



Two PhD positions available in Prof. Xiaodong Zou's group at Stockholm University

Project title: New cryo-electron microscopy methods for revealing atomic structures of biomolecules - Deadline for application: February 10, 2020

Two PhD positions are available in Prof. Xiaodong Zou's group at Department of Materials and Environmental Chemistry (MMK), Stockholm University (SU). SU is one of Europe's leading higher education institutions with more than 34,000 students and 5,000 employees. At MMK we focus on developing advanced methodologies for chemical analysis and structural characterisation, including analytical chemistry tools, electron crystallography, different spectroscopic methods and multiscale modelling, see our website www.mmk.su.se.

Project background: Knowing the 3D atomic structures is crucial for understanding the functions of macromolecules and chemical processes in biological systems. The information is also important for drug design. X-ray diffraction is presently the most important technique but requires large crystals. Electron microscopy (EM) and electron diffraction (ED) can be used for studying nano and micron-sized particles/crystals. Single particle cryo-electron microscopy (cryo-EM) has made important breakthroughs for structure determination of macromolecules (awarded Nobel Prize in Chemistry 2017). Recently the method based on 3D electron diffraction (3DED), also known as MicroED, has shown to be powerful in determining atomic structures from nano- and microcrystals too small for other methods. It was identified as one of the 2018 ten breakthroughs by *Science* (<https://vis.sciencemag.org/breakthrough2018/>).

The group of Prof. Zou is internationally leading in developing and applying electron crystallographic methods for structure determination. Prof. Zou has recently received two large grants, a 10-year grant from the Swedish research Council (Distinguished Professor Grant) and a 5-year grant from the Knut and Alice Wallenberg Foundation (Wallenberg Scholars), for developing new 3DED/MicroED methods to push the limits of current methods for structure determination of macromolecules.

About the projects

The PhD project aims at developing and applying new 3DED/MicroED methods to obtain structure information from microcrystals of pharmaceuticals and proteins. Two PhD students will be recruited, one primarily focusing on method development (subproject 1) and one on applications (subproject 2). The subproject 1 aims at developing methods and software for high-throughput and automatic data collection, processing, and structure determination. The project includes programming and machine learning for automation. Subject 2 aims at applications of 3DED/MicroED methods for structure determination of new pharmaceuticals and proteins and for studying protein-ligand interactions.

The students will be part of a large group working on one or both subprojects, depending on her/his background and interests. The project requires close collaboration with researchers from academia and industry. She/he should have a strong collaborative and communication skill, be self-motivated and a good team player. Good knowledge on computers and programming is desired for subproject 1 and previous knowledge on structural biology or TEM or crystallography is desired for subproject 2. The candidate should state in the cover letter which subproject(s) she/he is mostly interested in. The candidate should have a Master or equivalent degree in Physics, Biochemistry, Chemistry, Chemical Engineering or Materials Sciences.

More information

For more information please contact Prof. Xiaodong Zou telephone: +46 8 16 2389. e-mail: xzou@mmk.su.se. Website: <https://www.su.se/english/profiles/xzou-1.187418> <https://kaw.wallenberg.org/en/xiaodong-zou>.

Application

Detailed information about the position and how to apply can be found at <https://www.su.se/english/about/working-at-su/phd?rmpage=job&rmjob=11301&rmlang=UK>

