques and nanofabrication of devices. The collaborative framework provided by the group will give an international projection to the student activities. http://grupsderecerca.uab.cat/redec/ |
| Rosana Rodriguez Martinez | Tenured lecturer | Departament d'Enginyeria Electrònica. Escola d'Enginyeria. Campus Universitat Autònoma de Barcelona. 08193. Bellaterra, Barcelona, Spain | Rosana.Rodriguez@uab.es | Electrical and Telecommunication Engineering | Electronic Engineering Department | Reliability of micro- and nano- electronic devices and circuits | Nowadays, the necessity of ultra-scaled electronic devices has produced the appearance of new nanodevices and circuits. In this sense, the devices with resistive switching present extraordinary properties of scaling, operation speed, and lower occupied chip area, which makes them one of most promising candidates for memory, neuromorphic (neural networks) and logic applications. The application of the resistive switching phenomenon has open a new path to the development of a new computer organization, more efficient but completely different to the traditional Von-Neumann computation. Objectives: This proposal is to experimentally investigate the electrical characteristics and reliability of resistive switching nanodevices oriented to the implementation of memorycells, neuromorfic systems and logic applications. Our consolidated research group has an experience of more than 30 years in the field of electrical characterization and reliability.Supervisor: Rosana Rodríguez. Electronic Engineering Department. e-mail: Rosana.Rodriguez@uab.es |
| Environmental Science and Technology |
| Antoni Sánchez Ferrer | Tenured lecturer | School of Engineering | antoni.sanchez@uab.cat | Environmental Science and Technology | Department of Chemical, Biological and Environmental Engineeting | Composting of organic solid wastes | Characterization of gaseous emissions from solid waste and wastewater treatment faciliites |
| Ernest Marco-Urrea | Tenure-track lecturer | Carrer de les Sitges, 08193 Cerdanyola del Vallès, Barcelona | ernest.marco@uab.cat | Environmental Science and Technology | Department of Chemical, Biological and Environmental Engineering | Biodegradation of industrial contaminants and waste valorization | The topic is the use of bacteria to degrade halogenated contaminants in groundwater. Contamination of aquifers is a major environmental problem and the application of organohalide-respiring bacteria that can grow with these contaminants is an effective and low-cost remediation strategy. This project involves the use of anaerobic cultivation and molecular techniques (genomics and proteomics). |
| Joan Martinez Alier  | Honorary lecturer | ICTA UAB | ICTA-ICP, Edifici Z Campus de la UAB 08193 Bellaterra (Cerdanyola del Vallès) Barcelona · Spain | joanmartinezalier@gmail.com; juanlcau@gmail.com | Environmental Science and Technology | Institute of Environmental Science and Technology (ICTA), Universitat Autònoma de Barcelona (UAB) | Ecological economics and political ecology | Eco-Marxism Histories and Futures in China |
| Joan Martinez Alier  | Honorary lecturer | ICTA UAB | ICTA-ICP, Edifici Z Campus de la UAB 08193 Bellaterra (Cerdanyola del Vallès) Barcelona · Spain | joanmartinezalier@gmail.com; juanlcau@gmail.com | Environmental Science and Technology | Institute of Environmental Science and Technology (ICTA), Universitat Autònoma de Barcelona (UAB) | Ecological economics and political ecology | Environmental Justice and Ecological Civilization: Emerging Links in China |
| Joan Martinez Alier  | Honorary lecturer | ICTA UAB | ICTA-ICP, Edifici Z Campus de la UAB 08193 Bellaterra (Cerdanyola del Vallès) Barcelona · Spain | joanmartinezalier@gmail.com; juanlcau@gmail.com | Environmental Science and Technology | Institute of Environmental Science and Technology (ICTA), Universitat Autònoma de Barcelona (UAB) | Ecological economics and political ecology | The Role of the Community-based Initiatives for Sustainable Development in China |
| Joan Martinez Alier  | Honorary lecturer | ICTA UAB | ICTA-ICP, Edifici Z Campus de la UAB 08193 Bellaterra (Cerdanyola del Vallès) Barcelona · Spain | joanmartinezalier@gmail.com; juanlcau@gmail.com | Environmental Science and Technology | Institute of Environmental Science and Technology (ICTA), Universitat Autònoma de Barcelona (UAB) | Ecological economics and political ecology | The Belt and Road Initiative, Sustainability, and Natural Resources |
| Joan Martinez Alier  | Honorary lecturer | ICTA UAB | ICTA-ICP, Edifici Z Campus de la UAB 08193 Bellaterra (Cerdanyola del Vallès) Barcelona · Spain | joanmartinezalier@gmail.com; juanlcau@gmail.com | Environmental Science and Technology | Institute of Environmental Science and Technology (ICTA), Universitat Autònoma de Barcelona (UAB) | Ecological economics and political ecology | China's Energy Transition: Challenges and Chances |
| Joan Martinez Alier  | Honorary lecturer | ICTA UAB | ICTA-ICP, Edifici Z Campus de la UAB 08193 Bellaterra (Cerdanyola del Vallès) Barcelona · Spain | joanmartinezalier@gmail.com; juanlcau@gmail.com | Environmental Science and Technology | Institute of Environmental Science and Technology (ICTA), Universitat Autònoma de Barcelona (UAB) | Ecological economics and political ecology | Links between Ecological Economics and Political Ecology in China |
| Juan Antonio Baeza Labat | Tenured lecturer | Departament d'Enginyeria Química, Biològica i AmbientalEscola d'Enginyeria | JuanAntonio.Baeza@uab.cat | Environmental Science and Technology | Department of Chemical, Biological and Environmental Engineering | Nutrient removal and recovery from wastewater | Enhanced Biological Phosphorus Removal at short sludge age: towards energy and resource recovery.  |
| Patrizia Ziveri | ICREA Research Professor, Adjunct lecturer BAVE  | ICTA | patrizia.ziveri@uab.cat | Environmental Science and Technology | Institute of Environmental Science and Technology (ICTA), Universitat Autònoma de Barcelona (UAB) | Marine Global Change | Biodiversity of planktonic calcifiers under climate change |
| Patrizia Ziveri | ICREA Research Professor, Adjunct lecturer BAVE  | ICTA | patrizia.ziveri@uab.cat | Environmental Science and Technology | Institute of Environmental Science and Technology (ICTA), Universitat Autònoma de Barcelona (UAB) | Marine Global Change | Marine litter, microplastics, tourism |
| Xavier Font Segura | Tenure-track lecturer | c/ de les Sitges, s/n, Escola d'Enginyeria, Campus UAB, 08193 Cerdanyola del Vallés, Barcelona | xavier.font@uab.cat | Environmental Science and Technology | Chemical, Biological and Environment Engineering Dpt. | Nanomaterials for environmental engineering | Use of Metal Organic Frameworks with entraped nanoparticles, for catalitic reactions with environmental interest. For example producction of ethyl carbonate from CO or CO2, conversion of methane (biogas) to methanol, ... |
| Xavier Gabarrell i Durany/Laura Talens Peiró | Tenured lecturer/Researcher Beatriu de Pinós | ICTA-ICP, Edificio Z Campus de la UAB 08193 Bellaterra (Cerdanyola del Vallès) Barcelona | xavier.gabarrell@uab.cat; laura.talens@uab.cat | Environmental Science and Technology | Institute of Environmental Science and Technology (ICTA), Universitat Autònoma de Barcelona (UAB) | Industrial Ecology | In 2009, China generated almost five million tonnes of wasted electrical and electronic equipment (WEEE). China will overtake the United States as the first WEEE producer globally in the next years. Indeed, for 2030 China would generate over 25 million tonnes of WEEE, more than five times its current WEEE amount. The aim of the project is to explore potential circular economy strategies in WEEE, and estimate how the implementation of such principles could help reduce the volume of WEEE in China. As part of the project, the candidate will also analyse the production supply chain of some WEEE and analyse their current waste management in China. |
| Food Science |
| Manuel Castillo Zambudio | Tenure-track lecturer | Facultat de Veterinària. Travessera dels Turons s/n. Universitat Autònoma de Barcelona. 08103 Bellaterra (Cerdanyola del Vallès). Spain | manuel.castillo@uab.es | Food Science | Animal and Food Science | Development of optical sensors to control food industry processes | Inline estimation of thermal damage in milk using front-face fluorescence. The objective of this project is the development of a rapid, low-cost technology for inline quantification of damage tracers generated during milk processing using front-face fluorescence. Successful development of these innovative optic technology will aid in the decision-making process of dairy plants for the efficient use of milk and the assurance of a high quality product as well as in the authentication of milk treatments, which will benefit the consumers, the companies and the Governmental Regulatory Agencies.  |
| Jordi Saldo Periago | Tenured lecturer | Facultat de Veterinària. Travessera dels Turons s/n. Universitat Autònoma de Barcelona. 08103 Bellaterra (Cerdanyola del Vallès). Spain | jordi.saldo@uab.cat | Food Science | Animal and Food Science | Application of new technologies, nanotechnologies and technofunctionality for the improvement of food safety, the nutritional value of foods and the design and production of functional foods | The aim of the research will be the biofortification of seeds through changes in the germination step in a malting process. These changes would include addition of minerals in the stepping stage and physical treatments of the seed, including high pressure. |
| Genetics |
