Donostia International Physics Center

DIPC POST-DOCTORAL POSITIONS

The Donostia International Physics Center DIPC is currently accepting applications for post-doctoral appointments. This is a unique opportunity for highly motivated junior researchers with a recent PhD degree in physics or related fields to join some of the DIPC high-profile research teams.

Interested candidates please send an updated CV, a brief statement of interest, and contact information to postdoc@dipc.org. Reference letters are welcome but not indispensable. The particular position(s) to which the candidate is applying should be stated as well. Although candidates are encouraged to contact the project supervisors to know further details about the proposed research activity, please be aware that the application will be evaluated only if it is submitted directly to the email address mentioned above (postdoc@dipc.org).

Next review of applications is scheduled for January 10th 2014. Applications must be received before this date and will be evaluated by a Committee designed by the DIPC board on the basis of the following criteria (with point weights indicated in parentheses):

- CV of the candidate (40%)
- Adequacy of the candidate's scientific background to the project (40%)
- Reference letters (10%)
- Others: Diversity in gender, race, nationality, etc. (10%)

Evaluation results will be communicated to the candidates soon after. Positions will only be filled if qualified candidates are found.

The duration of the appointment will be 1 year. The appointment could be renewed for a second year, subject to performance and to the availability of funding.

The salary will be 32000 euros per year before taxes.

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JOB OPENINGS

- ***Unveiling biochemical relevant structural conformations of the Aluminum cation amyloid-beta peptide complex:***

  Post-doctoral position, contact person: J. Ugalde (jesus.ugalde@ehu.es). Reference: 2014/1.

  The aggregation of the Amyloid-beta peptide (Aβ) is directly associated with the Alzheimer disease. The Aβ peptide is an intrinsically disordered protein (IDP), which means that it does not adopt a stable tertiary structure but diverse structural conformations interconvert at a fast rate. The lack of order and the propensity to aggregation makes impossible to study it by conventional methods such as X-ray crystallography or NMR spectroscopy. On the other hand, aluminum has been detected in the amyloid fibrils. However, little it is known about the binding mode of Al(III) to Aβ peptide.

  The project associated with this post-doctoral position intends to gain a deeper insight in the Aluminum Aβ complex. The aim of this position is to characterize the ligand binding site and obtain a full description of its fluxionality. Followed by a careful analysis of the monomer's different conformational landscapes in order to determine the alpha-helix to beta-strand conformational changes induced by the metal loading.

  The candidates should have a strong background in fully ab-initio and QM/MM calculations for carefully selected model systems, assessing force fields for large scale molecular dynamics simulations, advances sampling methods including well-tempered metadynamics and data post-processing and evaluation. Experience on dimensionality reduction techniques is also required.

- ***Structure & Dynamics of Complex Materials Based on Polymers***

Post-doctoral position, contact person: J. Colmenero (juan.colmenero@ehu.es). Reference: 2014/2

The selected candidate will work integrated in a currently running project carried out by the "Polymers & Soft Matter" group. The general scientific objective of this project is to achieve a fundamental understanding of the interplay between structure and dynamics at different length and time scales (*micro, nano, meso, macro*) in materials of increasing complexity based on polymers and soft matter, in particular: branched polymers, multi-component, nano-structured and biopolymer systems. These materials exhibit complex dynamics and rheology and, in many cases, show hierarchical relaxations over many different length- and time-scales, which needs to be unravelled. This in turn affects the processing and properties of the final materials. In order to rationally design appropriate materials and processes for various technological applications, a rigorous knowledge of the interplay between structure and dynamics at different length and time scales is demanded. This is especially urgent in the face of current opportunities offered by tailored molecular engineering of polymers at the industrial scale and the proposed use of these materials in nano-structured composites for smart applications in devices, electronics and high performance applications. In this general framework, four different – although in some way related – work packages (WP) are considered: (WP1) **Rheology of polymers of complex architectures**; (WP2) **Materials based on soft nano-particules**; (WP3) **Nano-confinement in polymer systems**; (WP4) **Physical aging in nano-composites and low dimensional systems**. Moreover, going in the way of increasing complexity, the project also propose a bridge to biological systems focus on biopolymers based on amino acids and in the important role of the natural solvent, water: (WP5) **Window to biology – biopolymers based on amino acids**.

To carry out this project the unique methodology developed by our group involves the combination of different experimental **relaxation techniques**, **scattering techniques** (neutron and XR) **microscopy techniques**, **molecular dynamics simulations** and **chemical synthesis activities** as well.

The candidates should have a strong background in polymer science in general. Depending on the particular expertise and technical skills of the selected candidate he/her will be incorporated in one of the different work packages defined above.