Jobbnorge ID: 295257
Deadline: 3/23/2026
Website: http://www.ntnu.no
Scope: Fulltime
Duration: Temporary

The Department of Electric Energy has a vacancy for a

PhD Candidate in Fault detection in hydropower generators

This is NTNU

NTNU is a broad-based university with a technical-scientific profile and a focus in professional education. The university is located in three cities with headquarters in Trondheim.

At NTNU, 9,000 employees and 43,000 students work to create knowledge for a better world.

You will find more information about working at NTNU and the application process here.

Video: https://youtu.be/Xt-yHCN5QS0

About the position

Are you motivated to take a step towards a doctorate and open up exciting career opportunities? Are you interested in advancing environmentally friendly hydropower technology, and do you have a strong competence in electric machinery and electromagnetics? As a PhD Candidate with us, you will work to achieve your doctorate, and at the same time gain valuable experience that qualifies you for a further career in higher education and research, both in and outside academia.

The Department of Electric Energy (IEL) at NTNU is seeking a highly motivated candidate for a full-time (100%) PhD position for 3 years as part of the project “Modelling and analysis of pumped storage hydrogenerators”. The project is linked to the new research center FME RenewHydro. You will join the research group Electrical Machines and Electromagnetics (EME) at IEL, where we foster an open, inclusive, and collaborative working environment.

Our working environment is characterized by a friendly, supportive atmosphere, with regular gatherings such as research group professional meetings, monthly colloquia, shared lunches, and “Friday coffee” sessions to wrap up the week. These formal and informal occasions provide opportunities to exchange ideas, celebrate milestones, and strengthen connections. PhD candidates also arrange social activities, open to everyone who wishes to join, creating a welcoming and inclusive community.

Your immediate leader will be the Head of Department.

About the project

FME RenewHydro

FME stands for Centre for Environment-friendly Energy Research, and FME RenewHydro is a new research center for environmentally friendly energy, developing hydropower to be more flexible and contributing to more sustainable renewable energy. With increased cooperation and new knowledge in technology, markets, environment and society, the research center RenewHydro will work to reach national energy, climate and nature targets.

In RenewHydro, researchers in the fields of technology, biology, economics, society and climate will collaborate with experts from the hydropower industry and public administration to solve key challenges in the energy field, develop solutions for a low-emission society and strengthen the business community's ability to innovate.

In addition to technology for the hydropower plants themselves, the researchers will look at, among other things, security of supply, how climate effects change hydropower, how the power can and will develop, and how hydropower can take into account the environment in rivers and reservoirs in the form of nature-based solutions.

We face major challenges in the future. Climate change will affect the whole society, including hydropower and nature. In RenewHydro, we will therefore also focus on the major connections with biological diversity, sustainability and land use.

NTNU leads the center and the main research partners are the Norwegian School of Business NHH, the Norwegian Institute for Natural Research - NINA and SINTEF Energi. Centre duration is from 2025 till end of 2032. See here for more information.

About the project

Hydropower machines in Norway have traditionally been designed and operated as base load suppliers. New operating schemes in different types of power markets make the loading of the machines different from the past. The operation is more intermittent and closer to design capabilities, combined with a goal to reduce maintenance and operational costs.

Thus, the early, precise, and cost-effective detection of faults becomes more important. The research is in part a continuation of ongoing research on fault detection and identification using electromagnetic signatures. Through previous research efforts, several mechanical and electrical failures in the rotor have been detected. A detector system with signal processing software is under development and testing. The research is at the international forefront.

In the continued research effort, other mechanical and electrical faults are targeted. This includes stator faults such as stator winding short circuits. The PhD Candidate is expected to utilize FEM numerical models, combined with signal processing and pattern recognition, to identify targeted faults. The research extensively uses laboratory and field (power station) testing.

As mentioned above, you will be a part of the research group Electrical Machines and Electromagnetics (EME) at IEL, where you are expected to take an active role in the group and participate in activities.

The main supervisor will be Professor Arne Nysveen (IEL). Co-supervisor will be Dr. Hossein Ehya (AIMSES).

Duties of the position

- Carry out research of good quality within the framework described above.
- Literature review on advanced low-cost sensor technologies applicable for monitoring the health of stator winding, stator core, rotor, and rotor windings.
- Modelling and simulation of fault signals and detection using various sensors.
- Explore different signal processing methods for improved robustness in detection and discrimination of faults.
- Experimental verification in the laboratory and field (power station).
- Participate in activities of the research group Electrical Machines and Electromagnetics (EME).
- Academic publications and dissemination. Researchers in RenewHydro are expected to contribute regularly to internal and external seminars with research partners and sponsors.
- Participate in international activities such as conferences and/or research stays at foreign educational/research institutions.
- Complete academic training consisting of coursework corresponding to a minimum of 30 ECTS.