| Dr. Mayka Sanchez  | Researcher IGTP  | IGTP. Crta can ruti cami de les escoles s/n | msanchez@carrerasresearch.org | Genetics | Josep Carreras Leukaemia Research Institute. Iron Metabolism: Regulation and Diseases (Dr. Mayka Sanchez) | Iron metabolism. See http://www.carrerasresearch.org/es/Iron\_Metabolism:\_Regulation\_and\_Diseases | **Uncovering new molecular and pathophysiological networks in iron metabolism:** Characterization of novel IRP-target mRNAs in silico, in vitro and in vivo and proceed with innovative strategies to identify additional genes important for iron metabolism and/or responsible for new iron pathological entities. All these using new molecular methods and bioinformatic tools, unique knock-out mouse models and patients’ samples. Overall, these studies will revolutionize the investigation in iron metabolism providing significant insight into molecular pathways in iron homeostasis and will contribute in the development of new therapies for iron-related diseases. |
| Materials Science |
| Javier Rodríguez-Viejo | full professor | Departament de Física. Facultad de Ciencias. | javier.rodriguez@uab.es | Materials Science | Department of Physics | Nanomaterials and microsystems | Glasses are ubiquituos materials in our daily life. However, their low stability prevents their use in many potential applications. Ultrastable glasses grown from the vapor phase at temperatures below the glass transition temperature show enhanced mechanical and thermodynamic stability compared to conventional glasses quenched from the liquid. This project aims to use fast-scanning nanocalorimetry to investigate the kinetics and thermodynamics of vapor-deposited Mg-based thin film metallic glasses, as well as their glass forming ability. Complementary techniques for structural and mechanical charecterization will also be used. |
| Prof. Jordi Arbiol | ICREA Research Professor | 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 | 3D image reconstructions with electron tomography in the TEM, and HRTEM, EELS analyses of soft nanomaterials. |
| César Fernández Sánchez | Researcher CSIC | Campus UAB | cesar.fernandez@csic.es | Materials Science | Institute of Microelectronics of Barcelona (IMB-CNM, CSIC)  | Microelectronics / Materials for Nanobioelectronics, Nanobiosensors and Bioanalytical applications / Sensors and Biosensors | **LungCheck: Multiplex point-of-care device for lung disease biomarkers in sputum**. This project is focused on the development of an in-vitro point-of-care (POC) bioanalytical device based on sputum sampling and rapid multiplex biomarker analysis, for the early diagnosis of chronic obstructive pulmonary disease (COPD) and lung cancer in high-risk patients. LungCheck rationale is based on the integrated human immune response to infection and inflammation. The POC device will be validated for rapid detection of infection in COPD and potentially lung cancer incidence. It will be based on the quantitative detection of specific inflammatory markers secreted by the human immune system in response to pathogenic microorganisms as well as lung tumour-related exosomes released by the cancer cells to induce immune tolerance. The technology behind this device comprises the development and integration of electrochemical transducer arrays and fluidic components to be easily coupled and decoupled and as such facilitate the rapid and reliable detection of the selected biomarkers.  |
| Amparo Fuertes Miquel | Professor  | Campus UAB, 08193 Bellaterra (Spain) | amparo.fuertes@icmab.es | Materials Science | Institut de Ciència de Materials de Barcelona (CSIC). Research Group: Chemistry of functional nitrides, batteries and carbon nanomaterials | Nitride chemistry for new advanced materials | Title: New perovskite oxynitrides with electronic properties.The partial substitution of the anion oxide by nitride can expand and tune the physical properties of oxides, and oxynitrides are an emerging group of solids to explore new materials . The differences in polarizability, electronegativity and anion charge of nitrogen and oxygen induce changes in the electronic interactions of oxides by nitrogen introduction. The effects on properties arise from the higher covalency and enhanced polarization of metal–nitrogen bond and the changes in the energies of electronic levels, which are important in slightly doped nitrogen metal oxides as in stoichiometric oxynitrides. In this project we aim to design, synthesize and characterize new transition metal perovskite oxynitrides to search novel magnetic, ferroelectric and colossal magnetoresistance materials. The student will train in diverse synthetic methods of inorganic materials, in the structural characterization by using diffraction methods and in the study of electrical and magnetic properties of materials. |
| Dino Tonti | Researcher CSIC | campus UAB | dino@icmab.es | Materials Science | Department of Chemistry | Materials for energy | Metal air batteries are being intensively studied to overcome the cost and energy limitations of Li-ion batteries for large scale applications such as electric vehicles and grid storage. These electrochemical storage technologies require innovative cell design and control of the morphology of carbon-based electrodes. The present work will address the architecture of cells and of different carbonaceous composites in order to achieve fast kinetics, high energy density and a stable electrode-electrolyte interface. Main tasks include:• preparation and characterization of electrode composites from carbon-based materials such as graphene, nanotubes and xerogels• development of batteries and study by multiple electrochemical techniques• analysis and modeling of interactions and transport properties |
| Josep Fontcuberta | Researcher | Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Campus de la UAB, Bellaterra 08193, Spain | fontcuberta@icmab.cat | Materials Science | Institut de Ciència de Materials de Barcelona (ICMAB-CSIC) | Ferroelectric materials for photovoltaics | Ferroelectric materials are being explored as new candidates for solar energy harvesting. The candidate will join a leader team of people working on this subject. He/she and learn why and how ferroelectric materials can be useful and the appropriate techniques for growing, tailoring the band gap for enlarged photon absorption and testing. Equipment to be used include: advanced thin film grown facilities, high and low temperature electric and magnetic measurements, nanoscopic proximity probes and X-ray facilities, and access to nanofabrication labs. Visit .http://www.icmab.es/mulfox/ for more information. |
| Josep Fontcuberta | Researcher | Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Campus de la UAB, Bellaterra 08193, Spain | fontcuberta@icmab.cat | Materials Science | Institut de Ciència de Materials de Barcelona (ICMAB-CSIC) | Engineering brain-like neurons and synapse with ferroelectrics | Emulating brain operation in advanced computing is currently a major axis of research. It has been recently shown that ferroelectric tunnel devices, built to constitute ferroelectric memories, have the key ingredients for perform neuron-like functions and it has been claimed that memories can be built and designed to mimic some learning aspects on neuronal networks. In essence, this property results from the continuous multi-memory states than can be obtained in ferroelectric tunnel junctions. Within this project we aim at contributing to this challenging objective by growing and fabricating nanometric ferroelectric tunnel junctions and testing their functiona and learning ability. We intend to develop suitable materials and methods for testing single junctions (neuron-like elements) as well study the mutual interaction among interconnected very simple memory ensembles The candidate will joint a leader team and learn about how to fabricate ferroelectric memories and to test with the vision to determine their potential performance as neuron cells. Equipment to be used include: advanced thin film grown facilities, high and low temperature electric and magnetic measurements, nanoscopic proximity probes and X-ray facilities, and access to nanofabrication labs. Visit .http://www.icmab.es/mulfox/  |
| Josep Fontcuberta | Researcher | Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Campus de la UAB, Bellaterra 08193, Spain | fontcuberta@icmab.cat | Materials Science | Institut de Ciència de Materials de Barcelona (ICMAB-CSIC) | Transparent metals | Transparent metallic materials are needed in a variety of very important applications, from flat panel displays to photovoltaics panels or transparent electronics. So far indium thin oxide (ITO) has been the material of choice. However the scarcity of the raw materials (Indium) make ITO prohibitively expensive and new materials must be urgently developed. This objective seems to be at odds with conventional experience as typically, metals reflect light. We will address also this issue by exploring new ways of thinking about transparent metals and the new approaches for materials selection. The candidate will be supervised by Prof. Josep Fontcuberta. Josep Fontcuberta has a long expertise on oxide materials, and magnetic and ferroelectric thin film devices. He coauthors more than 400 scientific papers and he has a long experience on PhD supervision (more than 24 students have already successfully accomplished the PhD). |
