



UPPSALA
UNIVERSITET

1-2 PhD students in molecular biophysics

The Department of Cell and Molecular Biology is organized into seven research programmes which all focus on different areas of cell and molecular biology: Computational Biology and Bioinformatics, Microbiology and Immunology, Molecular Biology, Molecular Biophysics, Molecular Evolution, Molecular Systems Biology and Structural Biology. The scientific basis of what we do lies in biology, but our research overlaps with other areas such as medicine, computer science, mathematics, chemistry, engineering sciences and physics. In total, we are over 200 staff and ~50 Ph.D. students. Please read more about the department's work at <https://icm.uu.se>.

The research group of Associate Professor Michael Landreh is part of the Molecular Biophysics Program at the Department of Cell- and Molecular Biology (ICM). The Laboratory of Molecular Biophysics focuses on developing and applying biophysical methods, most notably photon science, cryo-electron microscopy, and mass spectrometry, to study the structures and interactions of biomolecules.

The Landreh lab employs state-of-the-art protein engineering and mass spectrometry to unravel the structure/function relationship of proteins that play key roles in cancer and neurodegeneration. Of particular interest are integral membrane proteins and proteins that exhibit a high degree of disorder, both of which are challenging to capture with other structural biology approaches.

We are a multi-national research team with diverse backgrounds ranging from biophysics to cell biology, and we regularly use our expertise in protein interactions and mass spectrometry to collaborate with other research groups inside and outside of Sweden. The group comprises three PhD students and three postdocs, with additional lab space at the SciLifeLab Solna and Karolinska Institutet.

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Duties

The advent of Machine Learning (ML) has revolutionized structural biology. Many protein complexes can be predicted with high accuracy, and, together with experimental data, we can potentially build atomistic models of entire cellular compartments. This PhD project aims to bring together large-scale structure prediction using AlphaFold2 with mass spectrometry-based structural proteomics to understand the structure-function relationship of cellular machines, and in particular membraneless organelles that are formed via liquid-liquid phase separation. For this purpose, the PhD candidate will (a) design and produce phase-separating proteins to elucidate their gas-phase structures, (b) conduct large-scale AF2 predictions to identify interactions between cellular components, and (c) combine mass spectrometry, electron microscopy, and computational simulations to predict their three-dimensional structure, and their interactions with target proteins, in their native environment(s). There are, furthermore, opportunities to contribute to work in related areas, including integrating Omics data and alternative approaches within ML-based structure prediction.

The project is part of a larger collaboration with the groups of Prof. Arne Elofsson, Stockholm University and SciLifeLab, Assoc. Prof. Lukas Käll (KTH, SciLifeLab), and Assoc. Prof. Hossein Azizpour (KTH). It offers a unique breadth of research and training opportunities from the basics of machine learning to applied cell biology. The student will be expected to take an active role in the computational and experimental aspects of the work and spend time in both the Landreh and Elofsson labs. The student will be actively involved in building interdisciplinary collaborations and will be encouraged to develop own research ideas that provide additional perspectives.

Requirements

To meet the entry requirements for doctoral studies, you must

- hold a Master's (second-cycle) degree in Biophysics, Biochemistry, Bioengineering, or a related discipline, or
- have completed at least 240 credits in higher education, with at least 60 credits at Master's level, including an independent project worth at least 15 credits, or
- have acquired substantially equivalent knowledge in some other way.

The successful applicant has a strong background in biochemistry, biophysics, bioengineering, or a related area and is interested in molecular or structural biology.

Hands-on work experience with protein expression and purification (cloning, eukaryotic or prokaryotic expression hosts, chromatography-based purification methods, biophysical characterization) as well as with biophysical structure analysis (preferably cryo-electron microscopy or native mass spectrometry) is crucial. Documented experience with computational methods is also a strong merit. An excellent command of spoken and written English is preferable. The PhD project is part of a larger project, and special emphasis will therefore be placed on the interpersonal skills, teamwork, and the ability of the candidate to interact with researchers across different disciplines and backgrounds.

Rules governing PhD students are set out in the Higher Education Ordinance chapter 5, §§ 1-7 and in [Uppsala University's rules and guidelines](#).

About the employment

The employment is a temporary position according to the Higher Education Ordinance chapter 5 § 7. Scope of employment 100 %. Starting date as agreed. Placement: Uppsala

For further information about the position, please contact: Michael Landreh, michael.landreh@icm.uu.se, +46-76-2925929

Please submit your application by 24 November 2023, UFV-PA 2023/3957

Are you considering moving to Sweden to work at Uppsala University? [Find out more about what it's like to work and live in Sweden](#).

Uppsala University is a broad research university with a strong international position. The ultimate goal is to conduct education and research of the highest quality and relevance to make a difference in society. Our most important asset is all of our 7,500 employees and 54,000 students who, with curiosity and commitment, make Uppsala University one of Sweden's most exciting workplaces.

Read more about our benefits and what it is like to work at Uppsala University <https://uu.se/om-uu/jobba-hos-oss/>

Please do not send offers of recruitment or advertising services.

Submit your application through Uppsala University's recruitment system.

Placement: Department of Cell and Molecular Biology

Type of employment: Full time , Temporary position

Pay: Fixed salary

Number of positions: 1

Working hours: 100%

Town: Uppsala

County: Uppsala län

Country: Sweden

Union representative: ST/TCO tco@fackorg.uu.se

Seko Universitetsklubben seko@uadm.uu.se

Saco-rådet sacco@uadm.uu.se

Number of reference: UFV-PA 2023/3957

Last application date: 2023-11-24

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