Jobbnorge ID: 300934
Deadline: 5/28/2026
Website: https://www.usn.no/
Scope: Fulltime
Duration: Fixed Term

Do you want to contribute to the development of knowledge, insight and solutions that are relevant to society and working life today and in the future?

PhD in Distributed Optimization & Control of Reactive Power for Grid Stability-Nordic Power System

Welcome to USN

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 the position

We are looking for a PhD research fellow within “Distributed Optimization and Control of Reactive Power considering grid stability in the Nordic Power System ". The position is part of the CoordQ project (Enhanced Reactive Power and Voltage Coordination in the Nordic Power System), funded by the Research Council of Norway (RCN).

Project web-page: CoordQ - Universitetet i Sørøst-Norge

Are you interested in “Distributed Optimization and Control of Reactive Power considering grid stability in the Nordic Power System", and want to engage in research with skilled colleagues who share your interests? Maybe you can become our new colleague at the Department of Electrical Engineering, IT and Cybernetics at the Faculty of Technology, Natural Sciences and Maritime Sciences (TNM). The position is available from 1 September 2026 with the latest starting date on 1 January 2027.

This is an educational position that is primarily intended to give promising researchers the opportunity to develop academically and professionally through organised research training.

It is a condition that the person who accepts the position applies for admission to the faculty’s doctoral programme in Technology within three months of starting in the position. (https://www.usn.no/english/research/postgraduate-studies-phd/our-phd-programmes/technology/)

The doctoral programme includes relevant courses corresponding to 30 ECTS (approximately six months) of study, a thesis based on independent research, active participation in national and international research environments, relevant research dissemination, a trial lecture and public defence of the thesis. Read more about organised research training at USN on our website.

The PhD research fellowship is for a fixed term of three years with pure organised research training.

Your personnel manager will be head of department, and your supervisors will be Sambeet Mishra and Thomas Øyvang It is a prerequisite that you live close by so that you can be present at, and available to, the academic environment at your workplace during ordinary working hours. The place of work will be at campus Porsgrunn.

The position is internally funded.

About the doctoral project

The person appointed will be affiliated with the research project Enhanced Reactive Power and Voltage Coordination in the Nordic Power System (CoordQ), which is headed by University of South-Eastern Norway (USN).

The person appointed will be affiliated with the research group Electrical Power Systems. The research project focuses on strengthening the Nordic power system, from a Norwegian perspective, to meet growing electricity needs while enhancing energy security and reliability. The project will develop a national control framework to reduce power system losses, improve reactive power coordination, and stabilize grid operations by enhancing collaboration between grid controllers at different system layers. Fair price incentives and market participation for reactive power ancillary services will be established to improve grid efficiency and cost-effectiveness. CoordQ brings together leading research and industry partners including USN (project owner), NTNU, Statnett (TSO), Statkraft, Skagerak Kraft, Lede (DSO), and Aker Solutions.

Recruitment and research education are an important part of the mission of CoordQ. The PhD candidates funded by the project will contribute with cutting-edge knowledge and research. As a CoordQ-funded PhD candidate, you will be employed by USN and take an active part in the

research activities. Through the project, you will have access to a forum with other PhD candidates and postdocs, and opportunities for research to stay with partners, both nationally and abroad, through its international network.

This PhD position “Distributed Optimization and Control of Reactive Power considering grid stability in the Nordic Power System" will be associated with Work Package 1 (WP1) on Real-time Fleet Control in CoordQ. The overall objective is to strengthen multi-time scale controller coordination between Automatic Voltage Regulators (AVRs) and power electronic converters, enhancing resilience and adaptive control to improve system stability under fluctuating grid conditions.

The work of the PhD candidate will be integrated with the ongoing work carried out by the research partners in WP1. In the initial phase, the supervisors, the candidate (based on the candidate's profile), and research partners in CoordQ will work together to identify the comprehensive research questions to address the overall objective of the PhD work.