| Ignasi Fina  | Researcher | Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Campus de la UAB, Bellaterra 08193, Spain | ifina@icmab.es | Materials Science | Institut de Ciència de Materials de Barcelona (ICMAB-CSIC) | Photo-writing in ferroelectric green memory devices | Optic fibers are at the core of communications technology because they allow fast data transfer. Before the data is showed up at our screens, it should be converted into electric or magnetic “0” and “1”s, and optoelectronic transducers are required. It is well-known that ferroelectric materials can do the mentioned conversion without requiring any intermediate device. The physical mechanism that triggers this effect is that ferroelectric materials can store the charge generated during the illumination, even after switching off the optic stimulus. Integrating this well-known phenomenon to ultrathin ferroelectric tunnel junctions, which are a promising candidate for faster and less power consumption green memory devices, would allow the simplification of the data storing procedure. However, to achieve this chimeric objective deeper analysis on the effect of light in ultrathin ferroelectric devices is needed. If successful the project outcome will allow to improve data communication in the framework of IoT devices, at the same time that energy consumption is keep low in order to make possible more sustainable future electronic devices. The proposed PhD thesis will carefully address the photoelectric response of ferroelectric tunnel junction under different conditions using state-of-the-art characterization devices. Therefore, the PhD student will acquire knowledge on material growth and basic characterization. The PhD student will get wide experience on photoelectronic characterization, not only required for technological perspectives like the one proposed for his/her PhD thesis, also required for still emerging technological areas such as solar cells. The student will be integrated in research synergies with groups across Europe (UK, France, Czech Rep., and Germany) and USA (California). Moreover, he will be required to attend and participate at international conferences, and trigger by himself dissemination and outreach activities. Therefore, good communication skills are mandatory.The PhD student will be integrated to the MULFOX group at ICMAB (http://www.icmab.es) under supervision of Ignasi Fina (https://sites.google.com/site/ifinawebsite ). |
| Ignasi Fina  | Researcher | Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Campus de la UAB, Bellaterra 08193, Spain | ifina@icmab.es | Materials Science | Institut de Ciència de Materials de Barcelona (ICMAB-CSIC) | Green and robust magnetic memory devices | Spintronics can be introduced by setting up analogies between electrical switches and the ability of some materials to change its electrical resistance after magnetic stimuli. Ever since the seminal works by Lord Kelvin in Glasgow, back in mid nineteenth century, one type of magnetic materials have dominated the academic research arena: the ferromagnets. Ferromagnets have been everywhere from the earliest audio magnetic tapes up to the modern hard-drives. Following its wake, antiferromagnetic spintronics is an emerging field of research which walks on the footsteps of ferromagnets holding the promise for a unique additional features: magnetic unrivalled robustness.The aim of the present project is to explore the possibility to growth high quality Ferroelectric/antiferromagnetic fully insulating structures. The student will be responsible in the materials growth and characterization using a wide range of characterization techniques: structural, morphological, compositional, and magnetometric.The use of large scale facilities, such as synchrotron light, is also planned for advanced magnetoelectric characterization.If successful the results might pave the way towards the electric control of antiferromagnetic order at room temperature, interesting for a wide range of applications. The student will be integrated to the MULFOX group at ICMAB (http://www.icmab.es/mulfox/). |
| Florencio Sánchez | Researcher-CSIC | Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Campus de la UAB, Bellaterra 08193, Spain | fsanchez@icmab.es | Materials Science | Institut de Ciència de Materials de Barcelona (ICMAB-CSIC) | Epitaxial ferroelectric oxide thin films with enhanced polarization | The properties of ferroelectric oxide films depend largely on the lattice parameters. The thesis will develop new methods to control the lattice strain in epitaxial BaTiO3 ferroelectric thin films: 1) nanocomposite films containing a minority secondary oxide phase (1D or 2D), 2) single BaTiO3 films with strain gradients to generate a flexoelectric response, and 3) single BaTiO3 films on flexible mica substrates. The films will be grown by pulsed laser deposition, and the thesis will involve exhaustive structural and functional characterization of the BaTiO3 films. The student will join the Multifunctional Thin Films and Complex Structures group (http://www.icmab.es/mulfox/) in the Materials Science Institute of Barcelona (ICMAB-CSIC). The research group, formed by researchers and students from different countries is internationally recognized by its research in growth and properties of functional oxide thin films. |
| Lourdes Fàbrega | Researcher CSIC | ICMAB-CSIC, C/Til.lers s/n, Campus de la UAB, E-08193 (SPAIN) | lourdes@icmab.es | Materials Science | ICMAB-CSIC | Nanostructured Functional Materials;Chemistry applied to Materials Science; Advanced materials for nanoengineering | MODELLING OF SUPERCONDUCTING RADIATION DETECTORSCryogenic superconducting Transition Edge Sensors (TES) are radiation detectors with outstanding sensitivity, with a wide range of applications, such as astronomy, nanotechnology, biomedicine, security and industry. TES are already in use or being projected as essential elements in very demanding future experiments and space missions, as well as in advanced characterization of nanomaterials and quantum information. This project will address the electrothermal modelling of TES microcalorimeters for radiation detectors, with the aim of understanding their performances and optimize them. The student will work in a multidisciplinary team constituted by experts in materials science, nanotechnology, cryogenics and engineering, that is developing TES detectors for astrophysics and other applications; he/she will get familiar with simulation tools and perform cryogenic characterization of the detectors; he/she will also contribute or follow the processes of detector design and fabrication for specific applications.Student profile: physicist, materials scientist or engineer with knowledge of programming/simulation tools. Knowledge on other areas such as superconductivity and nanotechnology will be appreciated. |
| Marta Mas Torrent | Researcher-CSIC | Campus UAB, 08193 Bellaterra | mmas@icmab.es | Materials Science | ICMAB | Organic field-effect transistors: towards high performing and flexible devices for sensing | Organic devices are raising a great deal of interest for low-cost and large area applications. Here, we plan to fabricate organic field-effect transistors (OFETs) based on crystalline films of organic semiconductors on flexible substrates. These devices will be applied in sensing applications such as pressure sensors or (bio)chemical sensors. |
| Xavier Torrelles Albareda | Researcher | ICMAB; Campus UAB; 08193 Bellaterra | torrelles@icmab.es | Materials Science | ICMAB-CSIC | Catalysis: water dissociation for hydrogen production | Titania is of interest among others for the photovoltaic conversion of light to electricity. However, it absorbs only a small portion of the available solar energy. This limitation has motivated attempts to modify its absorption edge as for example by partial substitution of oxygen with another electronegative atom or adsorbing molecular species. A much less explored way is titania supported on ferroelectric materials able to enhance visible light photoactivity. The objective is designing and test epitaxial titania films grown on ferroelectric oxide as photo-catalysts by PLD to enhance water dissociation process for production of green energies as Hydrogen. |
| Núria Aliaga Alcalde | Professor ICREA | ICMAB- Campus de la Universitat Autònoma de Barcelona | nuria.aliaga@icrea.cat | Materials Science | ICMAB- Institute of Material Science of Barcelona-CSIC | Molecular Electronics | Synthesis and characterization of conjugated molecules, so-called Curcuminoids, toward their use as active components in nanodevices. The candidate will be trained in the organic chemistry and coordination chemistry as well as in surface science. The student will learn how to functionalized surfaces to attach the molecules and how to measure conductance values of the final devices.  |
| Carmen Ocal | Researcher-CSIC | ICMAB, Campus UAB, Bellaterra 280193 | cocal@icmab.es | Materials Science | INSTITUT DE CIENCIA DE MATERIALS DE BARCELONA, ICMAB-CSIC | Nanoscience, chirality on surfaces | It has been established, recently, that helical molecules having right of left handed chirality, adsorbed on Au surfaces, behave as spin filters i.e. the transmission through the molecular axis of an electron with a determined spin orientation, depends on the chirality of the molecules. For this end, obtaining spatially uniform chiral layers with atomic-scale control of their handedness is crucial. In order to explore the origin of chirality transfer and amplification involved in the 2D and 3D assembling process, during this PhD project the self-assembly of the two chiral forms of the same molecule will be deposited, either from the vapor phase or from molecular solutions under ultra-high-vacuum (UHV), depending on the particular molecule. In the later case, using a dedicated atomic layer injection system, it will be of particular importance performing a solvent screening investigation. The supramolecular structure of the assembled layers will be determined at the molecular level for different surface coverages using a combination of Scanning Tunneling Microscopy and Atomic Force Microscopy (STM/AFM) in UHV conditions. The student will acquire the necessary expertise in these and other techniques usefull for the project development. Additionally to these microscopies, sinchrotron radiation techniques will be used when needed.  |