Career-enhancing work, which is in addition to the research project and doctoral education, may be offered to a candidate who demonstrates clear motivation and ability for such work, and if the Department determines there is a need. Examples of career-enhancing work include, but are not limited to, contributing to teaching, laboratory and exercise teaching, supervision, and examination work within the employee's areas of competence.

Be prepared for changes to your work duties after employment.

Required selection criteria

- You must have a relevant Master's degree in electric power engineering with a focus on electric machinery design or modelling. Your course of study must correspond to a five-year Norwegian course, with 120 credits obtained at master's level. Master's students can apply, but the master's degree must be obtained and documented before starting the position and no later than autumn 2026.
- You must have a strong academic background from your previous studies and have an average grade from your Master's degree study, or equivalent education, which is equal to B or better compared to NTNU's grading scale. If you do not have letter grades from previous studies, you must have an equally good academic foundation. If you have a weaker grade background, you may be considered if you can document that you are particularly suitable for a PhD education, i.e., by having relevant work experience and/or published/publishable scientific papers.
- You must meet the requirements for admission to the Faculty's Doctoral Programme.
- You must have English language skills, both written and spoken, corresponding to the scale B2 in the Common European Framework of Reference for Languages (CEFR). Applicants who are not native English speakers are encouraged to document their English language proficiency. This can be done through an approved English language test. One of the following test scores could be documented for this purpose:
    - TOEFL internet-based test (iBT) - Score equivalent to the B2 level: 79 - 101.
    - IELTS - Score equivalent to the B2 level: 5.5 - 6.0
    - Cambridge English - Score equivalent to the B2 level: 160 - 179.

Further assessment of both written and oral English language skills, as well as the ability to communicate fluently, will be conducted throughout the selection process and during any interviews for all applicants.

The appointment is to be made in accordance with NTNUs guidelines for recruitment positions and Regulations for the degrees philosophiae doctor (ph.d.) and philosophiae doctor (ph.d.) in artistic development work at the Norwegian University of Science and Technology (NTNU) for general criteria for the position.

Preferred selection criteria

- Knowledge of numerical analysis of electromagnetics or electric machines
- Knowledge of the design of electrical machines
- Knowledge of signal processing methods
- Work experience with operation or maintenance of (preferably) large machines
- English language skills, both written and spoken, corresponding to the scale C1 in the Common European Framework of Reference for Languages (CEFR). See which scores are equivalent to the C1 level here.

Personal characteristics

To complete a doctoral degree (PhD), the candidate is expected to:

- demonstrate strong motivation, curiosity, and a learning-oriented mindset
- work independently, take initiative, and maintain good structure and discipline in their work
- communicate effectively and collaborate well with supervisors and peers
- show resilience and work constructively when facing challenges or setbacks
- demonstrate integrity and a strong sense of responsibility in their research conduct

Emphasis will be placed on personal and interpersonal qualities.

We offer

- An exciting job with an important mission in society
- Developing tasks in a strong and international professional environment
- Career guidance and follow-up during the PhD period
- Open and inclusive working environment with committed colleagues
- Social activities organized by PhD Students
- Weekly social gathering on Fridays (Friday coffee)
- Working capital that can be used to implement the project
- Mentor programme as a new employee at NTNU
- Favorable terms as a member of the Norwegian Public Service Pension Fund (SPK)
- Free Norwegian language training at a basic level (A2)

As a PhD Candidate at NTNU, you will have access to employee benefits.

Diversity

Diversity is a strength, and at NTNU we aim to be an employer that reflects the diversity in society and that makes use of the potential of the population's collective skills. Our vision is Knowledge for a better world and our values are creative, critical, constructive and respectful. We believe that an organization that is equal, diverse, and gender-balanced is essential for us to achieve our goals.

We strive to attract employees with different skills, life experiences and perspectives to contribute to even better problem solving of our societal mission in research and education.

If you think this position is relevant and interesting, we encourage you to apply, regardless of gender, functional ability, and cultural background, or whether you have been out of work for a period of time.

At NTNU we want to increase the proportion of women in scientific positions. We have a number of measures to promote equality.

Salary and conditions

In the position of PhD Candidate, code 1017, your gross salary will normally be NOK 550 800,- per annum depending on qualifications and seniority. A 2% statutory contribution to the State Pension Fund is deducted from the salary.

The employment period is 3 years, with the possibility of an additional 3 to 12 months of employment related to career-enhancing activities.

The option for career-enhancing work may be offered to a candidate who has clear motivation and ability for such work, and if the Department deems it necessary. This will be clarified with the candidate during and after any interview.

For employment as a PhD Candidate, it is a prerequisite that you gain admission to the PhD programme in Electric Power Engineering within three months of your employment contract start date, and that you participate in an organized doctoral programme throughout the period of employment.

The position is conditional on funding.

As an employee at NTNU, it is important that you keep yourself up to date with academic and organizational changes and adapt to them.

For the necessary professional and social interaction, it is a prerequisite that you are physically present and available to the institution on a daily basis.

