Norwegian University of Life Sciences

Jobbnorge ID: 285911
Deadline: 9/22/2025
Website: http://www.nmbu.no
Scope: Fulltime
Duration: Fixed Term

From design to mechanism — create green catalysts nature never evolved

PhD in AI-Guided De Novo Enzyme Design for Green Chemistry

About the position in AI-Driven Copper Enzyme Research

The Faculty of Chemistry, Biotechnology and Food Science (KBM) at the Norwegian University of Life Sciences (NMBU) has a vacant 3-year PhD position related to enzyme design, with the possibility of an extension for up to 6 months. The position is funded by NMBU.

We seek highly motivated candidates that want to focus on creating new catalysts for green chemistry through **de novo design of enzymes that incorporate transition metals**. The project will engineer and evaluate catalytic proteins that perform difficult transformations, with particular emphasis on (a) **activation of O2 and related reactive oxygen species** and (b) **novel reducing catalysts that proceed via metal-hydride intermediates**. The overarching aim is to deliver selective, energy-efficient biocatalysts that address sustainability challenges in synthesis.

The successful candidate will drive the full experimental pipeline: computationally guided construct design; expression and purification of proteins; **structural determination** to resolve active-site architecture; **activity assays** to quantify kinetics and selectivity under operationally relevant conditions; and **multi-modal spectroscopy** (e.g., UV-Vis, NMR, EPR and complementary methods) to characterize metal coordination, redox states, and catalytic intermediates. You will work closely with colleagues spanning protein chemistry, spectroscopy, and computation to iterate design-build-test-learn cycles and to elucidate **structure-activity-mechanism** relationships.

You will join a **well-equipped laboratory** and a **professional, collaborative team**. Available infrastructure includes modern protein production/purification, spectroscopy suites, crystallography access, and facilities for handling air-sensitive metalloproteins/complexes. We offer **comprehensive training** across these methods as needed; strong motivation, curiosity, and scientific rigor are more important than prior experience in every technique.

The position provides opportunities for co-supervision/mentoring within the group, presentation of results at international meetings, and publication in high-impact venues.

The applicant is made aware that an application for a PhD position at NMBU is at the same time an application for admission to a PhD programme at the institution. The documentation that is necessary to ensure that the admission requirements are met must be uploaded as an attachment.

Main tasks

You will grow into a multidisciplinary role that blends design and mechanistic study of de novo metalloenzymes. We will provide tailored training for each method below—**prior expertise in only a subset is perfectly fine**.

- **Design and characterize cycle.** Use AI-guided protein design to create and refine metalloprotein scaffolds; express and purify variants; integrate experimental feedback to iterate designs.
- **Activity & structure.** Develop robust assays, quantify kinetics/selectivity, and determine structures to resolve active-site architecture.
- **Spectroscopy & intermediates.** Apply UV-Vis and EPR (including stopped-flow when needed) to track metal coordination, redox states, and transient intermediates during turnover.
- **Mechanistic diagnostics.** Employ redox titrations/electrochemistry and computational chemistry to generate theozymes and map reaction coordinates.
- **Molecular biology & biochemistry.** Clone, express, and purify designed variants; assess stability and activity across substrate panels; validate products by LC-MS and NMR.
- **Team science & dissemination.** Document workflows, contribute to shared methods/tools, present at meetings, and co-author publications while fostering a collegial, interdisciplinary lab culture.

The successful candidate is expected to enter a plan for the progress of the work towards a PhD degree during the first months of the appointment, with a view to completing a doctorate within the PhD scholarship period.

Competence

The successful applicant must meet the conditions defined for admission to a PhD programme at NMBU. The applicant must have an academically relevant education corresponding to a five-year master's degree or a cand.med.vet. degree, with a learning outcome

corresponding to the descriptions in the Norwegian Qualification Framework, second cycle. The applicant must have a documented strong academic background relevant to the position and be able to document proficiency in both written and oral English. For more detailed information on the admission criteria please see the PhD Regulations and the relevant PhD programme description.

The applicant must document expertise and interest in the research subject.