| Martí Gich Garcia | Researcher CSIC | Materials Science Institute of Barcelona (ICMAB-CSIC), www.icmab.es; Nanoparticles and Nanocomposites Group, www.icmab.es/nn | mgich@icmab.es | Materials Science | Institut de Ciència de Materials de Barcelona-CSIC | Nanostructured Materials | **Porous carbon thin film microelectrodes for continuous in-stiu environmental monitoring** Electrochemical sensors based in carbon electrodes are suitable candidates for in-situ environmental monitoring of a broad range of species, from organic molecules to heavy metals. However, the low cost production of highly reliable and sensitive sensors is still challenging. The aim of the PhD is developing a new family of carbon thin film electrodes by combining the chemical solution deposition of organic-inorganic gel films and photolithography. These electrodes will be tailored to be applied in the in-situ detection of relevant prioritary hazardous substances in waters.  |
| Jaume Veciana/ Concepció Rovira | Research Professor-CSIC | Institut de Ciència de Materials de Barcelona. Campus de la UAB. Bellaterra | vecianaj@icmab.es. cun@icmab.es | Materials Science | NANOMOL-ICMAB | Materials for information science and electronics. Research in the emerging scientific discipline of molecular electronics and spintronics | Developement of Molecule-Based Materials for Spintronics based on organic radical conductors. The project developement will imply the synthesis of organic molecules, their organization in crystals and the study of the electronic and magnetic properties of the molecules and the derived materials. |
| Riccardo Rurali | Researcher CSIC | ICMAB-CSIC, Campus de Bellaterra | rrurali@icmab.es | Materials Science | Theory and Simulation of Materials, ICMAB-CSIC | Theory and simulation of the behaviour of materials / Materials physics I | THERMAL RETIFICATION AT THE NANOSCALE - The goal of this project is providing a theoretical framework aimed at understanding and controlling the manipulation of heat flux within semiconducting nanowires. The student will perform quantum numerical simulations in order to devise realistic approaches for the engineering of a nanoscale thermal diode, 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. Nanowires present multiple advantages over bulk materials to achieve heat rectification, mostly due to their reduced dimensionality and to the flexibility given by the chemistry of growth to yield structures that appear to be suited for these applications. 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 |
| Esther Barrena | Researcher-CSIC | ICMAB, Campus UAB, Bellaterra 280193 | ebarrena@icmab.es | Materials Science | INSTITUT DE CIENCIA DE MATERIALS DE BARCELONA, ICMAB-CSIC | Nanoscience, organic semiconductors |  The goal of this project is to elucidate structure-property relationship in 2D organic layers for organic field effect transistors by employing scanning probe microscopies and syncrotron- related techniques. |
| Jaume Veciana/ Concepció Rovira | Research Professor-CSIC | Institut de Ciència de Materials de Barcelona. Campus de la UAB. Bellaterra | vecianaj@icmab.es. cun@icmab.es | Materials Science | NANOMOL-ICMAB | Materials for information science and electronics. Research in the emerging scientific discipline of molecular electronics and spintronics | Developement of Molecule-Based Materials for Spintronics based on organic radical conductors. The project developement will imply the synthesis of organic molecules, their organization in crystals and the study of the electronic and magnetic properties of the molecules and the derived materials. |
| Marta Mas Torrent | Researcher-CSIC | Campus UAB, 08193 Bellaterra | mmas@icmab.es | Materials Science | ICMAB | Organic field-effect transistors: towards high performing and flexible devices for sensing | Organic devices are raising a great deal of interest for low-cost and large area applications. Here, we plan to fabricate organic field-effect transistors (OFETs) based on crystalline films of organic semiconductors on flexible substrates. These devices will be applied in sensing applications such as pressure sensors or (bio)chemical sensors. |
| Maria Isabel Alonso Carmona | Researcher ICMAB-CSIC | ICMAB | isabel@icmab.es | Materials Science | Group of Nanostructured Optoelectronic Materials (ICMAB-CSIC) | Materials for energy | **Preparation and characterization of hybrid semiconducting composites based on polymers and inorganic nanofillers**: This work aims to the improvement of photovoltaic and thermoelectric properties by selection of proper material combinations in which the thermally insulating organic matrix is improved by good electrically conductive inorganic fillers. |
| Medicine |
| Miquel Sabria Leal | full professor | Ctra. Can Ruti. Cami escoles s/n. 08916, Badalona (Barcelona | msabria.germanstrias@gencat.cat  | Medicine | Medicine. Faculty of Medicine. Campus Can Ruti | Environmental pathogens, disinfection and treatment | New low cost products for disinfection in water systems: Efficiency study against Legionella  |
| Antonio Artigas | Adjunct Lecturer | Parc Taulí 1, Edifici Santa Fe, laboratori de Recerca | aartigas@tauli.cat | Medicine | Fundació Parc Taulí | Patologia respiratoria | Acute lung injury is a disease with a high incidence and mortality in the intensive care unit and its treatment is still controversial. Protective ventilation with low tidal volumes improve outcome of Acute Respiratory Distress Syndrome (ARDS) patients with mechanical ventilation, however, it can cause increased partial pressure of CO2 beyond the physiological range. Some studies suggest that this could moderate the inflammatory response, but recently published evidence suggests that hypercapnia can be harmful, contributing to a worsening of lung injury. To clarify this fact, the first aim of this project is to determine the effect of hypercapnia acidosis on human alveolar cells, paying attention to the cellular response. This project will also try to discern the response caused by hypercapnia and acidosis. The second aim of this project is to investigate the effect of hypercapnia acidosis on cocultures of neutrophils or alveolar macrophages with hATII. The third aim of this project is to evaluate the effect of different concentrations of CO2 on a preclinical model of acute lung injury. To carry out the first and the second objective we will isolate human alveolar type 2 cells (hATII) from human biopsies and stimulate these cells with differential CO2 concentrations with or without pH control. For the second objective we will either isolate neutrophils and alveolar macrophages. We will analyze cellular parameters such as permeability, inflammatory response, apoptosis and proliferation. For the third objective, we will observe the effect of different doses of CO2 in Sprague-Dawley rats with an acute lung injury. The expression and synthesis of pro and anti-inflammatory markers, the number of macrophages and neutrophils in the bronchoalveolar-lavage and the integrity of the alveolar epithelium will be evaluated by histological analysis.  |
| Eva Martínez Balibrea | Researcher IGTP  | IGTP.C/Ctra. De Can Ruti, Camí de les escoles s/n 08916 Badalona | embalibrea@iconcologia.net | Medicine | Medical oncology service/Catalan Institute of Oncology - Germans Trias i Pujol Research Institute | We study the molecular mechanisms of resistance to chemotherpay in colorectal cancer. We look for biomarkers and new drug targets. | We have demonstrated that curcumin can overcome resistance to chemotherapy (Ruiz de Porras V et al, Sci Rep, 2016). We want to study the possible combination of curcumin with standard treatments in colorectal cancer by using in vivo orthotopic mouse models. |
| Joan Martí-Fàbregas | Adjunct Lecturer | Stroke Unit, Neurology Service - Department of NeurologyHospital de la Santa Creu i Sant Pau. c/ Sant Antoni Mª Claret, 167, 08025, Barcelona. | JMarti@santpau.cat | Medicine  | Medicine Department UAB - Stroke Unit, Department of Neurology, Neurovascular Research Laboratory, Institute of Research, Hospital de la Santa Creu i Sant Pau. | Neurology | Stroke, neurosciences, genetics, epigenetics, Genome Wide techniques, Molecular biology and Integromics.**NEUROLOGICAL DETERIORATION AFTER STROKE, OMICS TECHNIQUES TO FIND DRUGS TO IMPROVE NEUROLOGICAL OUTCOME.** BACKGROUND AND OBJECTIVES.Currently there are not neuroprotective drugs to directly improve the neurological deterioration that occursafter stroke.Our objective is to use Genome-wide techniques to find new drug targets and improve neurologicaldeterioration after stroke.METHODS.PHASE-1: We will analyze ischemic strokes with neurological outcome data, measured using dNIHSS at 24h(difference between NIHSS score at 24h and baseline NIHSS<6h). We will perform an Epigenome-wideAssociation Study (EWAS) to analyze the methylation pattern of 850,000 CpG sites using the EPIC-InfiniumBeadChip. We will analyze blood samples (obtained <6h) from 500 ischemic strokes. We will perform aGenome-Wide Association Study (GWAS) in 4,000 strokes using a Human-Exon BeadChip to detect morethan 3,000,000 genotyped/imputed polymorphisms.PHASE-2: Replication of the significant results (EWAS: pvalue<10-7; GWAS: pvalue<10-8) in a new cohort ofpatients (n=2,000). We will perform integromics analysis with mixOmics platform and pathway analysis.PHASE-3: We will analyze the genes from Phase-1 statistically replicated (after Bonferroni correction) inPhase-2. We will use the GTEX platform to determine the genes altered due to the significant CpG sites orpolymorphisms. Secondly, we will determine the association with the size of the brain infarct (animal models)and the response to ischemia (in vitro models).We will study the significant genes in brain necrotic samples from 6 ischemic strokes using Real Time-PCRand immunohistochemistry techniques.Finally, the interesting genes from Phase-2 and Phase-3 and the key proteins in the integromics and pathwayanalyses, will be included in the Anaxomics platform analysis to find currently used drugs that could modulatethose risk factor genes.EXPECTED RESULTSWe will find currently used drugs and new drug targets that could be useful in the clinical practice. |