Some potential specific research objectives:

- Develop distributed optimization strategies for optimal reactive power dispatch in the Nordic Power System
- Design Automatic Voltage Regulation schemes under various operational conditions including transformer limits, generator set points and stability
- Investigate limits for load cycles and inductive absorption in varied grid topologies
- Explore dynamic controller limits between synchronous generator and inverter-based resources for grid balancing
- Develop adaptive control mechanisms between inverter-based resources and synchronous generator focusing on reactive power capabilities
- Identify mechanisms to enhance grid resilience with high share of inverter-based renewables

Duties

- Complete the doctoral programme up to completion of the doctoral degree within the employment period
- Conduct high-calibre research within the framework described above
- Produce scholarly publications and disseminate research results
- Work closely within the CoordQ project, contributing actively to project activities and delivering research results relevant to industrial partners
- Comply with project-related confidentiality requirements, including NDAs and data management procedures as required by the project and its collaborators
- Participate in the research group Electrical Power Systems - Universitetet i Sørøst-Norge
- Participate in national and/or international activities such as conferences
- Be prepared for changes in your work tasks after appointment

Qualifications

Required qualifications:

- Master’s degree (120 ECTS credits) (or equivalent qualifications) within the field of STEM (e.g. electrical power engineering, control system engineering, Physics or environmental engineering, Mathematics (Operations research) or Computer Science or Machine Learning).
- Documented knowledge of relevant methodologies, both quantitative and/or qualitative, at master’s level.
- Weighted average grade of B or higher on the master’s degree and thesis.
- 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.
- Excellent written and oral English language skills.
- Meet the formal requirements for admission to USN’s doctoral programmes and Faculty of Technology, Natural Sciences and Maritime Sciences ’s doctoral programme in Technology no later than three months after starting in the position.
- **Requirements regarding security clearance** (Further information regarding security is provided below in the job advertisement).

Preferred qualifications:

- Demonstrate experience or strong interest in power system modeling, optimization, machine learning, and control systems.
- Documented programming experience (e.g., GitHub projects) in Python, Julia, MATLAB, or similar.
- Knowledge of renewable energy systems (hydropower, wind, solar) and their grid integration.
- Experience in mathematical modeling, optimization algorithms, and data-driven methods.
- Possess a strong academic record, with relevant experience in either industry or academia.
- Show a deep interest in interdisciplinary research, is capable of independent work, and actively engages with the supervision team.
- Ability to collaborate and work effectively in an international and interdisciplinary research environment.

Personal qualities

In order to be able to complete a doctoral degree, you need to:

- be ambitious and demonstrate motivation and potential for research in the field.
- work independently but also participate in teamwork. Be motivated to work interdisciplinary.
- present and discuss your research with other academics and have good dissemination skills. work in a structured way, set goals, and make plans to achieve them.
- get involved and contribute constructively with feedback. The successful candidate should be creative and actively contribute to the team.
- work constructively under pressure or in the face of adversity.
- analyse data, assess different perspectives, and draw well-founded conclusions.
- be flexible and open to adjusting the project plan as necessary.
- have the academic skills and personal qualities to be able to complete the doctoral programme within the employment period.
- personal skills like a positive and friendly attitude, and contributing to a sustainable social environment will also be valued.

When assessing applications, particular importance will be attached to

- Formal qualifications
- The scientific quality, research relevance and degree of innovation of the project
- The relevance of the project to the profile of the doctoral programme
- The personal qualities mentioned above

Language requirements

Requirements for proficiency in English

This position requires good English language skills. International applicants must document this with a valid certificate from one of the following tests. Specific requirements regarding grades can be found on our webpage English requirement for programmes and subjects taught in English at USN.

- TOEFL - Test of English as a Foreign Language, Internet-Based Test (IBT)
- IELTS - International English Language Testing Service
- Certificate in Advanced English (CAE) or Certificate of Proficiency in English (CPE) from the University of Cambridge
- PTE Academic - Pearson Test of English Academic

The following applicants are exempt from the requirements listed above:

- Applicants with one year of completed university studies in Australia, Canada, Ireland, New Zealand, UK or USA
- Applicants who have completed a master's degree with English as the language of instruction in an EU or EEA country
- Applicants who are exempt based on the Norwegian Directorate for Higher Education and Skills (HK-dir)'s GSU list (Higher Education Entrance Qualification for foreign applicants)

Applicants from Norway can confirm their English language skills by submitting their upper secondary school diploma.

