UNIVERSITETET I OSLO

Jobbnorge ID: 230517
Deadline: 9/30/2022
Website: http://www.uio.no/
Scope: Fulltime
Duration: Engagement

Postdoctoral Research Fellow in Sustainable Battery Technology for Renewable Energy Systems

Job description

A Postdoctoral Research Fellow position is available at the Department of Technology Systems (ITS) of the University of Oslo (UiO).

The fellowship is a full-time position with a fixed-term period of three years, of which 10% can be devoted to teaching-related compulsory duties.

An extended load of compulsory duties may be offered at the time of appointment, for candidates who can and want to contribute to teaching and supervision at the department as well as the EMPOWER project administration and management. In this case, the appointment period could be extended to four years, the compulsory duties will then be spread out over the full contract period, averaging 25% per year.

Starting date: as soon as possible.

No one can be appointed for more than one Postdoctoral Research Fellowship at the University of Oslo.

Job & project description:

We seek a research enthusiast with a PhD, who presents appropriate work performance and interest in investigating the potential of end-of-life batteries used in mobility (e.g., in electric vehicles (EVs) & micromobility) as an energy storage solution in renewable energy systems.

The study will include:

1) an experimental part, focused on characterization of second-life battery performance and their operation in laboratory-scale microgrids

2) a theoretical part, focused on extended analysis of sustainability & circular economy perspectives in the EV/micromobility battery production and application

The position is associated with the project EMPOWER: Sustainable Batteries in Mobility - (Em)powering a Net-zero Energy Transition. This initiative has been recently funded by UiO:Energy Convergence Environments and will run over the period 2022-2027. EMPOWER takes interdisciplinary research and education perspectives to investigate the role of electric vehicle batteries in enabling a sustainable net-zero energy transition in Norway.

EMPOWER offers early career scientists an inspiring interdisciplinary research and education environment. You will be a part of a fantastic team at the University of Oslo, composed of eight senior researchers/professors and six early career researchers across four faculties and six departments, as well as a wide range of industry and international partners. The main supervisor(s) are named under each job advert, and you will be co-supervised by at least one core member from another discipline.

More about EMPOWER

Both the EU's Green Deal and the EU Circular Economy Action Plan mention the centrality of batteries to sustainable futures. In Norway, transport is the highest greenhouse gas-emitting sector. To reach the vision of a Norwegian net-zero energy system by 2050, the decarbonisation of all transport segments is crucial. While batteries represent a central technology for zero-carbon transportation, they also pose complex socio-ecological problems. A holistic analysis of the battery role for sustainable transport in a net-zero energy system is still missing. EMPOWER will address this knowledge gap, proposing an interdisciplinary approach to study the diversity of challenges (social, environmental, material, market, legal) found in the design, production, use, re-use, and recycling of batteries. Using Norway as a case study, EMPOWER will focus on investigation of electric vehicle/micromobility batteries to: i) develop a common definition of sustainable batteries for mobility across industry and involved disciplines; ii) explore representations of this sustainability concept in EV production and utilization, including the energy system perspective; iii) determine how the inclusion of this interdisciplinary set of criteria, for the sustainability of EV/micromobility batteries, impacts the design of net-zero energy systems; and iv) co-design educational offer for young people and early career researchers to facilitate their interdisciplinary understanding of battery-cantered research.

We are looking for people who are motivated to work towards a sustainable transition and are excited to collaborate with researchers from various disciplines.

The main purpose of a postdoctoral fellowship is to provide the candidates with enhanced skills to pursue a scientific top position within or beyond academia. To promote a strategic career path, all postdoctoral research fellows are required to submit a professional development plan no later than one month after commencement of the postdoctoral period.

More about position

The focus of this postdoctoral position is twofold:

1) To recognize and map the opportunities and challenges for the sustainable application of waste EV batteries in microgrids, with integrated renewable energy sources, (RES), e.g., solar and wind energy

and

2) To identify the role of technology in enabling the development of sustainable EV battery value chains

In the first task, you will:

- design, integrate and characterize the performance of battery packs, based on various types of second life battery cells/modules
- test the engineered battery packs, integrated in a lab-scale microgrid, to explore their potential as an energy storage medium in RES. The research will involve comparative studies between new and second-life EV batteries, with a particular focus on battery technical performance as well as grid stability and resilience during load changes, failures and disruptive conditions

In the second task, you will:

- apply a circular economy viewpoint to identify and describe current technologies utilized in the EV battery value chain (e.g., materials extraction, electrode/cell/module production, pack assembly, vehicle integration, use & reuse/recycle, etc.) and look at them from a battery life cycle perspective. The work will be done in collaboration with research fellows from the other project work packages (focusing on social, environmental and legal aspects in the EV production and utilization) as well as industrial partners. This activity is envisioned to extend the battery life cycle perspective by a techno-economic input.

