PhD position in biophysics at the Institute of Structural Biology, Grenoble, France

UNDERSTANDING REVERSIBLY SWITCHABLE RED FLUORESCENT PROTEINS

The recruited student will investigate the photophysical mechanisms of reversibly photoswitchable red fluorescent proteins, employing fluorescence imaging, optical spectroscopy, and X-ray crystallography. The goal will be to contribute fundamental knowledge of these essential fluorescent markers and to engineer improved variants.

Advanced fluorescence imaging is essential to discover the secrets of life, and has largely benefited from the discovery of Fluorescent Proteins (FPs). Reversibly Switchable Fluorescent Proteins (RSFPs, Ref 1) are capable to switch between a fluorescent "on-state" and a nonfluorescent "off-state" under specific light illumination. They have fostered many types of imaging applications including super-resolution methods. Yet, RSFPs are still imperfect: their brightness is limited, their switching kinetics is dependent on environmental conditions, their resistance to irreversible photobleaching is insufficient. In particular, whereas green RSFPs are performing relatively well, red RSFPs have been lagging behind. The switching performances of green and red RSFPs are linked with their intrinsic or light-activated protein-dynamics properties and can be studied by combining structural biology approaches, such as kinetic X-ray crystallography, with optical spectroscopy and fluorescence imaging (Ref 2). In the proposed PhD project, those techniques will be used to better understand red RSFPs and facilitate their rational engineering towards brighter and more photo-resistant variants. The recruited student will work in close collaboration with another PhD student to be hired, who will approach the same questions by employing NMR.

Grenoble is situated in the middle of the beautiful French Alps, and the IBS provides a truly unique environment for state-of-the-art integrated cellular and structural biology (http://www.ibs.fr/).

Candidates should have a strong interest to work at the interface between physics, chemistry and biology. Knowledge of advanced fluorescence microscopy and/or X-ray crystallography is required. Preliminary experience in image analysis, biochemistry, cell biology and/or molecular biology will be appreciated.

The project is financed by the French ANR (project: Photoswitch NMR), and the student will be employed by CEA (https://instn.cea.fr/en/theses-and-phds-at-the-cea/). Gross salary is ~2400€ per month.

Applications are now open. Please send a CV, a detailed motivation letter, your transcripts, and at least one reference letter to Dominique Bourgeois (dominique.bourgeois@ibs.fr). Selection will stop when a suitable candidate has been identified.