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## Professor/Associate Professor in Electrical Energy Informatics (IE-107-2018)

### Industry Sponsored Professorship/Associate Professorship in Electrical Energy Informatics - Blockchain Technology and Artificial Intelligence for Electricity Markets and Power System Operation (IE-107-2018)

The Department of Electric Power Engineering (IEL) (<https://www.ntnu.edu/elkraft>), at the Faculty of Information Technology and Electrical Engineering (IE) (<https://www.ntnu.edu/ie/>), Norwegian University of Science and Technology (NTNU), in collaboration with Statnett, the Transmission System Operator (TSO) of Norway, invites applications for a full-time tenured Professorship/Associate Professorship in Electrical Energy Informatics - Blockchain and Artificial Intelligence for Power System Operation and Electricity Markets.

Blockchain technology (BT) together with artificial intelligence (AI) and big data (BD), is seen as constituting the next generation digital information infrastructure, and widely perceived as one of the next main drivers of innovation in the electrical energy sector. Together with Statnett and the Faculty of Information Technology and Electrical Engineering, the Department of Electric Power Engineering aims to strengthen the interdisciplinary alliance for the application of BT, AI and BD to the power system sector. For the successful applicant, this represents a unique opportunity to participate in the development of an exciting new interdisciplinary field as part of a larger ongoing digitalization drive. As such, the present hiring is of great strategic importance for the Department of Electric Power Engineering, and the ability of the candidate to contribute to the Department's strategy in this regard will strongly influence the selection process.

#### Information about the Department

Currently there are 12 Professors, 7 Associate Professors and 4 Lecturers at the Department of Electric Power Engineering. In addition, there are 4 Adjunct Professors, 2 Adjunct Associate Professors, 9 Postdoctoral researchers, 3 Researchers, about 40 PhD students, and 15 technical/administrative staff. The Department is presently in a growth-phase. Research activities are currently organized under five Research Groups: Electrical Machines and Electromagnetics, Electricity Markets and Energy System Planning, High Voltage Technology, Power Electronic Systems and Components, and Power System Operation and Control. The Department has a good laboratory infrastructure for research and education, as well as a mechanical workshop, supported by a technical staff of about 10 persons. The Department is also in charge of The National Smart Grid Laboratory (<https://www.ntnu.edu/smartgrid>).

#### Fields of research and teaching

The Professor/Associate Professor will have responsibility for research and teaching within Electrical Energy Informatics. The focus is on the deployment of Blockchain Technology, Artificial Intelligence and Big Data for Electricity Markets and Power System Operation. The Professor/Associate Professor will lead the research activities investigating transmission system operator- and distribution system operator related innovations by exploiting the complementarity between BT, AI and BD. Example research topics include, but are not limited to, flexibility- and transactive energy mechanisms in the electrical energy trading processes (wholesale markets, local markets, and peer to peer trading of green electric power), better integration of renewable energy resources using smart contracts, and creation of new power grid management tools.

For wide-spread acceptance of BT and AI in the electricity sector and consequent extensive deployment, conceptual frameworks need to be systematically developed, followed by simulation-based evidence to design architectural support for the possible design alternatives, further leading to field testing and demonstration through prototype deployments (small- and large-scale).

For deployment in the electricity sector, the Blockchain technology design's feasibility with a view to scalability, extensibility, interoperability, and energy efficiency of computational resources is also an underlying research theme. Considerations regarding Cyber and Information Security should be integrated in the research topics. The Faculty of Information Technology and Electrical Engineering already has significant research activity in the fundamental aspects of BT, AI and BD. The prospective candidate is expected to collaborate with relevant research groups in this regard, such as groups at the Department of Computer Science, the Department of Information Security and Communication Technology, the Department of Engineering Cybernetics, and the Center for Cyber and Information Security.

The position is presently attached to the Electricity Markets and Energy System Planning Group, where the prospective candidate will have to take an active role in strengthening the interdisciplinary alliance for the application of BT, AI and BD to the power system sector. The candidate is also expected to be engaged in the future development of relevant courses in the field of digitalization in electric power systems, with a view to pedagogical excellence.

#### Responsibilities and duties

MSc and PhD candidates from the study programmes of the Faculty are expected to be competitive in the international job market. The Professor/Associate Professor will play a leading role in developing the research and educational profile in the field of Electrical Energy Informatics, and in ensuring an excellent learning environment, in collaboration with colleagues, students, and external stakeholders. The Faculty's study programmes are required to have a strong international profile, and as such the Professor/Associate Professor is expected to contribute to the development of international alliances and collaboration. The Professor/Associate Professor is required to teach relevant

courses at all levels, and should supervise MSc and PhD students. Continuing education is included in the portfolio of educational activities of the Department, and the Professor/Associate Professor is expected to actively contribute to these activities.

The research activities of the Department rely crucially on external funding, and the development of educational programmes may also receive external funding. The Professor/Associate Professor is expected to work actively to secure research grants and funds from the Research Council of Norway, Nordic and European research and educational agencies, relevant industry partners, and other available sources. NTNU places great importance in projects under the EU Framework Programmes for Research and Innovation, such as Horizon 2020. Thus, weightage in the selection process will be placed on experience in the acquisition and management of externally funded research projects.

The Department has close collaboration with Statnett, the Norwegian TSO, on research and continuing education. The Professor/Associate Professor is required to collaborate effectively with Statnett to strengthen and stimulate the scientific and technical cooperation between the Department and Statnett in areas of mutual interest. Further, the Professor/Associate Professor should be able to disseminate relevant parts of her/his research to a wider audience in Norway and abroad.

The Professor/Associate Professor is expected to participate in the formal management of research, education, and other relevant areas of activity in agreement with the Head of Department.

The work place will be in Trondheim.

