

EDPY – Physics Doctorate Program

Lausanne, September 23, 2020

PhD Position in Method Development in Electron Microscopy

A PhD student position is available in the Stahlberg laboratory to develop methods in Coherent Electron Diffractive Imaging (CEDI) to study frozen hydrated biological specimens. CEDI is a method that uses a high-end cryo-electron microscope to illuminate a frozen cryo-EM protein sample with a convergent but slightly defocused electron beam. An aberration corrector in the illumination system of the electron microscope will allow to maintain coherence in the illumination despite the high angle of beam convergence. This beam will traverse the frozen cryo sample and phase-contrasted electron diffraction patterns of the sample will be recorded with a high-speed hybrid pixel detector camera. These patterns will be computationally evaluated with iterative algorithms in order to reconstruct the electron illumination wavefront and the object wavefront. The latter corresponds to the projection image of the specimen. This method will be automated to be applied to a multitude of frozen protein samples, and the ensemble of recorded patterns will be evaluated to obtain the high-resolution 3D structure of the biological protein.

This project will utilize a prototype frontier cryo-electron microscope that will be installed by our laboratory in the Cubotron building. It will involve advanced electron microscopy optics, including aberration correction, phase contrast ptychography optics methods, and diffractive imaging. It will also involve the application of the method to study the 3D structure of an important membrane protein by cryo-EM.

The candidate for this PhD position should hold a Master's degree in Physics, Electrical Engineering, or a related field (in exceptional cases, a Bachelor's degree will also be accepted). The lab language is English. The candidate must be accepted by the doctoral school in Physics (<https://www.epfl.ch/education/phd/programs/edpy-physics/>).

For more information, please contact henning.stahlberg@epfl.ch.