Required Academic qualifications

- A relevant masters degree
- Training and research experience in protein biochemistry and molecular biology

The following experiences and skills will be emphasized:

- **Core laboratory foundation:** Practical experience with **cloning, bacterial expression systems, and protein purification**.
- **Enzymology & assay development:** Basics of activity measurements, data handling, and kinetic thinking; prior experience is a plus but not essential.
- **Structural & spectroscopic methods:** Exposure to or interest in X-ray crystallography, NMR, and/or EPR/UV-Vis for probing active sites and intermediates.
- **Computational chemistry (nice to have):** Familiarity with MD and/or QM/MM, or motivation to learn these tools to inform design and mechanism.
- **AI-guided protein design (nice to have):** Curiosity about methods such as ProteinMPNN, RFdiffusion, and AlphaFold; prior hands-on use is beneficial but not required.
- **Analytical chemistry:** Experience or willingness to learn LC-MS, NMR, and UV-Vis for product and protein characterization.

You need to:

- **Collaborate effectively** in an interdisciplinary team, share protocols, and give/receive constructive feedback.
- **Communicate clearly**, both in writing and presentations, and document experiments for reproducibility.
- **Show initiative and curiosity**, including learning new techniques and integrating experimental and computational insights.
- **Work rigorously and safely**, planning experiments, managing time, and maintaining high-quality records.

Remuneration and further information

Salary in position as Doctoral Research Fellow, position code 1017 in salary range NOK from 550800 - 660000 depending on competence and experience. From the salary, 2 percent is deducted in statutory contributions to the State Pension Fund.

Employment is conducted according to national guidelines for University and Technical College PhD scholars.

For further information, please contact Dr. Åsmund Røhr Kjendseth, Associate Professor.

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Information for PhD applicants and general Information to applicants

Application

To apply online for this vacancy, please click on the 'Apply for this job' button above. This will route you to the University's Web Recruitment System, where you will need to register an account (if you have not already) and log in before completing the online application form.

Application deadline: 22.09.2025

Your CV must be entered in JobbNorge's CV form and not just included as an attachment. This is to be able to comply with the regulations of §15 of the Public Administration Act.

In the application, the candidate must confirm that information and documentation (in the form of attachments) submitted via the job application can also be used by NMBU in a possible admission process.

Applicants invited for an interview are expected to present original diplomas and certificates.

The following documents must be attached to the application:

- Motivation letter (maximum 1 page). This must be specific and motivate why you apply for this position.
- Complete CV
- Certified copies of academic diplomas and certificates. (i.e. Diploma, transcript. Diploma supplement for both bachelor and master). Diplomas, transcripts and diploma supplements that are not in Norwegian or English must be uploaded in the original language. An English translation of these documents must also be attached.
- Applicants from universities outside Norway are kindly requested to send a diploma supplement, or a similar document, which describes in detail the study program and grading system.
- Documentation of proficiency in written and oral English in accordance with NMBU PhD regulation section 5-2 (3).
- Names and contact details for two references
- Additional relevant documentation of professional knowledge (for example, list of scientific works). If it is difficult to judge the applicant's contribution for publications with multiple authors, a short description of the applicant's contribution must be included.

About The Faculty of Chemistry, Biotechnology and Food Science

The Faculty of Chemistry, Biotechnology and Food Science (KBM) has about 180 employees, 80 PhD students and 500 BSc and MSc students. The faculty has 11 research groups within chemistry and biochemistry, microbiology and microbial gene technology, bioinformatics and data analysis, food science and nutrition. The Faculty has a state-of-the-art infrastructure for research and education: A biorefinery lab, proteomics platform, fermentation lab, a murine facility, platform for studies of microbial regulation of GHG release and a small-scale pilot plant for processing of food, incl. a microbrewery. Additionally, KBM has a strong competence in enzymology, fermentation and biorefining. KBM aims

at a strong research position and collaborates in networks and research projects both nationally and internationally.

For further information please follow this link: https://www.nmbu.no/en/faculty/kbm

The Norwegian University of Life Sciences

NMBU will contribute to securing the future of life through outstanding research, education, communication and innovation. We have the country's most satisfied university students, who receive research-based education in a unique student environment. Our graduates gain a high level of competence in interdisciplinary collaboration and are popular in the labor market.

NMBU has internationally leading research environments in several subjects. Together with our partners in society and business, we contribute to solving some of the biggest societal challenges of our time. We focus on innovation, communication and entrepreneurship because we believe these challenges are best solved with joint efforts. We believe that a good working environment is characterized by diversity.If necessary, workplace adaptations will be made for persons with disabilities. More information about NMBU is available at www.nmbu.no/en

Additional information

Contact person:

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