### **Qualifications**

Applicants must hold a PhD relevant for the specified fields of research and teaching. We are looking for a candidate with a PhD in Computer Science, Information and Communication Technology, or Electrical Engineering, or similar, with sufficient specialization in energy informatics, blockchain technology, artificial intelligence, and big data. If not already possessing sufficient familiarity with electric power systems to understand the application domain, the candidate should demonstrate a strong willingness to strengthen her/his background in this regard.

For the position as Associate Professor, the applicant will primarily be evaluated on the basis of scholarly achievements and research potential, teaching experience and teaching potential, communication skills, and leadership potential, as well as motivation and personal suitability. The successful applicant must have a strong academic track record showing internationally competitive research, or demonstrate a clear potential to make a future international impact. Documented acquisition of external funding and experience with research leadership will be rated positively. Industrial experience and relevant collaboration with industry will be considered as beneficial.

The candidate employed in the category of Associate Professor will later have the possibility of applying for a full professorship. The candidate should have a research potential which makes it likely to qualify for a full professorship within five years of employment, even with normal teaching duties.

For the position as Professor, the applicant must have a strong academic track record showing internationally competitive research. The applicant should demonstrate significant national and international networking and collaboration experience, leadership skills, and have a strong publication record in terms of papers in peer-reviewed journals and other relevant international publication channels. The applicant should document the ability to obtain external funding from relevant sources, be internationally recognized and be able to initiate and lead research at international level. Industrial experience and relevant collaboration with industry will be considered as beneficial.

The candidate should have experience in the supervision of Masters and PhD students or similar experience qualifying for such work. The candidate's motivation and personal suitability for the position will also be considered in the evaluation.

For both position categories, the applicant should demonstrate communication skills that qualify for excellent teaching, supervision, and dissemination. The applicant should possess interpersonal skills necessary for successful collaboration with colleagues and stakeholders. Further, documented competence in the execution of joint interdisciplinary projects will be considered in the evaluation. Demonstrated pedagogical experience will be given weight in the selection process.

Concerning general criteria for the position, we refer to the Norwegian regulations concerning appointment and promotion to teaching and research posts:

<https://www.regjeringen.no/no/dokumenter/regulations-concerning-appointment-and-promotion-to-teaching-and-research-posts/id2519258/>

### **Formal regulations**

If the candidate does not have prior formal pedagogical qualification in university-level teaching the candidate must complete a recognized course which gives a pedagogical qualification within the first two years of employment. NTNU offers such courses.

Proficiency in the English language must be documented. Proficiency in a Scandinavian language will be rated positively. New members of the academic staff who do not master a Scandinavian language are expected to achieve proficiency in Norwegian within three years of employment. This proficiency should correspond to level three in the Norwegian for Foreigners courses provided at NTNU.

Diversity is important to achieve a good, inclusive working environment. We encourage all qualified candidates to apply, regardless of the gender, disability or cultural background.

The engagement is to be made in accordance with the regulations in force concerning State Employees and Civil Servants, and assessments regarding the legislations regulating export control. The candidate must adhere regulations that concern changes and developments within the discipline and/or the organizational changes concerning activities at NTNU.

Under Section 25 of the Freedom of Information Act, information about the applicant may be made public even if the applicant has requested not to have his or her name entered on the list of applicants.

Further details about the position can be obtained from Associate Professor Vijay Vadlamudi, [vijay.vadlamudi@ntnu.no](mailto:vijay.vadlamudi@ntnu.no), or the Head of Department, Professor Ole-Morten Midtgård, [ole-morten.midtgard@ntnu.no](mailto:ole-morten.midtgard@ntnu.no).

### **Salary Conditions**

The position as Professor is normally remunerated with gross salary from NOK 611.700 to NOK 1.274.100 a year. 2% of the salary will be deducted as an obligatory premium to the Norwegian Public Service Pension Fund.

The position as Associate Professor is normally remunerated with gross salary from NOK 490.900 to NOK 722.400 a year. 2% of the salary will be deducted as an obligatory premium to the Norwegian Public Service Pension Fund.

### Requirements for the application

The application must contain:

- CV including information pertaining to the given qualifications and a full list of publications with bibliographical references.
- Testimonials and certificates.
- The most important publications that are relevant for the evaluation of the applicant's qualifications (maximum 10 publications). Joint works will also be evaluated. If the contributions from individuals in a scientific collaboration are not obvious, the applicant must enclose a short summary of her/his contribution.
- A brief description of the scientific/technological relevance of the candidate's research with respect to the requirements of this advertisement.
- A draft research proposal for the first few years of employment.
- Information about educational experience, including development of study programs, curricula, teaching experience, and development of teaching methods and the learning environment.  
See "Documentation of an applicant's pedagogical qualifications":  
<http://www.ntnu.edu/vacancies/pedagogical-qualifications>
- Information about dissemination activities.
- Other documents which the applicant would find relevant.

Incomplete applications will not be processed. Following the application deadline, a shortlist of applicants will be drawn up. The shortlisted applicants will be evaluated by an international expert committee. The top candidates from the evaluation by the expert committee will be invited for trial lectures and interviews. The ranking of candidates will take into account not only the accumulated academic production, but also the candidate's potential for scientific and pedagogical development, and personal suitability. Weightage in the selection process will also be placed on the ability of the candidate to teach and conduct research in any Scandinavian language. Further, emphasis on strategic considerations will be placed in the final selection of candidates.

Since the advertised research competence falls in the scope of activities related to the Norwegian critical infrastructure, the shortlisting process will also take security clearance requirements into account.

Application deadline: **September 30, 2018.**

Reference no: **IE-107-2018.**

Jobbnorge-ID: 153465, Søknadsfrist: Avsluttet