The Department of Electric Power Engineering has a vacancy for a

PhD position in Electric Power Engineering within "Insulation Stressed with fast Rise Time Repetitive Voltages from High Voltage Power Electronics (FastTrans)"

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We are looking for dedicated employees to join us.

Video: https://www.youtube.com/watch?v=cIgKd1SwGLI

About the position
The Department of Electric Power Engineering (IEL), has a vacancy (100% position) as PhD Candidate within the field of high voltage technology. The described position is part of a new Norwegian Research Council KPN-project within the ENERGIX program with eight industry partners. The project (FastTrans) focuses on stresses from power electronics on materials and connected equipment. In addition to the announced position, there will be one PhD position related to steep pulse propagation into the windings of generators, motors and transformers and one PhD at University of Bologna related to motor stresses.

The prospective candidate will work in the research group High Voltage Technology (HVT).
The main supervisor of the PhD candidate will be Prof. Kaveh Niayesh.
The position reports to the Head of Department.

Main duties and responsibilities
The objective of the PhD education is to qualify for scientific research of high international standard. The PhD education has a nominal duration of three years of full-time study and includes required coursework or similar academic training comprising a minimum of 30 credits. The most important component of the PhD education is an independent scientific research project carried out under academic supervision, which results in the PhD thesis. The PhD degree is conferred based on these two elements and the doctoral examination, which consists of a trial lecture and a public defense of the scientific thesis.

The candidate is expected to fully complete the course work and the PhD thesis within the period of employment, which could be 3 or 4 years. The doctoral examination may take place after the period of employment. The option of 4-year employment would imply 1 year of duties as teaching Assistant for the Department and may be offered to a candidate with clear motivation and ability for such work, if the Department sees the need. This will be clarified during and after any interview.

Project description
The anticipated large scale integration of offshore wind power and electrification of the oil and gas activity in the North Sea demand reliable electrotechnical components and robust system solutions that ensure the security of the energy supply for the Norwegian mainland as well as for the planned North Sea grid. Central to the physical infrastructure is the integration of high voltage power electronic components used for effective switching and seamless control of the power flow between the different suppliers and consumers in the power grid.
Cutting edge wide-bandgap semiconductor power electronic components are rapidly developing toward higher voltage ratings and faster turn on/off times fueled by the development of new materials and the need for reducing energy losses. However, the rapid switching of power converters causes voltage surges with fast rise times that can inflict more severe stress on electrical apparatus than the stress caused by pure sinusoidal voltages. There is a need to investigate and understand how these fast voltage surges affect the electrical insulation in all types of high voltage equipment under the influence of power electronic converters. These range from internal effects inside the converters to stresses in connected high voltage apparatus such as transformers, filter coils, rotating machines/motors, cables, and cable terminations adjacent to the converters.

This PhD project will study the insulation system of power semiconductor switches under high voltage repetitive steep pulse stresses. The PhD will work closely with leading international industrial partners to define and supply test objects of relevance and interest. A laboratory with advanced test equipment is available. Topics of interest are:

- Developing models for high field stresses in relevant insulation systems.
- Partial Discharge (PD) measurement in presence of fast high voltage pulses.
- Experimental investigation of ageing of insulation materials exposed to fast repetitive high voltage pulses.
- Development of appropriate physical models for ageing mechanisms to be validated by experimental studies.
Qualification requirements
The qualification requirement is completion of a master's degree with strong academic background with a grade of B or better in terms of NTNU’s grading scale.

Applicants must hold a M.Sc. degree (or equivalent) within electrical engineering with good knowledge of insulation materials and high voltage measurement techniques.

Master’s students who expect to complete their master’s degree studies by summer 2020 are also encouraged to apply. Employment will then be postponed until the master’s degree is finished and will be under the condition of at least a grade of B on the master’s thesis.

The appointment is to be made in accordance with the regulations in force concerning State Employees and Civil Servants and national guidelines for appointment as PhD, postdoctor and research assistant.