The appointment is carried out in accordance with the principles of the State Employees Act.

The nature of the work will, with a high degree of likelihood, involve the development of, or access to, assets and information that are considered particularly vulnerable to activities posing a security risk, and for which compelling security considerations apply. The selected candidate must therefore undergo an assessment of personal security suitability. In this context, verification of identity, academic transcripts, and other submitted documentation will also be conducted. The candidate must be able to obtain relevant security clearance for access to and obtain information about hydropower stations and equipment.

About the application

The attachments (including a description of your scientific work) must accompany the application as these documents form the basis of the application assessment. The documents must be in Norwegian/a Scandinavian language or English.

Please note: the application will only be assessed on the basis of the information we have received by the application deadline. Therefore, make sure that your application clearly shows how your skills and experience meet the criteria described above. The application and all attachments must be sent electronically via Jobbnorge.no. If you are invited to an interview, you must bring certified copies of certificates and diplomas upon request.

The application must include:

- A cover letter where the applicant explains personal motivation, briefly summarizes scientific work, and describes how their background is a good fit (400 words/1 page).
- Project outline containing proposals for an overall description of research questions, theoretical perspectives, methodological design for the project, and progress plan (maximum 1500 words/4 pages, including references). This proposal shall neither be deemed final nor binding for the project.
- CV.
- If you have testimonials of work experience, submit them.
- Transcripts and diplomas for Bachelor's and Master's degrees. If you have not yet completed your Master's thesis, you must provide confirmation of your estimated submission date for the Master's thesis, or confirmation that your Master's thesis has been submitted.
    - Applicants from universities outside Norway are asked to provide a diploma supplement or similar document that details the study program and grading system. Also, see the specific documentation requirements for education obtained outside Norway, applicable to certain regions or countries, here.
- A copy of the Master's thesis. If you have recently submitted your Master's thesis, you are encouraged to include a draft of the thesis. Documentation of a completed Master's degree must be provided before assuming the position.
- If you have publications or other relevant research work, submit them.
- You are encouraged to include documentation of English language proficiency if you are not a native speaker of English.
- Name and contact information of three referees.

If all or parts of your education have been taken abroad, we also ask you to attach documentation of the scope and quality of your entire education, including both Bachelor's and Master's studies, as well as any other higher education. If your institution uses “diploma supplement” (normal for most European institutions), you must attach this. A description of the documentation required can also be found here. If you already have a statement from Norwegian Directorate for Higher Education and Skills (HK-dir), please attach this as well.

Joint work will be considered. If it is difficult to identify your contribution to joint work, you must attach a brief description of your participation.

When assessing the best qualified, we emphasize necessary qualifications such as education, experience and personal suitability. Motivation for the position, ambitions, and potential for research will also count when assessing the candidates.

NTNU recognizes a wide range of academic contributions and has committed itself to The San Francisco Declaration on Research Assessment and CoARA (responsible assessment of research and recognition of a greater breadth of academic contributions in accordance with NTNU's social mission).

Aptitude and personality tests

We use aptitude and personality tests to evaluate candidates’ characteristics, abilities, and suitability for the position. These tests help ensure a fair and objective evaluation of all candidates and support us in identifying the most qualified person for the role.

General information

A public list of applicants with name, age, job title, and municipality of residence is prepared after the application deadline. If you wish to be exempt from entry on the public applicant list, this must be justified. Assessment will be made in accordance with current legislation. You will be notified if the exemption is not granted.

If you think this position looks interesting and in line with your qualifications, you are welcome to apply.

If you have any questions about the position, please contact Professor Arne Nysveen by phone +47 73 59 42 63 or by e-mail at arne.nysveen@ntnu.no.

If you have any questions about the recruitment process, please contact senior HR consultant Sven Robert Storø by email at sven.r.storo@ntnu.no

Application deadline: 23.03.2026

For practical information about working at NTNU, please visit this webpage.

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The city of Trondheim is a modern European city with a rich cultural scene. Trondheim is the tech capital of Norway with a population of 200,000. The Norwegian welfare state, including healthcare, schools, kindergartens and overall equality, is probably the best of its kind in the world. Professional subsidized day-care for children is easily available. Furthermore, Trondheim offers great opportunities for education (including international schools) and possibilities to enjoy nature, culture and family life and has low crime rates and clean air quality.

NTNU - knowledge for a better world

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The Norwegian University of Science and Technology (NTNU) creates knowledge for a better world and solutions that can change everyday life.

Department of Electric Energy

The Department of Electric Energy is one of the seven departments at the Faculty of Information Technology and Electrical Engineering. Our department is Norway’s leading in the field, and our vision is to be at the centre of the digital, green shift. We have excellent collaboration with

business and industry as well as other universities and research organizations internationally. This gives us outstanding opportunities for interdisciplinary research with high relevance for the society, addressing industrial needs and global challenges.

Additional information

Place of service:

Høgskoleringen 1 7491 Trondheim (Trondheim Municipality)