Project description

Applicants must submit a preliminary research proposal with the application. The project description for the research project should be short and concise, 2-4 pages (600-1200 words). See further descriptions in the "Template for project descriptions for doctoral and postdoctoral fellowships at USN».

1. Introduction (the title, main problem and research questions and the background to the project)
2. State of the art (the project's research field)
3. Theory
4. Methodology
5. Work plan
6. Results and hypotheses
7. Bibliography

Applications with a project description exceeding 1200 words will not be processed.

The project proposal will be included in the assessment of the applicant's competence.

The final project description and work plan will be prepared in consultation with the supervisor(s) during the first three months of the employment period. It is a prerequisite that you complete the project during the employment period.

What we offer

- Organised research training in a large undertaking with an important social mission
- Careers advice and guidance throughout the entire doctoral programme. Together we will draw up a career plan that includes the skills and knowledge you will acquire
- An inclusive working environment with ambitious colleagues
- The opportunity to take Norwegian language courses
- Salary in accordance with the Norwegian State salary scale for PhD research fellows (position code 1017) NOK 550,800. In special cases, employment in code 1378 may be considered. Any further increases in pay grade will be based on length of service in the position
- Deductions will be made from your salary in order to make statutory contributions to the Norwegian Public Service Pension Fund on your behalf
- Membership in the Norwegian Public Service Pension Fund, ensuring favourable pension, insurance and loan schemes

Diversity

We believe that diversity is a resource in our work and learning environment. Different experiences and backgrounds contribute to different perspectives and better solutions to challenges that need to be solved.

We are committed to respecting each other's differences and will facilitate employees with disabilities. We take into account your needs and your situation in different phases of life.

If you find this position interesting, we encourage you to apply, regardless of gender, disability, cultural background or whether you have been out of work for a period of time.

If there are qualified applicants with disabilities, gaps in their CV or an immigrant background, we will call at least one applicant in each of these groups for an interview. If you recognize yourself in one of these categories, you can tick the box in our job search portal.

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

General information

The Appointment Committee for Fellowship Positions (TUS) is the appointing authority for this position. Your competence for the position will be assessed by an expert committee. The expert committee will assess your competence for the position based on the documentation you have registered in Jobbnorge.

Based on the expert committee's assessment, relevant applicants will be invited to an interview and to hold a trial lecture. References will also be obtained for relevant candidates.

Employment at USN is carried out in accordance with the principles set out in the Norwegian Civil Service Act, and the legislation that regulates the export of knowledge, technology and services. If your application is considered to be in conflict with the criteria in the latter legislation, it will be rejected without further consideration.

The University's **Guidelines for Recruitment Positions** provide a more detailed description of the criteria for appointment as a PhD research fellow.

As an employee of USN, you must at all times adapt to changes in the field and all organisational changes that are adopted.

Requirements regarding a licence and/or security clearance

- The position may involve access to and handling of unclassified, sensitive information.
  The person appointed must demonstrate a high level of integrity, loyalty, and security awareness, and comply with applicable regulations and internal security procedures.

- The position requires a background check prior to employment, pursuant to the Emergency Preparedness Regulations for the Power Supply § 6.7. You can read more about the background check here. USN carries out background checks on applicants in order to verify the information provided in their CV and available documents. The background checks are conducted by an external provider. Applicants will be contacted for their consent if this becomes relevant.

How to apply

If you think this position looks interesting and matches your qualifications, you can submit an application electronically by clicking on "Apply for the position" on this page. Here you will need to enter a short application text and information about your relevant education and work experience. In the application text, you must clearly describe your skills and motivation for the position.

