Jobbnorge ID: 276343
Deadline: 5/15/2025
Website: https://www.usn.no/
Scope: Fulltime
Duration: Temporary

The Faculty of Technology, Natural Sciences and Maritime Sciences have a vacancy for a position as

PhD Research Fellow in Predictive maintenance in hydro power operation planning

About the position

The Faculty of Technology, Natural Sciences and Maritime Sciences (TNM) has a vacancy for a 100 % position as PhD Research Fellow in "Optimizing hydroelectric operations using predictive maintenance under data uncertainty" from August 18, 2025. This position is associated with the FME RenewHydro center.

The position is located at the Department of Electrical Engineering, Information Technology, and Cybernetics and reports to the Head of Department. The department consists of the following research groups: "Applied Modeling and Control" (AMOC), "Electrical Power Systems" (EPS), and "Entrepreneurship and Student Enterprise" (ESE). The place of employment is Porsgrunn.

The employment period will be three years full time, and there is a premise for employment that the PhD Research Fellow is enrolled in USN's PhD-program in Technology within three months of accession in the position. It may be possible to get a four-year full-time employment period consisting of 75 % PhD Research Fellow and 25 % teaching duties.

About the PhD-project

Hydroelectric power plants play a crucial role in providing stable and renewable energy, contributing to grid reliability and sustainability. However, the efficient operation and maintenance of hydroelectric generators, turbines, and auxiliary components are critical to ensuring optimal performance and minimal downtime. Traditional maintenance strategies, such as time-based and reactive maintenance, often lead to unexpected failures and costly repairs, affecting overall power system stability. To address these challenges, predictive maintenance (PdM) techniques have emerged, leveraging real-time condition monitoring, fault diagnostics, and remaining useful life (RUL) estimation to improve asset management. However, a key challenge in implementing predictive maintenance is the presence of data uncertainty arising from sensor noise, missing data, fluctuating operating conditions, and environmental variations. Addressing these uncertainties is crucial for making reliable operational decisions in hydroelectric power systems, ensuring that maintenance strategies effectively prevent failures while maintaining energy production efficiency.

The integration of machine learning (ML) in predictive maintenance has transformed hydroelectric operations by enabling data-driven decision-making and real-time fault prediction. ML models, such as deep learning, reinforcement learning, and ensemble techniques, can analyze large-scale operational datasets from hydroelectric power plants, identifying patterns and early warning signs of equipment degradation. However, data uncertainty poses a significant challenge, as missing or noisy sensor readings can degrade model performance and lead to unreliable predictions. To mitigate these effects, advanced ML techniques such as Bayesian deep learning, probabilistic models, and uncertainty quantification methods can be applied to enhance model robustness. Additionally, transfer learning and domain adaptation can help improve predictive maintenance models by leveraging historical data from similar hydroelectric plants. By integrating ML-driven predictive maintenance with power system optimization, this research aims to enhance the reliability, efficiency, and cost-effectiveness of hydroelectric operations under uncertain conditions, contributing to a more resilient and sustainable energy infrastructure.

The project aims to strengthen the overall digital competence at USN in collaboration with FME RenewHydro center, NTNU in terms of data-driven models maintenance planning of hydropower generators.

Qualifications

Eligibility Requirements:

- a Master's degree equivalent to a Norwegian master's degree (120 ECTS)
- ability to collaborate and work effectively in an international and interdisciplinary research environment.
- applicants with a strong background in STEM fields (e.g., Electrical power engineering, control system engineering, Physics or environmental engineering, Mathematics (Operations research) or Computer Science or Machine Learning)
- the master thesis must be included in the application

Ideal Candidate:

- demonstrates experience or strong interest in modelling, programming, systems thinking, and qualitative/quantitative research methods
- documented programming experience for example GitHub project on MATLAB, Python, Julia, Javascript
- experience in hydropower engineering with control engineering and optimization is a distinctive advantage

- possesses a strong academic record, with relevant experience in either industry or academia
- has prior professional experience and a solid understanding of workplace responsibilities and expectations, which will be considered a key advantage
- shows a deep interest in interdisciplinary research, is capable of independent work, and actively engages with the supervision team to foster collaborative research

For admission to the Doctoral Program the weighted average grade is B or higher is usually required. The applicant must have gained the degree within the start date of the position, so applicants in the last semester of their master's degree are also encouraged to apply.

The candidate must have the ability to work independently and at the same time have the motivation to share knowledge and take part in teamwork.

Co-operation between staff members is an integrated part of the working atmosphere at the University of South-Eastern Norway. The candidate must be motivated and demonstrate a proven ability to work effectively within a team and in a collegiate manner to formulate and realize common objectives.

Personal characteristics

- strongly motivated and ambitious
- be structured, targeted and solution oriented
- have motivation to work interdisciplinary
- the successful candidate should be creative and actively contribute to the team he/she will be part of
- have good dissemination skills
- personal skills like a positive and friendly attitude, and contributing to a sustainable social environment will also be valued

In the evaluation of which candidate is best qualified, emphasis will be placed on education, experience and personal suitability, in terms of the qualification requirements specified in the advertisement.