NTNU is committed to following evaluation criteria for research quality according to The San Francisco Declaration on Research Assessment - DORA.

Other qualifications:
Applicants must have very good English language skills, written and spoken. Applicants from non-English speaking countries outside EU/EEA/Switzerland must provide preliminary documentation of English language proficiency, in terms of an approved test. The following tests can be used: TOEFL, IELTS and Cambridge Certificate in Advanced English (CAE) or Cambridge Certificate of Proficiency in English (CPE).

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

Personal characteristics
In the evaluation of the candidates, emphasis will be placed on education, experience and personal suitability, as well as personal motivation for the position, in terms of the qualification requirements specified above. We look for candidates who show clear signs of independence, original thinking and scientific mindset.

We offer
- exciting and stimulating tasks in a strong international academic environment
- an open and inclusive work environment with dedicated colleagues
- favourable terms in the Norwegian Public Service Pension Fund

Salary and conditions
PhD candidates are remunerated in code 1017, and are normally remunerated at gross from NOK 479 600 per year. From the salary, 2% is deducted as a contribution to the Norwegian Public Service Pension Fund.

The employment contract is for three years; however, there is a possibility for extension up to four years if selected for assistantship.

Appointment to a PhD position requires admission to the PhD programme in Electric Power Engineering. Applicants must be qualified for admission as PhD candidates at NTNU. See https://www.ntnu.edu/ie/research/phd for information about PhD studies at NTNU.

As a PhD candidate, you will have to successfully complete the PhD academic training programme; the training includes mandatory course work and other obligatory activities. Within the first three months of your employment, you must formally qualify for admission to the PhD programme at the Faculty of Information Technology and Electrical Engineering.

The engagement is to be made in accordance with the regulations in force concerning State Employees and Civil Servants, and the acts relating to Control of the Export of Strategic Goods, Services and Technology. Candidates who by assessment of the application and attachments are seen to conflict with the criteria in the latter law will be prohibited from recruitment to NTNU.

The Department of Electric Power Engineering works closely with key players in the Norwegian electricity supply sector, who manage critical infrastructure. A comprehensive risk assessment of the candidates' research interests and potential activities related to national threat assessments will therefore also form basis for the final selection of candidates.

General information
A good work environment is characterized by diversity. We encourage qualified candidates to apply, regardless of their gender, functional capacity or cultural background. Under the Freedom of Information Act (offentleglova), information about the applicant may be made public even if the applicant has requested not to have their name entered on the list of applicants.

Questions about the position can be directed to Prof. Kaveh Niayesh, kaveh.niayesh@ntnu.no, or to the Head of Department Ole-Morten Midtgård, ole-morten.midtgard@ntnu.no.

About the application:
Applications are to be submitted electronically through this page (http://www.jobbnorge.no).

The application must contain:
A cover letter where the applicant describes personal motivation and relevance with respect to the requirements of this advertisement.

A draft research proposal (1 or 2 pages) for the PhD study, where the candidate presents her/his own ideas for the PhD-work and how it can be applied, based on the project description given in this advertisement. This proposal will be neither final nor binding for the project.

CV including information pertaining to the given qualifications.

Testimonials and certificates (Both BA and MA diplomas included course certificates). Applicants from universities outside Norway are kindly requested to send a diploma supplement or a similar document, which describes in detail the study programme and grading system.

The required documentation of English language proficiency.

Names and contact information of at least two references.

Emphasis will be placed on the quality of the cover letter and the ideas and/or originality of the draft research proposal in shortlisting of candidates. Incomplete applications will not be taken into consideration.

In the final assessment of the candidates, strategic considerations at the Department of Electric Power Engineering will also be taken into account. We aim for better gender balance, and when qualifications are approximately equal among qualified candidates, female applicants will be preferred.


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

Department of Electric Power Engineering
The Department of Electric Power Engineering 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.