| Neurosciences |
| Jose Ramon BAYASCAS RAMIREZ | Tenure-track lecturer | Facultat de Medicina, Unitat de Bioquímica (M2), Campus UAB, Cerdanyola del Vallès 08193, Spain | joseramon.bayascas@uab.cat | Neurosciences | Institute of Neuroscience | The role of PDK1 in Alzheimer Disease | To validate the PDK1/Akt kinases as potential targtes for the treatment of Alzheimer Disease. To investigate the mechanisms by which inhibition of Akt protects neurons from amyloid-beta induced neurotoxicity |
| Assumpció Bosch Merino | Tenured lecturer | C/ de la Vall Moronta, Edifici H, UAB | assumpcio.bosch@uab.es | Neurosciences | Institute of Neuroscience | Neurodegeneration and Aging | Study of the neurodegeneration caused by lysosomal storage diseases |
| Assumpció Bosch Merino | Tenured lecturer | C/ de la Vall Moronta, Edifici H, UAB | assumpcio.bosch@uab.es | Neurosciences | Institute of Neuroscience | Neuroregeneration and Repair | Peripheral neuropathies, mechanisms of development and therapeutic approaches |
| Carlos A. Saura | Tenured lecturer | Unitat de Bioquímica i Biologia Molecular, Facultat de Medicina, UAB | carlos.saura@uab.cat | Neurosciences | Institute of Neuroscience | Biological basis of aging and dementia | Synaptic plasticity and memory loss in Alzheimer´s disease |
| Pharmacology |
| Nieves Pizarro Lozano | Adjunct lecturer UDIMAS | Fundació IMIM,c/Dr. Aiguader, 88 08003 Barcelona | npizarro@imim.es | Pharmacology | Department of Pharmacology, Therapeutics and Toxicology (Fundació IMIM) | Clinical Pharmacology Research | Prevention with a Mediterranean Diet intervention of Cognitive Decline in subjects with Mild Cognitive Impairment or Subjective Memory Complaints |
| Physics |
| Juan Campos Coloma | full professor | Universitat Autònoma de Barcelona. Department of Physics. Group of Optics. 08193 Bellaterra (Barcelona) Spain | juan.campos@uab.es | Physics | Physics | Optics & Photonics | Development of polarimetric methods and instrumentation for the characterization of biological samples. Application to biomedical research.  |
| Aitor Mugarza | Adjunct Lecturer ICREA | Edifici ICN2 | aitor.mugarza@icn.cat | Physics | Institut Català de Nanociència i Nanotecnologia (ICN2) | Synthesis and characterization of graphene nanostructures with tailored properties | Bottom-up synthesis and transfer of graphene nanostructures onto gateable arquitectures. In a first step the researcher will continue developing bottom-up methods that the group is studying at the present in order to synthesize different graphene nanostructures based on-surface chemistry routes. Functionalized nanoribbons, porous networks, and nanoislands of different geometry will be synthesized on metallic templates. In a second step, the student will develop methods to transfer the nanostructures to insulating surfaces, where electrical contacts will be made by lithographic methods. This graphene-based nanodevices will be used for proof of principle experiments of different functionalities, from transistor to electro-optical response or to bio/chemical sensing. |
| Aurelio Juste | Researcher ICREA | Institut de Física d'Altes Energies, Edifici Cn, Facultat de Ciències UAB, E-08193, Bellaterra (Barcelona), Spain | juste@ifae.es | Physics | Physics Department / IFAE | Experimental particle physics (ATLAS) | “Probing the Higgs sector with the ATLAS detector at the Large Hadron Collider”On July 2012 the ATLAS and CMS experiments at the Large Hadron Collider (LHC) announced the discovery of the long-sought Higgs boson, a particle responsible for the breaking of the electroweak symmetry and the generation of the mass of other known elementary particles. It is of critical importance to continue our exploration of the newly-discovered Higgs sector through precise measurements of the Higgs boson properties, particularly its couplings to the top and bottom quarks, as well as searching for additional Higgs bosons, as predicted by many extensions of the Standard Model such as Supersymmetry. These are among the highest priorities in particle physics research for the next decade, and in particular of the LHC during its second run, which started in June 2015 at an increased center-of-mass energy of 13 TeV, significantly enhancing its discovery reach. Undertaking a PhD in particle physics offers the chance to explore fundamental questions in nature and to use some of the world's most technologically advanced experimental and computing facilities. The successful candidate will join a competitive research group at the Institut de Física d’Altes Energies (IFAE) and will carry out a PhD thesis within the ATLAS collaboration in one of the above high-profile physics topics. The IFAE group is a member of the ATLAS collaboration since 1992, where it has major responsibilities on the operation of several components of the detector (pixel detector, hadronic calorimeter and trigger system), as well as their upgrade for future LHC runs. The IFAE group is carrying out a broad and competitive physics program with multiple research lines, including the one above, where it is playing a leading role within the ATLAS collaboration. The successful candidate will also have the opportunity to work in a highly international environment at CERN (Switzerland) in collaboration with scientists from the best universities and research centers around the world. |
| Aurelio Juste | Researcher ICREA | Institut de Física d'Altes Energies, Edifici Cn, Facultat de Ciències UAB, E-08193, Bellaterra (Barcelona), Spain | juste@ifae.es | Physics | Physics Department / IFAE | Experimental particle physics (ATLAS) | “Searches for Supersymmetry with the ATLAS detector at the Large Hadron Collider”Supersymmetry represents one of the most promising extensions of the Standard Model (SM), naturally explaining the stability of the electroweak scale, predicting the unification of gauge couplings at high energy and providing a dark matter candidate. Supersymmetric models postulate the existence of a supersymmetric partner for each SM particle, which can be searched directly at colliders. Particularly well motivated are searches for the stop, sbottom and gluino, the supersymmetric partners of the top quark, the bottom quark and the gluon, respectively, which are predicted to be relatively light. As a result, the search for supersymmetric particles is among the highest priorities in particle physics research for the next decade, and in particular of the LHC during its second run, which started in June 2015 at an increased center-of-mass energy of 13 TeV, significantly enhancing its discovery reach. Undertaking a PhD in particle physics offers the chance to explore fundamental questions in nature and to use some of the world's most technologically advanced experimental and computing facilities. The successful candidate will join a competitive research group at the Institut de Física d’Altes Energies (IFAE) and will carry out a PhD thesis within the ATLAS collaboration in one of the above high-profile physics topics. The IFAE group is a member of the ATLAS collaboration since 1992, where it has major responsibilities on the operation of several components of the detector (pixel detector, hadronic calorimeter and trigger system), as well as their upgrade for future LHC runs. The IFAE group is carrying out a broad and competitive physics program with multiple research lines, including the one above, where it is playing a leading role within the ATLAS collaboration. The successful candidate will also have the opportunity to work in a highly international environment at CERN (Switzerland) in collaboration with scientists from the best universities and research centers around the world. |
| Aurelio Juste | Researcher ICREA | Institut de Física d'Altes Energies, Edifici Cn, Facultat de Ciències UAB, E-08193, Bellaterra (Barcelona), Spain | juste@ifae.es | Physics | Physics Department / IFAE | Experimental particle physics (ATLAS) | “Searches for new strong dynamics with the ATLAS detector at the Large Hadron Collider”Finding an explanation to the stability of the electroweak scale against quantum effects has driven significant theoretical research, giving rise to proposed extensions of the Standard Model (SM) such as Supersymmetry. Alternative solutions can be found in the context of models involving a new strong interaction and new heavy (vector-like) quarks, which couple preferentially to the top quark and Higgs boson. Direct searches for signatures of such new strong dynamics (such as vector-like quark production or 4-top quark production) are among the highest priorities in particle physics research for the next decade, and in particular of the LHC during its second run, which started in June 2015 at an increased center-of-mass energy of 13 TeV, significantly enhancing its discovery reach. Undertaking a PhD in particle physics offers the chance to explore fundamental questions in nature and to use some of the world's most technologically advanced experimental and computing facilities. The successful candidate will join a competitive research group at the Institut de Física d’Altes Energies (IFAE) and will carry out a PhD thesis within the ATLAS collaboration in one of the above high-profile physics topics. The IFAE group is a member of the ATLAS collaboration since 1992, where it has major responsibilities on the operation of several components of the detector (pixel detector, hadronic calorimeter and trigger system), as well as their upgrade for future LHC runs. The IFAE group is carrying out a broad and competitive physics program with multiple research lines, including the one above, where it is playing a leading role within the ATLAS collaboration. The successful candidate will also have the opportunity to work in a highly international environment at CERN (Switzerland) in collaboration with scientists from the best universities and research centers around the world. |
