PhD student in Biochemistry

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The Department of Chemistry – BMC conducts research and education in analytical chemistry, biochemistry and organic chemistry. More than 100 people, including around 45 PhD students, work at the department. New employees and students are recruited from all over the world and English is the main working language. The department is located at the Biomedical Centre in Uppsala, which facilitates collaborations with research groups in biology, pharmacy, medicine and SciLifeLab and gives access to advanced infrastructure for experimental and theoretical studies. The international environment and good opportunities for interdisciplinary collaborations enables PhD students at the department to participate in relevant research projects and prepare for an international research career.

Read more about the research at The Department of Chemistry – BMC at our website.

In our group we try to make a positive difference in society through beyond state-of-the-art research on enzymatic catalysis mechanisms with the intention to replace fossil fuels with non-carbon-based alternatives. This PhD project addresses open questions of green hydrogen (H2) catalysis in Nature.

To fight climate change, green hydrogen (H2) represents a clean fuel. The redox enzyme hydrogenase catalyses H2 production (2e-+2H+->H2) with abundant reactants and at ambient conditions in contrast to the fossil fuel depended and CO2 emitting Steam Reformation. However, the structural understanding of this enzymatic
catalysis is based on snapshots of potential reaction intermediates accumulated at non-turnover conditions.

This PhD project aims to follow the molecular events of H$_2$ evolution in [FeFe]-hydrogenases during turnover, at ambient conditions and in real time to reveal fundamental chemical principles that can be used for green and sustainable H$_2$ catalyst design.

To achieve this in practice, you will produce enzyme crystals and continue to develop the in our group existing experimental handles to control and verify the redox state inside crystals. To characterise the function and structure of key reaction intermediates you will solve room temperature structures. Critically, via rapid mixing and our novel artificial photoactivation method you will follow H$_2$ catalysis in the form of real time molecular movies via transient spectroscopy and time-resolved crystallography at Free Electron Laser X-ray sources.

You must be interested and willing to engage with different academic disciplines. The approach is technically highly challenging and spans from expression, purification and crystallisation of proteins over their biochemical and biophysical characterisation to photochemical activation and advanced, up to date structure determination using synchrotron and Free Electron Laser X-ray sources. You will be trained on all technical aspects and soft skills (e.g. time management, scientific writing) required to complete your PhD.

A successful outcome of the project will be further facilitated by you being part of an interdisciplinary, international and open research group with regular face to face supervision in a diverse department that encourages healthy lifestyle, well-being and cares about mental health. While having the security of this research community, as a PhD student you will have great control over your personal work schedule and freedom to plan largely independently.

**Duties**
The main duties of PhD students are to devote themselves to their research studies, which includes participating in research projects and third cycle courses. The work duties can also include teaching and other departmental duties (not more than 20 % of full time).
Requirements

- To be eligible for doctoral education, a basic higher education equivalent to at least 240 ECTS credits, including at least 60 ECTS credits at Master’s level, including an independent project equivalent to at least 15 credits, or has acquired substantially equivalent knowledge in some other way, more information about the general requirements can be found [here](#).
- A person has special eligibility for a doctoral program in biochemistry if he/she has passed examinations in courses in biochemistry (or other subjects relevant to biochemistry) comprising a total of at least 120 higher education credits or the equivalent. The courses shall comprise at least 90 credits in chemistry, including at least 45 credits in biochemistry of which at least 15 credits shall consist of a project in biochemistry. More information about the subject specific requirements can be found [here](#).
- Very good English proficiency in speech and writing.

Great emphasis will be placed on personal qualities such as good collaborative skills, motivation and independence, as well as how the applicant through his/her experience and competence is judged to have the abilities necessary to develop within and acquire the doctoral education.

Additional qualifications

We are looking for a highly motivated person with a strong interest in the field of sustainable catalysis with a focus on enzymatic systems.

Merits are skills in molecular biology such as heterologous protein expression and protein production. Further beneficial but not explicitly mandatory is be experience in optical spectroscopy, photocatalysis and/or X-ray crystallography.

Doctoral students are normally engaged for some teaching at undergraduate and graduate level. Previous experience from teaching/mentoring, even from environments outside the school/university, as well as other outreach activities may therefore be meritorious.

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: Moritz Senger, moritz.senger@kemi.uu.se.

Please submit your application by 31 January 2024, UFV-PA 2023/4885.

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 Chemistry - BMC  
**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 saco@uadm.uu.se

Number of reference: UFV-PA 2023/4885
Last application date: 2024-01-31

Apply for position