ESPCI PARIS

Institut Langevin
ONDES ET IMAGES

PhD Offer:

Super-Resolution Microscopy for Oxidative DNA Damage and Repair Dynamics

Type of position: PhD

Supervisor: Ignacio Izeddin (ignacio.izeddin@espci.fr)
Host institute: Institut Langevin, ESPCI Paris, Université PSL, CNRS. 1 rue Jussieu, 75005 Paris
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The Institute Langevin at ESPCI Paris is seeking a motivated PhD candidate to join an exciting ANR-funded collaborative project investigating the interplay between DNA repair and transcriptional regulation through single-molecule localization microscopy (SMLM).

Project Overview

This interdisciplinary research aims to elucidate the dynamics of oxidative DNA damage repair, focusing on the 8-oxoguanine (8-oxoG) lesion and its repair by the OGG1 enzyme. The project will explore the coordination between Base Excision Repair (BER) and transcription, with a particular emphasis on the role of the Mediator complex.

Your Role

As a PhD student, you will be primarily responsible for developing and implementing advanced microscopy techniques to study the spatial organization and dynamics of OGG1 and the Mediator complex at the molecular level. Your key responsibilities will include:

- Super-resolution imaging: Utilize SMLM techniques to achieve nanoscale resolution of OGG1 and Mediator complex distributions in the nucleus. Implement advanced multi-color imaging to observe the spatial relationships between OGG1, Mediator subunits, and other relevant proteins or nuclear structures.
- Single-particle tracking: Employ high-speed imaging to track the movement of individual OGG1 and Mediator proteins in real-time, revealing their diffusion characteristics and binding kinetics.
- Live-cell dynamics: Optimize live-cell imaging conditions to observe the real-time formation and dissolution of repair and transcription clusters in response to oxidative stress.
- Analyzing complex datasets using cutting-edge image analysis methods and developing new analysis tools as needed.

Required Qualifications

- Master's degree in Physics, Biophysics, or a related field. (Master's degree in Biology with experience in advanced microscopy is welcome to apply.)
- Strong background in optics and microscopy
- Programming skills (Python, MATLAB or similar preferred)
- Interest in interdisciplinary research at the interface of physics and biology

Project Environment

You will be part of a dynamic collaboration between: Ignacio Izeddin lab at Institut Langevin, ESPCI Paris (your primary affiliation); Anna Campalans lab at Institut de Radiobiologie Cellulaire et Moléculaire (IRCM), Institut de Biologie François Jacob, CEA, Fontenay aux Roses; Sébastien Huet lab at Institut de Génétique & Développement de Rennes (IGDR), Université de Rennes; international partners at the University of Pittsburgh and University of Melbourne.

This position offers a unique opportunity to work with leading experts in super-resolution microscopy, DNA repair, and transcriptional regulation.

How to Apply

For more information about the project or position, please contact Ignacio Izeddin (ignacio.izeddin@espci.fr). To submit your application, please send your CV, motivation letter, and two potential references if available to ignacio.izeddin@espci.fr