Jobbnorge ID: 267872
Deadline: 10/27/2024
Website: http://www.ntnu.no
Scope: Fulltime
Duration: Temporary

The Department of Energy and Process Engineering has a vacancy for a

PhD Candidate in developing battery digitalisation methods for parameter identification

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 job

For a position as a PhD Candidate, the goal is a completed doctoral education up to an obtained doctoral degree.

This PhD is a part of the FME Battery centre, which is a large national centre gathering all research and industry partners in Norway who are focused on batteries. More information about FME battery can be found at the centres website.

The Sustainable Energy Systems research group in the The Department of Energy and Process Engineering at the Gløshaugen campus of NTNU is searching for excellent applicants for a PhD position. For a position as a PhD Candidate, the goal is a completed doctoral education up to an obtained doctoral degree. The position duration is 3 years.

The primary focus of this position is the digitalization of batteries through a comprehensive approach encompassing laboratory experimentation, sophisticated modelling techniques, and the application of data-driven methodologies.

Batteries have emerged as pivotal components in the global endeavour towards decarbonizing the energy sector, particularly evidenced by the substantial rise in demand for electrified transportation worldwide. Despite the significant strides made, there remain notable research cavities within battery technologies. The convergence of experimental and digital research represents a critical step towards the advancement of these technologies. Therefore, the digitalization of batteries promises to unlock new avenues for the application of modelling-based methodologies (including electrochemical, electrical equivalent, and physical models) and data-driven approaches to laboratory experimentation results. This innovative approach stands to expedite the development of battery technologies while facilitating the creation of digital twins, offering deeper insights into the functional parameters of these batteries.

The overarching aim of this PhD project is to conceive and cultivate digitalized battery research in close collaboration with industry. Central to this endeavour is the exploration of whether modelling and data-driven methodologies can be effectively harnessed to augment parameterisation of battery technologies. By leveraging laboratory-acquired data, we seek to refine our experimental research focus, emphasizing computationally optimized theories and hypotheses. The creation of a digital twin for batteries holds the promise of expediting the process of theory and hypothesis testing, thereby minimizing the duration spent on less fruitful avenues of inquiry. Moreover, the integration of data-driven methodologies into the digital twin framework affords opportunities for refining theories and hypotheses, with a particular emphasis on enhancing key parameters such as charging and discharging kinetics.

The candidate for this educational research position must possess the requisite skills to conduct comprehensive battery analysis in the laboratory setting, including but not limited to battery cycling, parameter measurement, and diagnostic interrogation. Additionally, proficiency in applying data driven techniques to ascertain unknown battery parameters (such as state of health, aging, and internal thermal properties) is paramount.

You will report to Associate Professor Jacob Lamb to whom further inquiries may be directed.

NB: The application must include a brief description (~300 words) of possible implementation and data-driven strategies that pertain to the topic mentioned above (i.e. Project Proposal/Research Plan).

Duties of the position

- The candidate will plan and execute a comprehensive, independent research project under supervision. This will involve computational experiments, data analysis and integration.
- The candidate will learn to master academic writing and be lead author of several journal publications.
- The candidate is expected to present their work at international conferences and workshops.
- The candidate is expected to collaborate internationally, which may involve extended periods outside of Norway.
- The candidate is expected to contribute to the supervision of Masters students and other student projects.

Required selection criteria

- You must have a professionally relevant background with a master's degree (or similar level) involving computational science (machine learning and modelling).
- Relevant experience with independent work is necessary.
- Proficiency with data analysis and collection software is required (i.e., Python, Matlab, LabVIEW, etc.).
- Good understanding and experience with experimental electrochemistry.
- Experience with applying data driven approaches to batteries.
- Excellent written and oral English language and communication skills.
- Your education must correspond to a five-year Norwegian degree program, where 120 credits are obtained at master's level
- You must have a strong academic background from your previous studies and an average grade from the master's degree program, or equivalent education, which is equal to B or better compared with NTNU's grading scale. If you do not have letter grades from previous studies, you must have an equally good academic basis. If you have a weaker grade background, you may be assessed if you can document that you are particularly suitable for a PhD education.
- Master's students can apply, but the master's degree must be obtained and documented by the start date of the position.
- You must meet the requirements for admission to the faculty's doctoral program.

The appointment is to be made in accordance with Regulations concerning the degrees of Philosophiae Doctor (PhD) and Philosodophiae Doctor (PhD) in artistic research national guidelines for appointment as PhD, post doctor and research assistant

Preferred selection criteria

- This work involves a wide-range of technical competencies and skills. A strong academic background and a demonstrated capacity to learn new topics will be considered more relevant than industrial experience.
- Previous specialization and research within the area of batteries and data-driven sciences.
- Demonstrated capacity for multi-tasking and collaborative research.
- Applicants whose backgrounds may be subject to critical Export Control restrictions and regulations may be automatically disqualified.
- Candidates who can speak a Scandinavian language are preferred, but not essential.