The application must include:

- Cover letter outlining the motivation and a detailed Curriculum Vitae (CV)
- Certified diplomas for your bachelor's and master's degrees (120 ECTS). The diplomas must be in a Scandinavian language or English. The transcript should clearly show the grades obtained for different courses taken at the bachelor's and master's degree.
  - Applicants with higher education completed outside Norway must provide documentation that the education has **been recognised and approved** by the Norwegian Directorate for Higher Education and Skills (HK-dir) You must submit your application for approval before the position's application deadline. Attach a receipt or decision when applying. The approval must be forwarded once available and is a requirement for employment.
- An explanation of the grading system for foreign education (diploma supplement if available)
- A copy of your master's thesis and any scientific publications and a list of these; GitHub profile with project is also relevant. If your master's thesis was a collaborative project, you must submit a short statement detailing your involvement
- Other relevant certificates and diplomas
- A 2-4-page project proposal describing the doctoral project and a personal statement explaining your motivation for the position and how you would carry out the tasks if you are offered this position. The description preferably also contains new ideas or methods that the candidate would think of using them for the execution of this PhD project.
- Documentation of your English language skills
  - Language proficiency in English can be documented in the following ways (see above: Requirements for proficiency in English)
- List of any scholarly publications
- Contact information for up to three references
- Other relevant certificates (if applicable, must be specified)

The application will be assessed based on the information available in Jobbnorge at the expiry of the application deadline. Make sure your application shows clearly how your skills and experience meet the competence requirements described in the job advertisement. Each applicant is responsible for ensuring that the required documentation has been uploaded with the application deadline.

When assessing who is best qualified for the position, we attach weight to education, experience and personal qualities.

All documentation must be provided in a Scandinavian language or English. If the attachments exceed 30 MB in total, they must be compressed before uploading. Any translations must be certified. The selection process includes a test where qualified candidates shall complete a task to demonstrate their skills and competence.

Please note that information about you as an applicant may be disclosed publicly even if you have requested not to be included on the public list of applicants (cf. Section 25 of the Norwegian Freedom of Information Act). You will be notified if your request for exemption from public disclosure is denied.

We only consider applications and attachments registered in Jobbnorge. On request, you must be able to provide certified copies of your documentation.

Contact information

For more information about the position, please contact:
Head of Department Svein Thore Hagen, email; svein.t.hagen@usn.no
Associate professor Sambeet Mishra, email; sambeet.mishra@usn.no
Associate professor Thomas Øyvang, email; thomas.oyvang@usn.no

For questions regarding the recruitment process, please contact:
HR-Advisor Live Rykkje Lindgård, email; liverl@usn.no

About USN

USN er universitet nær deg. Her jobber vi sammen for å finne løsninger. For lokalsamfunnet, verden og alle oss som bor her. På våre campuser fra fjord til fjell vil du jobbe i nærheten av hjemstedet ditt på sørøst-landet. Her gjør du en meningsfull jobb blant yrende studentliv og innovative forskningsmiljøer. Du får en arbeidsplass som er tett på de store samfunnsutfordringene - og samtidig nær løsningene på dem. Et arbeid vi gyver løs på med våre aller beste virkemidler: utdanning og forskning.

Vi tilbyr profesjonsorienterte og arbeidslivsrettede utdanninger, forskning og kunnskapsformidling med høy internasjonal kvalitet. Som ansatt får fordype deg i ditt eget felt, samtidig som du har tilgang til en buffet av muligheter for utvikling og læring.Gjennom de offisielle kanalene - og gjennom et nettverk av kunnskapsrike og rause kollegaer som kan mye om mangt.

USN er resultatet av fusjoner mellom tidligere høyskoler. Høyskolen i Sørøst-Norge ble dannet 1. januar 2016 da Høyskolen i Buskerud og Vestfold fusjonerte med Høyskolen i Telemark. Høyskolen fikk universitetsstatus i 2018. Rektoren vår heter Pia Cecilie Bing-Jonsson.

Les mer om hvordan det er å jobbe på Universitetet i Sørøst-Norge.

Additional information

Contact person:

Svein Thore Hagen, Head of Department
Phone: | E-mail: svein.t.hagen@usn.no

Place of service:

Raveien 215 3184 Borre (Horten Municipality)