Norwegian University of Life Sciences

**Jobbnorge ID:** 306464
**Deadline:** 30.09.2026
**Website:** http://www.nmbu.no
**Scope:** Fulltime
**Duration:** Temporary

Build AI digital twins for real-time fermentation control and drive the future of biotech

# PhD scholarship within Bioprocess Engineering

## About the position

A PhD position is available at the Department of Physics at the Faculty of Science and Technology.

The PhD position is for a period of 3 years, with a desired start date of 1st of October 2026.

The PhD position is part of the research project **"fermentAIon: AI controlled fermentation for microbial lipid production"** funded by the Research Council of Norway. This highly innovative project aims to develop a fully AI driven digital twin that enables real-time optimization and control of fermentation processes. The candidate will develop the digital twin for microbial lipid fermentations by integrating data from online spectroscopy, standard bioreactor sensors, and lab-scale bioreactor experiments across various oleaginous microorganisms. The candidate will build and benchmark chemometric and physics-informed machine learning models to monitor, forecast, and ultimately control critical process parameters, implanting these models in advanced control frameworks to optimize performance.

## Main tasks

- Investigate knowledge-driven, data-driven, and hybrid approaches for modeling fermentation processes based on spectral and other sensor data and utilizing a wide range of techniques such as mechanistic, chemometric, deep learning, and physics-aware models.
- Improve robustness and reliability of the developed methods for deploying AI models in real environments utilizing augmentation, transfer learning, uncertainty quantification and anomaly detection techniques.
- Design, evaluate and test automated control strategies (MPC, model-based and model-free RL) for optimal feeding and harvesting in the fermentation process.
- Participate in the development of a comprehensive digital twin for monitoring, prediction, and control of fermentation processes.
- Work cooperatively and constructively within the project team and collaborate with other project partners.

**Secondary tasks**

In addition to the main tasks listed above, during the project, the candidate is expected to learn and carry out the following activities to collect the experimental data necessary for model development:

- Lab-scale fermentation experiments at various scales and with different setups (batch, fed-batch, and continuous modes).
- Online vibrational spectroscopy measurements (such as Raman and FTIR).
- Infrared microscopy imaging of individual microbial cells.
- Reference analyses of the bioprocess samples with standard analytical techniques (such as HPLC and GC) on various samples collected during the fermentation experiments.
- Chemometric analyses of the obtained data.

## Competence

**Required qualifications**

- A Master's degree or equivalent in Bioprocess Engineering, Biochemical Engineering, Chemical Engineering, Systems/Control Engineering, Applied Biotechnology or a related field. Foreign degrees must correspond with the admission criteria for the PhD program. Candidates submitting M.Sc. thesis within 30. August 2026 may be considered.
- In the Master's degree, both the average grade point and the Master's thesis, must be B or better in the Norwegian educational system. Applicants who have recently graduated with excellent results may be given preference.
- Proficiency in both written and oral English in correspondence with the admission criteria for the PhD program.
- Documented knowledge and experience in process modelling and process kinetics (such as mass/energy balances and reaction rate modelling, growth models, parameter estimation and model validation).

- Documented knowledge and experience in data analysis and scientific computing (such as proficiency in
- Python/R/MATLAB, data visualization, machine learning, and statistics for bioprocesses).
- Personal suitability and motivation for the position.

**Qualifications considered an advantage**

- Documented knowledge and experience in machine learning, deep learning, and control (such as CNNs, RNNs/LSTMs, autoencoders, physics-informed neural networks, anomaly/outlier detection, uncertainty quantification, model predictive control).
- Documented knowledge and experience in vibrational spectroscopy and chemometrics (such as practical experience with Raman/infrared spectroscopies, spectral pre-processing and chemometrics for spectroscopic data).
- Documented knowledge and experience in analytical chemistry for fermentation products (such as sample preparation and measurement with HPLC and GC of microbial metabolites).
- Documented knowledge and experience in microbiology (such as working with bacteria/yeasts/microalgae in sterile conditions, safe lab practice).
- Documented knowledge and experience in bioprocess and fermentation operations (such as operation of lab scale bioreactors, experience with batch/fed-batch cultivations).

**Personal qualities**

- Good time management and organizational skills, with the ability to prioritize tasks effectively.
- Good collaboration skills and an ability to join interdisciplinary academic communities.
- Good written and verbal communication skills for effective presentation of research findings.

## Remuneration and further information

Salary in position as PhD Research Fellow, position code 1017, 550 800 NOK. For exceptionally well qualified candidates a higher salary may be considered.

By applying, the candidate confirms that information and documentation submitted via the job application may also be used by NMBU in a possible admission process to the PhD program. Admission to a PhD program is a prerequisite for appointment to the PhD position.

For professional and social interactions, the candidate is expected to be physically present at NMBU on a daily basis.

Employment is to be made in accordance with Regulations to the Universities and University Colleges Act and Regulations for the PhD degree at the Norwegian University of Life Science (NMBU) , and in accordance with the Civil Servant Act, the Security Act, and the Export Control Act.

For further information, please contact Boris Zimmermann, Ph.D, phone: +47 67231576, (e-mail: boris.zimmermann@nmbu.no).

Information for PhD applicants and general Information to applicants

## Application

Send application electronically via the link "Apply for this job" at the top of this page. 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: 30.09.2026

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

Interviews with the best qualified candidates will be arranged. Applicants invited for an interview are expected to present original diplomas and certificates.

The following documents must be attached to the application:

- Motivation letter
- CV
- Certified copies of relevant 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 Forskrift for graden philosophiae doctor (ph.d.) ved Norges miljø- og biovitenskapelige universitet - Lovdata
- 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 Science and Technology

The Faculty of Science and Technology (REALTEK) develops research-based knowledge and educates civil engineers and lecturers needed to reach the UN's sustainability goals. We have approximately 150 employees, 70 PhD students and soon 1500 students. The education and research at REALTEK cover a broad spectrum of disciplines.

This includes data science, mechanics and process engineering, robotics, construction and architecture, industrial economics, environmental physics and renewable energy, geomatics, water and environmental engineering, applied mathematics as well as secondary school teacher education in natural sciences and use of natural resources such as in agriculture, forestry and aquaculture. The workplace is in Ås, 30 km from Oslo.

What is it really like to work at the Faculty of Science and Technology (REALTEK) at NMBU?

- Guided tour of the Faculty of Science and Technology on Vimeo

# The Norwegian University of Life Sciences (NMBU)

NMBU skal bidra til å sikre fremtidens livsgrunnlag gjennom fremragende forskning, utdanning, formidling og innovasjon. Vi har landets mest fornøyde universitetsstudenter, som får forskningsbasert utdanning i et unikt studentmiljø. Våre kandidater får med seg høy kompetanse på tverrfaglig samarbeid og er populære i arbeidsmarkedet.

NMBU har internasjonalt ledende forskningsmiljøer innen flere fag. Sammen med våre partnere i samfunns- og næringslivet bidrar vi til å løse noen av de største samfunnsutfordringene i vår tid. Vi satser på innovasjon, formidling og entreprenørskap fordi vi mener disse utfordringene best løses med felles innsats.

Vi mener at et godt arbeidsmiljø preges av mangfold. Vi oppfordrer kvalifiserte kandidater til å søke uavhengig av kjønn, funksjonsevne, kulturell bakgrunn eller om du har vært utenfor arbeidslivet en periode. Vi vil legge arbeidsplassen til rette for personer med nedsatt funksjonsevne.

Nærmere opplysninger om NMBU finnes på www.nmbu.no

## Additional information

### Place of service:

Universitetstunet 3 1430 Ås (Ås Municipality)