Personal characteristics

- Enthusiastic and highly motivated
- Able to work effectively on their own and in a team
- Diligent, thorough, and hard-working
- Able to work structured and goal oriented with a drive to get projects finished
- Creative, good at finding solutions
- The applicant is expected to contribute to the social and environment and activities of the Sustainable Energy Systems group above and beyond the position itself.

Emphasis will be placed on personal and interpersonal qualities.

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
- Employee benefits

Salary and conditions

As a PhD candidate (code 1017) you are normally paid from gross NOK 532 200 per annum before tax, depending on qualifications and seniority. From the salary, 2% is deducted as a contribution to the Norwegian Public Service Pension Fund.

The period of employment is 3 years.

Appointment to a PhD position requires that you are admitted to the PhD programme in Sustainable Energy within three months of employment, and that you participate in an organized PhD programme during the employment period.

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 attachment are seen to conflict with the criteria in the latter law will be prohibited from recruitment to NTNU. After the appointment you

The position is subject to external funding by the Norwegian Research Council.

It is a prerequisite you can be present at and accessible to the institution daily.

About the application

The application and supporting documentation to be used as the basis for the assessment must be in English.

Publications and other scientific work must be attached to the application. Please note that your application will be considered based solely on information submitted by the application deadline. You must therefore ensure that your application clearly demonstrates how your skills and experience fulfil the criteria specified above.

In order for us to evaluate your application, it must include the following:

- CV and certificates
- transcripts and diplomas for bachelor's and master's degrees. If you have not completed the master's degree, you must submit a confirmation that the master's thesis has been submitted.
- A copy of the master's thesis. If you recently have submitted your master's thesis, you can attach a draft of the thesis. Documentation of a completed master's degree must be presented before taking up the position.
- Project proposal
- Name and contact information of three referees
- If you have publications or other relevant research work

If all, or parts, of your education has been taken abroad, we also ask you to attach documentation of the scope and quality of your entire education, both bachelor's and master's education, in addition to other higher education. Description of the documentation required can be found here. If you already have a statement from Norwegian Directorate for Higher Education and Skills, please attach this as well.

We will take joint work into account. If it is difficult to identify your efforts in the joint work, you must enclose a short description of your participation.

In the evaluation of which candidate is best qualified, emphasis will be placed on education, experience and personal and interpersonal qualities. Motivation, ambitions, and potential will also count in the assessment of the candidates.

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

General information

Working at NTNU

NTNU believes that inclusion and diversity is our strength. We want to recruit people with different competencies, educational backgrounds, life experiences and perspectives to contribute to solving our social responsibilities within education and research. We will facilitate for our employees' needs.

NTNU is working actively to increase the number of women employed in scientific positions and has a number of resources to promote equality.

EPT has established EPT Women in Science. The group is focused on supporting female Research Assistants, PhD Candidates, Postdoctoral Fellows and permanent academic employees within the Department. This support aims to help develop the academic careers of female employees, and is also made visible to our student body, to encourage them to consider an academic path. As part of the EPT Women in Science initiative we continue to build on our international network, inviting prominent female academics within and beyond the field of Engineering to speak at our events.

As an employee at NTNU, you must at all times adhere to the changes that the development in the subject entails and the organizational changes that are adopted.

A public list of applicants with name, age, job title and municipality of residence is prepared after the application deadline. If you want to reserve yourself 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 reservation is not accepted.

If you have any questions about the position, please contact Professor Jacob Lamb on e-mail: jacob.j.lamb@ntnu.no. If you have any questions about the recruitment process, please contact HR-consultant Renate Fjellheim on e-mail: renate.fjellheim@ntnu.no.

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

If you think this looks interesting and in line with your qualifications, please submit your application electronically via jobbnorge.no with your CV, diplomas and certificates attached. Applications submitted elsewhere will not be considered. Upon request, you must be able to obtain certified copies of your documentation.

Application deadline: 27th of October 2024

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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 Energy and Process Engineering

We conduct research and teaching covering the entire energy chain, from resources to the end-user. We look at how energy is produced and used by humans and machines in a sustainable way with regard to health, climate change and the resource base. The Department of Energy and Process Engineering is one of eight departments in the Faculty of Engineering.

Additional information

Contact persons:

- Jacob Joseph Lamb, Professor
  Phone: | E-mail: Jacob.j.lamb@ntnu.no
- Renate Fjellheim, HR-consultant
  Phone: | E-mail: renate.fjellheim@ntnu.no

Place of service:

Høgskoleringen 1 7491 Trondheim (Trondheim Municipality)