| Aurelio Juste | Researcher ICREA | Institut de Física d'Altes Energies, Edifici Cn, Facultat de Ciències UAB, E-08193, Bellaterra (Barcelona), Spain | juste@ifae.es | Physics | Physics Department / IFAE | Experimental particle physics (ATLAS) | “Searches for extra spatial dimensions and dark matter with the ATLAS detector at the Large Hadron Collider”Since the late 1970s, the search for new phenomena at particle colliders using monophoton or monojet events has attracted the attention of the scientific community. Such a simple final state, with one photon or one jet of hadrons and nothing else, could be instrumental in revealing physics beyond the Standard Model. In particular, this signature is characteristic of new physics models postulating the existence of large extra dimensions, involving a graviton that can travel in the higher dimensional space, or models including weakly-interacting particles, potentially making up the dark matter in the universe, that would be produced in pairs. Unraveling the structure of space-time or the nature of dark matter are among the highest priorities in particle physics research for the next decade, and in particular of the LHC during its second run, which started in June 2015 at an increased center-of-mass energy of 13 TeV, significantly enhancing its discovery reach. Undertaking a PhD in particle physics offers the chance to explore fundamental questions in nature and to use some of the world's most technologically advanced experimental and computing facilities. The successful candidate will join a competitive research group at the Institut de Física d’Altes Energies (IFAE) and will carry out a PhD thesis within the ATLAS collaboration in one of the above high-profile physics topics. The IFAE group is a member of the ATLAS collaboration since 1992, where it has major responsibilities on the operation of several components of the detector (pixel detector, hadronic calorimeter and trigger system), as well as their upgrade for future LHC runs. The IFAE group is carrying out a broad and competitive physics program with multiple research lines, including the one above, where it is playing a leading role within the ATLAS collaboration. The successful candidate will also have the opportunity to work in a highly international environment at CERN (Switzerland) in collaboration with scientists from the best universities and research centers around the world. |
| Sebastian Grinstein | Researcher ICREA | Institut de Física d'Altes Energies, Edifici Cn, Facultat de Ciències UAB, E-08193, Bellaterra (Barcelona), Spain | sgrinstein@ifae.es | Physics | Physics Department / IFAE | Experimental particle physics (ATLAS) | "New pixel sensor technologies for the ATLAS High Luminosity LHC upgrade"The LHC (Large Hadron Collider) is a particle accelerator located at CERN, Geneva (Switzerland), whose goal is the study of elementary particles and their interaction through the collision of high energy protons. ATLAS is one of the experiments installed around the 27 km long LHC ring. Efficient particle identification and track reconstruction is crucial to discriminate the relevant physics events from the background produced in the proton-proton collisions. For both tasks, good spatial resolution and hit detection efficiency of the detectors are mandatory to carry out the physics program. These requirements are even more demanding for the inner detectors where the particle flux is higher due to the proximity to the interaction point. In this area, pixel detectors play a crucial role, providing a position resolution of the order of 10 μm with excellent efficiency, while being able to cope with the associated high radiation doses. In order to study further the energy frontier, the luminosity of the LHC will be increased by a factor of ten in 2023. This will lead to higher occupancy and radiation doses, and therefore, new detector solutions will be required. The 3D sensor technology, which has recently been proven to be very radiation hard, is a strong candidate for the inner pixel detector layers. Other promising technologies are CMOS active sensors and low gain avalanche detectors (LGAD). The IFAE group already played a key role in the construction of the ATLAS 3D pixel modules for the ATLAS IBL and AFP detectors, and is also involved in the CMOS and LGAD sensor R&D effort. The successful candidate will have the opportunity to work in state-of-the-art high energy instrumentation development, in a highly international environment in collaboration with scientists from the best universities and research centers around the world. |
| Gervasi Herranz | Researcher-CSIC | Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Campus de la UAB, Bellaterra 08193, Spain | gherranz@icmab.cat | Physics | Institut de Ciencia de Materials de Barcelona (ICMAB-CSIC) | Plasmonic materials to control the flux of light at the nanoscale | The relentless progress in optical communications, either in long-distance Internet networks or in the nanoscale range on-chip communications, requires the development of new materials to control the flux of light. In this context, the exploitation of plasmonics opens new avenues to design systems that, using light, can be used more efficiently to control the flux of information along optical channels. Here we propose hybrid dielectric-metallic complex structures as a further complementary path to exploit photonic/plasmonic effects, aiming at manipulating optical signals with magnetic/electric fields at the desired light frequencies. The successful candidate will be trained in state-of-the-art optical spectroscopy as well as diffraction-limited imaging and e-beam/optical nanolithography. For recent references visit our site http://www.icmab.es/mulfox/ |
| Gervasi Herranz | Researcher-CSIC | Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Campus de la UAB, Bellaterra 08193, Spain | gherranz@icmab.cat | Physics | Institut de Ciencia de Materials de Barcelona (ICMAB-CSIC) | Dynamical modulation of electron spins with microwaves | At present, most of the digital information is stored in nonvolatile magnetic bits, e.g., in the hard disk drives of PCs and laptops, while data is processed in volatile memory units -e.g., in CPUs-. In order to extend the advantages of nonvolatility to processing units (i.e., adding to them the capability of permanent storage), efficient ways of manipulating the magnetism with electric currents are intensively researched, so that the information encoded in the magnetic bits (viz. with spins in up/down states) can be changed dynamically with electric pulses. In addition, over the past few years, the scientists have realized that some magnetic nanostructures (for instance, Pt/Co stacks) can host topological spin states (e.g. skyrmions), with a vast potential for new applications. With this foreground in view, we propose to modulate the magnetism of magnetic nanodevices using surface acoustic waves controlled by microwave (mw) pulse fields, in the technological relevant range of the GHz, where most telecommunication applications work (e.g., cell phones, RFIDs, Wifi, etc.). For recent references visit our site http://www.icmab.es/mulfox/ |
| Ferran Macià | Researcher Ramón y cajal | Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Campus de la UAB, Bellaterra 08193, Spain | fmacia@icmab.es | Physics | Institut de Ciència de Materials de Barcelona (ICMAB-CSIC) |  Bioinspired Magnetic Nanodevices | Electronic devices based on digital processing have completely changed our lives. We have witnessed miniaturization and improving performances since the invention of the electronic transistor in the mid past century. However, this wonderful progress has physical restrictions in energy dissipation and emerging quantum phenomena. A suggestion for a paradigm change is the use of spintronics—that considers the intrinsic spin of electrons and the corresponding magnetic moment—as an alternative to conventional electronics. Recent developments in spintronics have shown that spin excitations (spin waves) such as skyrmions or vortices have topological properties that might lead to new applications. Digital systems simplify the complexity of physical quantities in discrete levels and thus avoid unwanted changes caused by noise or fabrication defects. On the other hand, nature taught us that powerful machines that embrace complexity are possible: the brain. Biology has inspired many researchers to study new post-digital systems based on neural networks and proposed functionalities for devices. This thesis project proposes to study spin excitations in materials and the implementation of computing strategies using nanostructures and metamaterials (materials that have been structures artificially). The aim is to develop functional magnetic nanodevices that work at low power by using electric fields (or strain) and light instead of currents and magnetic fields. Examples of the proposed functionalities include computing with waves and delays, pattern recognition based on synchronization, or memories based on phase differences among oscillators (phase coding). The candidate will be supervised by Dr. Ferran Macià and will be part of the group of magnetism and functional oxides at ICMAB.  |
