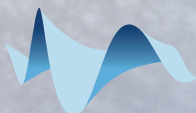


Development of real-time performance algorithms for matrix processing applied to microscopy imaging

Starting date and duration : from february 2023 for 5 months and +

Lab: Institut Langevin (Paris 5ème)
CNRS, ESPCI, PSL University
Gratification: 600€/month



Institut Langevin
ONDES ET IMAGES

Supervisors: V. Barolle, A. Aubry
Contact: victor.barolle@espci.fr

Overview

Thanks to the advent of tunable lasers and high-speed cameras, 3D imaging of biological tissues at the microscopic scale is now at reach.

At Institut Langevin (Paris), we develop efficient algorithms based on a matrix formalism to numerically compensate for aberrations and multiple scattering [1], the two fundamental limits for deep optical imaging in biological tissues

This digital microscope leads an entirely new non-invasive microscopic imaging modality. Working closely with biologists, the goal is now to extract quantitative informations from dynamic 3D images of tissues at subcellular resolution such as a tomography of its refractive index or of its scattering mean free path.

[1] A. Badon et al., *Science Advances* 6, eaay7170, 2020

Internship aim

As a member of a team of researchers, you will be involved in the development of next-generation computational imaging tools and AI applications. To do so, you will:

- take part in the experimental measurements with postdoctoral fellows (if interested)
- optimize the code architecture to reach real-time performance with GPUs
- compensate for sample motion
- take part in the development of new algorithms for various biomarkers (optical index/dynamic)

This position is the opportunity to take part in an innovative project within the academic world with strong potential for bio-medical applications. You will deal with various specimen types, from organoids to human skin.

[2] doi: 10.1186/s40644-020-00311-4

Skills

- Master's degree in Physics, Applied Mathematics or Computer Science
- Proficiency in Python or Matlab
- Ideally, strong skills in optimization, machine learning
- Experience in Pytorch or Tensorflow is a plus
- Experience in C++ is a plus

Benefits

- Located in the heart of the Latin Quarter
- Young team (Interns/PhD students/Post-Doc)
- Possibility to modify the internship's scope according to the candidate's skills
- Gap year accepted
- Possibility of a PhD after the internship

Send a CV to victor.barolle@espci.fr



ESPCI PARIS PSL