

INTERNATIONAL POSTDOCTORAL PROGRAM 2017

CAMPUS VIDA RESEARCH CENTERS NETWORK

Eligible Research Topics at CiQUS

The *Center for Research in Biological Chemistry and Molecular Materials (CiQUS)* of the University of Santiago de Compostela offers within this [Postdoctoral Program 2017](#) the research lines below.

(Note: In order to prepare the research proposal, candidates must select one of the eligible research topics and contact the prospective group leaders for guidance)

Development of stimuli-responsive nanocarriers for “smart” drug delivery

Supervisors: [Del Pino González](#) and [Montenegro García](#)

Description: The efficient delivery of nanocarriers into the cytoplasmic matrix, circumventing their storage in the phago-lysosome as viruses do, remains largely elusive. In this line, the project proposed focuses on the development of next generation “smart” nanocarriers with two main capabilities: virus-like dynamic intracellular features and remote control by external electromagnetic fields. To this aim, the groups of Javier Montenegro and Pablo del Pino will form an interdisciplinary hub with complementary expertise. The candidate should have sound experience in colloidal/organic chemistry and bionanointeractions.

Polymers for bulk heterojunction solar cells

Supervisors: [Massimo Lazzari](#) and [Rivadulla Fernández](#)

Description: The need of renewable and affordable energy sources boosted the research and development of solar cells with improved efficiency. The goal is to explore the possibility of using block copolymers as a photoactive material in a new generation of hybrid bulk heterojunction solar cells. Professors Rivadulla (former ERC-Starting Grant and actually ERC-Proof of Concept “ANTS” grant holder) and Lazzari (European Commission projects holder) will promote this interdisciplinary research line. Experience in materials chemistry, polymer synthesis and electrical transport measurements will be highly considered.

External stimuli self-sorting in amphiphilic supramolecular aggregates

Supervisors: [García Ríó](#)

Description: Exchange of solubilized species in micelles/vesicles between the inner core/palisade layer and the Stern layer usually do not occur, but in the case of sulfonatocalixarenes based micelles the guest can, in principle, exchange between the cavity and the other solubilisation sites (Chem. Eur. J. 2016, 22, 6466-6470). This particular property allow the study of molecular recognition and self-sorting events within the micellar aggregates where local concentrations can be exceptionally high and the active species are compartmentalized in specific locations.

Disabling Key Enzymes in Gram-negative bacteria for antibiotic drug discovery

Supervisors: [González Bello](#)

Description: Our research group is interested on addressing resistant ESKAPE pathogens causing major antibiotic drug resistance concerns through a multidisciplinary approach to promote basic research forward to clinic. By a combination of chemical, structural and computational tools, the inhibition of the clinically unexplored and promising enzyme targets, which are involved in metabolic or virulence processes, will be studied. The candidate would work in interdisciplinary projects in chemical biology and drug discovery.

Environmental sensitive fluorescent probes for cellular uptake signalling

Supervisors: [Granja Guillán](#) and [Montenegro García](#)

Description: Most of the standard fluorescent probes are insensitive to their local environment, cell penetrating peptide (CPPs) are invisible to microscopy and following fluorescent peptides in membranes and cell assays is difficult due to their dynamic character. Therefore, we propose to develop dynamic sensitive fluorescent probes. These probes will illuminate the uptake with mechanosensitive properties that will change with the local environment and they will be used as dynamic tracers of the peptide internalization pathway. This project will be carried out within the framework of ERC-StG "DYNAP".

Design and synthesis of novel nanographenes: from molecules to devices

Supervisors: [Gutián Rivera](#), [Pérez Meirás](#), [Peña Gil](#)

Description: The candidate will have the opportunity to work in one of the projects currently ongoing in our labs. The first one exploits the chemistry of arynes for the construction of nanographenes and other extended, functional PAHs with application in molecular electronics. A second one, which is developed in tight collaboration with surface physicists, is aimed to study single molecule chemistry and on-surface synthesis, including structurally defined graphene nanoribbons with tailored electronic properties.

New perspectives in metal catalysis or chemical Biology

Supervisors: [Mascareñas Cid](#)

Description: The candidate could work in interdisciplinary projects at the frontier between coordination and organometallic chemistry and catalysis or in projects with a higher focus in chemical biology. In particular we aim at discovering and developing new catalytic transformations of synthetic potential as well as discover new synthetic probes for biological intervention. The candidate should have either a strong experience in synthesis and organometallic chemistry or multidisciplinary knowledge in chemistry and biology.

Helical Polymers: Sensors and nanostructures

Supervisors: [Riguera Vega](#), [Quiñoá Cabana](#), [Freire Iribarne](#)

Description: The target goal of this interdisciplinary research is the design, synthesis and evaluation of smart polymers and nanostructures with stimuli-responsive properties. More precisely: the generation of size- and helically-controlled nanostructures from helical polymers and their applications for reversible chiral recognition; Asymmetric catalysis and processes related to their helicity such as optical sensors. Required experience: Organic and supramolecular chemistry, asymmetric synthesis and catalysis, smart polymers, nanoaggregates and solid state techniques.

Organometallic Catalysis: Development of new catalytic reactions

Supervisors: [Fañanás Mastral](#), [Saá Rodríguez](#), [Varela Carrete](#)

Description: Our research is dedicated to the elaboration and application of new catalytic methods in organic chemistry in order to facilitate new and efficient synthetic ways to organic molecules, specifically, in the synthesis of natural and synthetic bioactive products and in new organic materials. In particular, the candidate will work on the development of new transformations based on C-H activation processes and enantioselective bimetallic catalysis. A strong background in organometallic catalysis and/or synthetic organic chemistry is highly recommended.

Santiago de Compostela, January 19th, 2017