| Ferran Macià | Researcher Ramón y cajal | Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Campus de la UAB, Bellaterra 08193, Spain | fmacia@icmab.es | Physics | Institut de Ciència de Materials de Barcelona (ICMAB-CSIC) | Functional Magnonic Crystals: Manipulating Dynamical Magnetic States in Nanostructureswith Surface Acoustic Waves | Electronic devices based on digital processing have completely changed our lives. We have witnessed miniaturization and improving performances since the invention of the electronic transistor in the mid past century. However, this wonderful progress has physical restrictions in energy dissipation and emerging quantum phenomena. The magneto-elastic (ME) effect--the change of magnetic properties caused by the elastic deformation (strain) of a magnetic material--has been proposed as an alternative approach to magnetic fi elds for the low power control of magnetization states of nanoelements because it avoids charge currents, which entail ohmic losses. This thesis will explore the idea of using strain to control magnetization states in nanostructures with the possibility of using magnonic crystals for novel devices. In particular, the thesis will focus on controlling magnetic dynamical states in nanostructured materials with electric-field modulations of the strain (spin waves, dissipative solitons, dynamical skyrmions...). We will use hybrid devices that combine piezoelectric substrates where surface acoustic waves (SAW) propagate and magnetic thin films where dynamical modes can be excited. The final goal is to develop functional magnonic crystals; which is the equivalent of photonic crystals but using magnetization waves. |
| Jaume Gazquez | Researcher Ramón y cajal | Institut de Ciència de Materials de Barcelona (ICMAB-CSIC), Campus de la UAB, Bellaterra 08193, Spain | jgazqueza@gmail.com | Physics | Institut de Ciencia de Materials de Barcelona (ICMAB-CSIC) | ATOMIC COLUMN-BY-COLUMN MAPPING OF MAGNETISM | Understanding how magnetism works at the monolayer level, especially in low dimension devices and in the presence of defects, interfaces and surfaces is the key to achieving new magnetic devices. However, magnetism springs up at the atomic scale, and none of the existing spectroscopy techniques sensitive to magnetism have the necessary spatial resolution to study in real space novel phenomena such as charge leakage, symmetry breaking or dead layers that appear at the atomic scale. The candidate will apply the new imaging modes in an aberration corrected scanning transmission electron microscopy (STEM) capable of mapping atomic **magnetism** including spin and orbital moments in **real space** with **atomic resolution**. For recent references visit the site http://www.icmab.es/mulfox/ |
| Massimiliano Stengel | ICREA Research Professor | 　 | mstengel@icmab.es | Physics | Institut de Ciencia de Materials de Barcelona (ICMAB-CSIC) | Oxide materials for nanoelectronics | First-principles theoretical study of flexoelectricity and related gradient effects in low-dimensional oxide-based nanostructures |
| Verònica Ahufinger | Tenured lecturer | Grup Òptica. Departament de Física. Facultat Ciències. Edifici Cc. Campus UAB | veronica.ahufinger@uab.cat | Physics | Departament de Física | Ultracold atoms in optical potentials | Manipulation of individual ultracold atoms and Bose-Einstein condensates: Quantum dynamics and Atomtronics |
| Juan Camacho Castro | Tenured lecturer | C3/138, Departament de Física | juan.camacho@uab.cat | Physics | Physics | Superparamagnetic particles in dispersion | Modelling the magnetophoresis of superparamagnetic particles in suspension under uniform, non-uniform and variable magnetic fields. Theory and simulations. |
| Plant Biology and Biotechnology |
| Teresa Altabella | Researcher CRAG | 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)  | Isoprenoid metabolism in tomato: Involvement in development and stress responses  | Plant sterols are found in free form (FE) and conjugated as steryl esters (SE), glycosides (SG) and acylated glycosides (ASG). The profile of conjugated sterols differs greatly among plant species and may change in response to environmental cues. SG and ASG, together with FE, are main components of the plasma membrane and recent studies suggest that glycosylated sterols and sterol glycosyltransferases (SGT) are involved in the plant responses to different stresses. Unlike other plant species, tomato, along with other species of the genus Solanum, shows an atypical content of conjugated sterols including sterol glycosides SG and ASG. Recently, we have characterized 4 tomato SGT isoenzymes (SlSGT1-4). The main focus of the PhD. thesis will be to elucidate the role of SGTs and SG in the adaptive responses of tomato plants to abiotic stresses (drought and cold), using for this tomato plants with altered sterol profiles by overexpression or silencing of the different tomato SGT genes, with the ultimate aim of improving the agronomic performance of commercial tomato cultivars.  |
| Ana Montserrat Martín | Researcher IRTA  | Edifici CRAG. Campus de la UAB. 08193 Bellaterra (Cerdanyola del Vallès) – Barcelona | montse.martin@cragenomica.es | Plant Biology and Biotechnology | Plant responses to stress/ Centre de Recerca en Agrigenòmica CSIC - IRTA - UAB - UB (CRAG)  | Resistance to Cucumber Mosaic virus in melon | Cucumber Mosaic virus is a worldwide distributed pathogen able to infect economically important crops such as species from Solanaceae, Cruciferae and Cucurbitaceae families. Counteracting CMV is mostly based in search for natural resistances. In melon, only five sources of resistance have been reported until now and one of them is in the Korean accesion PI161375. We are developing populations using PI161375 and the Spanish accesion Piel de Sapo as parental lines. These populations have allowed us to uncover the participation of at least three genes (QTLs) involved cooperatively in the resistance to several strains of CMV. We have already cloned one of them, cmv1. The objective of this PhD thesis is to clone the remaining two QTLs using our populations and the information provided by the melon sequence generated in our lab. The fine mapping and cloning of these two QTLs will contribute to the dissection of the genetic architecture of the resistance to CMV and eventually, to the introgression of the genes into elite commercial cultivars to increase their resistance to this pathogen.  |
| Manuel Rodríguez- Concepción | Researcher-CSIC | Edifici CRAG. Campus de la UAB. 08193 Bellaterra (Cerdanyola del Vallès) – Barcelona | manuel.rodriguez@cragenomica.es | Plant Biology and Biotechnology | Plant metabolism and metabolic engineering/ Centre de Recerca en Agrigenòmica CSIC - IRTA - UAB - UB (CRAG)  | Metabolism and metabolic engineering of plants | Improving the production of plant metabolites of nutritional and industrial interest  |
| Paloma Mas | Researcher-CSIC | Edifici CRAG. Campus de la UAB. 08193 Bellaterra (Cerdanyola del Vallès) – Barcelona | paloma.mas@cragenomica.es | Plant Biology and Biotechnology | Plant Development and Signal Transduction/ Centre de Recerca en Agrigenòmica CSIC - IRTA - UAB - UB (CRAG) | The circadian clock | To identify how the circadian clock works and how it is regulated  |
| Jaume Martínez | Researcher ICREA  | Edifici CRAG. Campus de la UAB. 08193 Bellaterra (Cerdanyola del Vallès) – Barcelona | jaume.martinez@cragenomica.es  | Plant Biology and Biotechnology | Plant Development and Signal Transduction/ Centre de Recerca en Agrigenòmica CSIC - IRTA - UAB - UB (CRAG) | LIGHT REGULATION of PLANT DEVELOPMENT.  | We are fosused in understanding the molecular basis that control how plants deal qith vegetation proximity, that is, how they avoid or tolerate it..  |
| José Luis Riechmann | Researcher ICREA | Edifici CRAG. Campus de la UAB. 08193 Bellaterra (Cerdanyola del Vallès) – Barcelona | joseluis.riechmann@cragenomica.es  | Plant Biology and Biotechnology | Plant Development and Signal Transduction/ Centre de Recerca en Agrigenòmica CSIC - IRTA - UAB - UB (CRAG) | Genomic, proteomic and genetic analyses of the Arabidopsis flower development gene regulatory network  | The hidden nature of the Arabidopsis peptidome: Analyses of the Arabidopsis gene regulatory networks  |
| L. Maria Lois | Researcher-CSIC | Edifici CRAG. Campus de la UAB. 08193 Bellaterra (Cerdanyola del Vallès) – Barcelona | maria.lois@cragenomica.es | Plant Biology and Biotechnology | Plant Development and Signal Transduction/ Centre de Recerca en Agrigenòmica CSIC - IRTA - UAB - UB (CRAG) | SUMO in plant development and stress responses  | Molecular insights into SUMO biological role  |
| Ignacio Rubio  | Researcher Ramón y Cajal | Edifici CRAG. Campus de la UAB. 08193 Bellaterra (Cerdanyola del Vallès) – Barcelona | ignacio.rubio@cragenomica.es  | Plant Biology and Biotechnology | Plant responses to stress/ Centre de Recerca en Agrigenòmica CSIC - IRTA - UAB - UB (CRAG)  | From Cell to whole organism reprogramming upon pathogenesis | Plants lack cell mobility and therefore cell-to-cell communication is crucial to maintain organism homeostasis. The PhD candidate will use state-of-the-art technologies to address how single cells that are under pathogen attack communicate such threat to the surrounding and distal cells to cope with it. |
