Ciml IMMUNOLOGY

3-year postdoctoral scientist position

Study of long-range electrodynamic interactions between proteins

Centre d'Immunologie de Marseille Luminy, France

Context

In living matter, a complex network of molecular cascade events involving hundreds of different molecules, which have to diffuse, meet and interact at the correct time in the correct place, is responsible for the transmission of information through cells. All these biochemical reactions are highly spatially organized and coordinated. This project aims at extending the paradigm of the self-organization of the intracellular living matter, by exploring in biological systems the existence of long-range electrodynamic interactions (LEDIs) on protein-protein recognition processes.

LEDIs result from condensation phenomenon, characterized by the emerging of the mode of lowest frequency, expected in the TeraHertz (THz) frequency band. However, to date, LEDIs have eluded detection, mainly because performing THz spectroscopy in aqueous media is a well-known technological roadblock not yet overcome. In this project, the LINkS consortium will develop a breakthrough lab-on-chip THz biosensor technology to investigate LEDIs between proteins, from *in vitro* to *in vivo*. Our consortium gathers interdisciplinary expertise including theoretical physics, cell biology, nanotechnology and microfluidic engineering. Three academic partners and two SMEs, from four European countries will work in strong collaboration, across the traditional boundaries of their disciplines, to develop a disruptive lab-on-chip THz biosensor able to investigate LEDIs in the real complexity of biological systems.

LINkS project will have significant benefits for understanding the influence of electromagnetic fields on living organisms thus opening up new fields of research in medicine and biology.

Qualifications

We are seeking an enthusiastic and talented postdoc to embark with us on this ambitious and challenging project aiming at deciphering the role of long-range electrodynamic interactions (LEDIs) on protein-protein recognition processes.

The candidate must hold a PhD in biophysics or biochemistry with excellent technical skills in fluorescence imaging and spectroscopy techniques, protein characterization, and ideally previous experience with computing tools. Experience in protein purification or molecular and cellular biology as well as a good knowledge in the physico-chemistry of proteins is also preferred.

The candidate should have a proven record of accomplishment of successful independent working. The position further requires organizational qualifications and the ability to communicate effectively with internal and external collaborators.

Missions

The candidate will be expected to play a lead role in:

(1) The selection and design of protein models;
(2) The determination of the experimental conditions providing the at best the physiological environment for stabilized protein structures tacking into account technological constraints;

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(3) The engineering of the relevant biological models for liquid-liquid phase separation studies and light controlled molecular interactions;
(4) The development of analytical tools.

Offer

Within the frame of the LINkS project funded by the European Union H2020 FET Open call, this position is available for 3-years, with a flexible starting date between September and December 2021. You will work with enthusiastic consortium group leaders and join an already interdisciplinary group working at the crossroads between advanced optical imaging, biochemistry and cell biology. On a daily basis, you will collaborate with researchers, engineers and interact with the group of theoreticians and THz spectroscopy experimentalists. Salary is based on qualifications and professional experience in accordance with the CNRS policy.

Environment

Within the frame of an interdisciplinary collaboration with Professor Marco PETTINI (Centre de Physique Théorique, Marseille, France) and Associate Professor Jérémie TORRES (Institut d'électronique et des systèmes, Montpellier, France), the successful candidate will join the Centre d'Immunologie de Marseille Luminy, a public research institute dedicated to study immunology, located in the south of Marseille, France, at the gates of the beautiful Calanques National Park. The institute, which provides access to state-of-the art core facilities, has developed an organization and practices designed to foster the creativity and risk-taking of its researchers.

Application

We are looking forward to receiving your application documents, which include your CV, your list of publications, transcript of record, a motivation of your research interests (max. 1 page) and the contact details for appropriate referees in one PDF document. Please send it under the subject "Post-doc LEDI" by e-mail to Dr. Didier Marguet (marguet@ciml.univ-mrs.fr). He will also be happy to provide you with further information in advance.