We offer

- a stimulating and growing research environment, with good opportunities to develop your career and your academic skills
- an open and inclusive work environment with dedicated colleagues
- a good social environment
- attractive welfare benefits in the State Pension Plan
- opportunity for physical activities within working hours

Other information

The research area for the position may include technologies covered by the Ministry's export control regulations. Employment in the position requires a relevant license or security clearance. For more information, see https://nsm.no/en/

The Academic Appointments Board for PhD Research Fellowships is responsible for the appointment. An expert assessment of applicants will be carried out. The candidates deemed best qualified will be invited to an interview.

The person appointed must comply with the laws, regulations and agreements that apply at any given time to the post. Please note that approved work permit is a prerequisite for the employment.

According to its human resources policy, the University of South-Eastern Norway targets a balanced gender composition and aims to recruit persons with a background as an immigrant.

The University contributes to the Inkluderingsdugnaden (a voluntary scheme to promote inclusion), and it is our aim that our employees, to the fullest extent possible, shall reflect the diversity of the general population. We therefore encourage qualified applicants with disabilities to apply for the post. The University will facilitate the workplace for employees with disabilities.

The Department has few women appointed in scientific positions, and women are therefore particularly encouraged to apply.

Pursuant to section 25, 2nd paragraph of the Freedom of Information Act, information on the applicant may be disclosed even if the applicant has requested not be included on the list of applicants. Applicants will be notified if such requests are not allowed.

Salary

PhD Research Fellow (code 1017): NOK 532 200 a year. Further promotion will be based on time served in the position.

A statutory contribution to the state pension plan will be deducted from the employee's salary.

Contact information

For more information about the position, please contact:

Associate Professor Thomas Øyvang, phone +47 35 57 51 55 , e-mail: thomas.oyvang@usn.no

Professor Sambeet Mishra, e-mail: sambeet.mishra@usn.no

For questions regarding the recruitment process, please contact:

Britt G. Wien, e-mail: britt.g.wien@usn.no

How to apply

The University of South-Eastern Norway makes use of online application management. Applicants to the post must register their application and CV with enclosures online via the Jobbnorge recruitment portal by clicking on the link on the right-hand side - "Søk stillingen" (Apply for the post).

The following documents shall be attached to the online application:

- Cover letter outlining the motivation and a detailed Curriculum Vitae (CV)
- Transcripts and diplomas of Bachelor's and Master's Degrees. The transcript should clearly show the grades obtained for different courses taken at the Bachelor and Master Degree. The diplomas must be in a Scandinavian language or translated to English.

  If your higher education is from a university outside of Norway, we require it to be recognized by the Norwegian Directorate of Higher Education and Skills. You must apply for the recognition before the application deadline for this position expires. Add a receipt on your application or recognition when applying. The recognition must be sent to us and is a requirement for being hired.

- A 5-page maximum project description. The candidate should describe how he/she would carry out the tasks if he/she is offered this position. The description preferably also contain new ideas or methods that the candidate would think of using them for the execution of this PhD project.
- A copy of master thesis and any scientific publications and a list of these; GitHub profile with project is also relevant
- Three references (contact information)
- Other relevant certificates (if applicable, must be specified)

Please note that all documents must be in a Scandinavian language or in English. Any translations must be certified.

The application will be assessed on the basis of the attached documentation as requested above. Each applicant is responsible for ensuring that the required documentation has been uploaded with the application deadline.

The research area for the position may include technologies referred to in the Ministry's export control regulations. Relevant license or security clearances may therefore be required.

The University has been awarded a Charter & Code certificate by the European Commission, and is entitled to use the HR Excellence in Research (HRS4R) logo. The University is also a member of the EURAXESS network, which contributes to good working conditions for mobile researchers.

About us

The University of Southeastern Norway (USN) ranks as the country's fourth largest higher education institution. We are a vibrant community of approximately 18,000 students and 1,900 employees.

Video: https://vimeo.com/898549899/60305e2540

About USN

At USN you'll contribute to a mission that matters. The University of Southeastern Norway was established in 2018, following the merger of several smaller university colleges, some with historical roots dating back to the 17th and 18th centuries. We are committed to collaborative problem-solving, aiming to provide solutions that benefit our communities - locally as well as globally.

Our diverse campuses are located from the beautiful fjords to the snow-covered mountains. USN spans three Norwegian counties, with campuses in Bø, Drammen, Horten, Kongsberg, Notodden, Porsgrunn, Ringerike, and Rauland.

Wherever you're located, you will engage in meaningful work amidst a thriving student culture and innovative research environments. Our university offers a wide range of high-quality and internationally recognized academic programs.With a strong emphasis on profession-oriented and socially relevant education, we prepare our students for the workforce and equip them with the necessary skills to make a positive impact on society.

At USN, we deeply value and cultivate our relationships with local communities. Our staff and students are actively engaged in a variety of projects that address societal challenges, driving change and innovation. We place a strong emphasis on diversity, inclusion, and equal opportunity, and we strive to shape future leaders, innovators, and change-makers.

Read more about working for us: (link to) Work for us - Universitetet i Sørøst-Norge

Additional information

Contact persons:

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- Sambeet Mishra, Professor
  Phone: | E-mail: sambeet.mishra@usn.no

Place of service:

Kjølnes Ring 56 3918 Porsgrunn (Porsgrunn Municipality)