| Elena Monte | Researcher  | Campus UAB, CRAG building, Bellaterra. Cerdanyola del Vallès, 08193 BARCELONA | elena.monte@cragenomica.es | Plant Biology and Biotechnology | Plant Development and Signal Transduction / CRAG (Center for Research in Agricultural Genomics) | Plant communication to Increase Photoprotection  | In plants, communication from the nucleus to the chloroplast is bidirectional. Whereas nucleus-to-chloroplast signaling regulates chloroplast biogenesis, we have shown that retrograde signaling from choloroplast to nucleus is fundamental to adjust plant development to the light environment, particularly under high-light conditions when chloroplast is damaged and plant fitness and productivity are compromised. This project proposes a state-of-the-art approach to understand the mechanisms in retrograde signaling and explore biotechnological applications to improve plant photoprotection in rice and Arabidopsis. Reference: Phytochrome and retrograde signalling pathways converge to antagonistically regulate a light-induced transcriptional network. Martín G, Leivar P, Ludevid D, Tepperman JM, Quail PH, Monte E. Nat Commun. 2016 May 6;7:11431. doi: 10.1038/ncomms11431.  |
| Soraya Pelaz | Researcher | Campus UAB - Edifici CRAG | soraya.pelaz@cragenomica.es | Plant Biology and Biotechnology  | Plant Development and Signal Transduction Program at CRAG | Role of TEM genes in Plant Development | Evolution and Function of TEMPRANILLO in Plant Development and Adaptative Responses |
| Terrestrial Ecology |
| Robert Savé M. | Senior researcher, associate professor, coordinator of viticulture and Enology | IRTA Torre Marimon, km 12.1; E-08140-Caldes de Montbui (Barcelona) | robert.save@irta.cat | Terrestrial Ecology | Departament de Biologia Animal, Biologia Vegetal | Ecophysiology; agronomy, viticulture | Agriculture contributes significantly to greenhouse gas emissions and pesticides-related toxicity, which are linked to the different agronomic practices. Most environmental assessment methodologies (IPCC, EEA, USEtox) provide default values to count for Tests under controlled conditions will be performed, where water and macronutrients (N, P, K) balances and behavior (fate, exposure and toxicity) of pesticides, namely cupric ones, will be monitored in a grape crop under different soil and climatic conditions, and agronomic practices. Contrasting conditions will be simulated dealing with soil type (clayey and sandy) and fertilizer use (organic and mineral). Several balances will be calculated: water (water footprint), C (C footprint), N, P and K balances will be estimated from fertilizer, water, leachate (amount and composition), soil moisture, as well as nutrient content in leaves, fruits and branches, and soil, together with their air, water and soil emissions. As a proxy to the potential emission of reactive nitrogen species, the presence and activity of nitrifying and denitrifying bacterial populations in the soil will be analyzed using molecular microbial ecology techniques (qPCR). Regarding pesticides, we will focus particularly on the analysis of copper fungicides, whose toxicity depends on soil and climatic conditions, for its importance in vineyards. From these trials, emission factors will be estimated based on the different scenarios. These factors will be contrasted with default factors proposed by traditional methodologies (IPCC, EEA, USEtox) to compare the results of total emissions. After obtaining emission factors, these will be applied under field conditions in commercial plots of contrasting characteristics with respect to the parameters that most influence these factors in rainfed conditions. The end result of the project will consist in a protocol for calculating the environmental impact of different contrasting soil and climatic conditions allowing aid decision-making towards sustainable viticulture from an environmental point of view.emissions at TIER 1, advising a better approximation through the development of regional and technology specific ones (TIER 2 and 3). For the specific case of Mediterranean vineyard, these specific factors do not exist yet, so global default factors are used. Such a generalization means that emissions calculation can be misleading due to drought conditions and higher temperatures affecting nutrient availability. Proper adjustment of these factors would allow a more accurate environmental quantification, especially important in a crop like the vineyard that occupies a 4% of the agricultural area in Spain and 2% in Europe. The main goal of our project is adjusting factors in the analysis of the environmental impact of vineyard for different growing scenarios. These scenarios include climate variability (low rainfall, high temperatures, and water deficit), soil texture variability and different agronomic practices (fertilization, irrigation, pesticide treatments among others). Factor adjustment will allow a more accurate assessment of the different environmental impacts involved, i.e. climate change, eutrophication, acidification, toxicity, and from oil and water use. |
| JOSEP PEÑUELAS  | Research Professor CSIC and CREAF | Edifici C, Universitat Autònoma de Barcelona08193 Bellaterra | josep.penuelas@uab.cat | Terrestrial Ecology | CREAF, GLOBAL ECOLOGY UNIT CREAF-CSIC-UAB | Ecology of VOCs emissions by plants  | Ecology of VOCs emissions by plants. Biological and environmental effects  |
| JOSEP PEÑUELAS  | Research Professor CSIC and CREAF | Edifici C, Universitat Autònoma de Barcelona08193 Bellaterra | josep.penuelas@uab.cat | Terrestrial Ecology | CREAF,GLOBAL ECOLOGY UNIT CREAF-CSIC-UAB | Global change | Global ecology of nutrient imbalances in the terrestrial ecosystems. Factors driving them and ecological consequences. |
| JOSEP PEÑUELAS | Research Professor CSIC and CREAF | Edifici C, Universitat Autònoma de Barcelona08193 Bellaterra | josep.penuelas@uab.cat | Terrestrial Ecology | CREAF, GLOBAL ECOLOGY UNIT CREAF-CSIC-UAB | Remote sensing  |  Spectroradiometry and fluorescence to determine gas exchange (CO2 and VOCs) from foliar to forest scales |
| Josep Maria Espelta Morral | Senior Researcher CREAF | CREAF. Edifici Biociències. Campus Universitat Autònoma de Barcelona 08913 Cerdanyola del Vallès | Josep.Espelta@uab.cat | Terrestrial Ecology | CREAF | Forest Ecology, Global change, Conservation Biology, Dencdroecology and Ecophysiology | Deforestation is still a major threat for biodiversity conservation at a planetary scale. Yet some regions have experienced a steady recovery of forest areas owing to the expansion of forests in abandoned croplands during the XX century. These "new forests" may provide relevant ecosystem services (e.g. C sequestration) and they are growing faster than older forests. However to what extent these new forests may be more resilient to new climatic scenarios or because their faster growth they may suffer a more negative impact has been barely adressed. This doctoral project aim to analyze whether forest expansion in former agricultural lands may be an oportunity for forest conservation or an ecological trap in light of new climatic scenarios. This question will be analyzed in forests of teh NE Iberian Peninsula by means of ecophysiological and dendroecological techniques.  |
| ROBERT SAVÉ | Senior researcher, associate professor, coordinator of viticulture and Enology | IRTA-Torre MARIMON-km 12, 08140 Caldas de Montbui | robert.save@irta.cat | Terrestrial Ecology | IRTA | Global change | Agriculture contributes significantly to greenhouse gas emissions and pesticides-related toxicity, which are linked to the different agronomic practices. Most environmental assessment methodologies (IPCC, EEA, USEtox) provide default values to count for emissions at TIER 1, advising a better approximation through the development of regional and technology specific ones (TIER 2 and 3). For the specific case of Mediterranean vineyard, these specific factors do not exist yet, so global default factors are used. Such a generalization means that emissions calculation can be misleading due to drought conditions and higher temperatures affecting nutrient availability. Proper adjustment of these factors would allow a more accurate environmental quantification, especially important in a crop like the vineyard that occupies a 4% of the agricultural area in Spain and 2% in Europe. The main goal of our project is adjusting factors in the analysis of the environmental impact of vineyard for different growing scenarios. These scenarios include climate variability (low rainfall, high temperatures, and water deficit), soil texture variability and different agronomic practices (fertilization, irrigation, pesticide treatments among others). Factor adjustment will allow a more accurate assessment of the different environmental impacts involved, i.e. climate change, eutrophication, acidification, toxicity, and from oil and water use. |
| Jordi Martínez-Vilalta / Maurizio Mencuccini | Professor/Senior Researcher ICREA | Unitat d'ecologia / CREAF, Edifici C, Campus UAB, Cerdanyola del Vallès 08193 | Jordi.Martinez.Vilalta@uab.es / m.mencuccini@creaf.uab.cat | Terrestrial Ecology | Departament de Biologia Animal, Biologia Vegetai i Ecologia / CREAF | Ecosystem Physiology and Global Change | Study the tradeoffs and compensations between hydraulic traits, plant size and the leaf economics to explain plant performance and responses to drought, using global meta-analyses and modelling approaches. |