The research will be carried out at ITS/UiO and workshops of our industrial partners (BATTKOMP AS) in Norway. A part of the experimental study involving a micorgrid utilization will be conducted aboard, at the Renewable Energy Control Laboratory (REC), at Aalborg University (DK), which is one of the project academic partners.

At ITS, the research will be carried out within the Section for Energy Systems. ITS is a new and growing department at UiO, located in Kjeller, with internationally recognized research groups, which provide training and education for students and research fellows. The department is a part of the Kjeller Science Park, which is one of the largest research and development environments in Norway.

ITS focuses on application-driven research, where we address issues relevant to enabling sustainable solutions for current and future technological applications.

Qualification requirements

The Faculty of Mathematics and Natural Sciences has a strategic ambition to be among Europe's leading communities for research, education and innovation. Candidates for these fellowships will be selected in accordance with this, and expected to be in the upper segment of their class with respect to academic credentials.

- Applicants must hold a degree equivalent to a Norwegian doctoral degree, preferably in (sustainable) energy engineering, battery engineering, electrical power engineering, applied physics in battery/grid-related topics; an interdisciplinary degree combining one the above mentioned fields with social sciences and/or the humanities is preferred

Doctoral dissertation must be submitted for eval-uation by the closing date. Only applicants with an approved doctoral thesis and public defence are eligible for appointment.

- Fluent oral and written communication/presentation skills in English

Must have skills:

- Solid scientific background in battery technology, battery physics/chemistry & power electronics
- Documented **hands-on** experience with battery performance characterization techniques (e.g., state of health, state of charge, etc.)
- Acquaintance with battery charging/discharging algorithms and battery integration with renewable energy systems
- Ability to travel abroad

Preferred skills:

- Familiarity with up-to-date knowledge on sustainable battery technology trends
- Experience with design & integration of EV battery cells/packs
- Familiarity with electrical installation of power electronic interfaces, relay and protection devices as well as microgrid operation; research experience with control of power electronics (e.g., PV module-level converters, battery energy storage) in a grid/microgrid
- Interest and ability to mentor junior team members
- Experience in working within interdisciplinary teams

Personal skills

- Interdisciplinary mindset
- High interest in the research topic, including sustainability-oriented research
- Capacity to communicate across various research disciplines (or willingness to learn and develops such a skill)
- Collaborative and open attitude
- Ability to be a team player, interested in co-developing research ideas, but also capacity to work independently in a well-organized, attention-focused and timely manner
- Ability to express yourself, orally and written, in a clear and concise way

We offer

- Salary NOK 544 400 - 626 300,- per annum depending on qualifications in position as Postdoctoral Research Fellow (position code 1352)

- Attractive welfare benefits and a generous pension agreement
- Professionally stimulating working environment
- Vibrant international academic environment
- Postdoctoral development programmes
- Oslo's family-friendly surroundings with their rich opportunities for culture and outdoor activities

How to apply

The application must include

- Cover letter with **statement of motivation,** summarizing scientific work performance and research interest relevant for this position (including interdisciplinary perspective), together with explanation on **how your background & experience will allow you to conduct the research tasks in this project**
- CV (summarizing education, positions, any other relevant experience and qualifying activity)
- Copies of educational certificates (academic transcripts)
- A complete list of publications and up to 5 academic works that the applicant wishes to be considered by the evaluation committee
- Names and contact details of 2-3 references (name, relation to candidate, e-mail and telephone number)

The application with attachments must be delivered in our electronic recruiting system. Foreign applicants are advised to attach an explanation of their University's grading system. Please note that all documents should be in English (or a Scandinavian language).

In assessing the applications, special emphasis will be placed on the documented, academic qualifications as well as the candidates' motivation and personal suitability. Interviews with the best qualified candidates will be arranged.
It is expected that the successful candidate will be able to complete the project in the course of the period of employment.

Formal regulations

Please see the guidelines and regulations for appointments to Postdoctoral fellowships at the University of Oslo.

If an applicant has applied for and been granted funding for a fulltime research stay abroad while being employed as a Postdoctoral Research Fellow, the employ-ment will be prolonged with the equivalent time as the research stay, but for no longer than of twelve months (thus extending the employment to a maximum of four years).

No one can be appointed for more than one Postdoctoral Fellow period at the University of Oslo.

According to the Norwegian Freedom of Information Act (Offentleglova) information about the applicant may be included in the public applicant list, also in cases where the applicant has requested non-disclosure.

Inclusion and diversity are a strength. The University of Oslo has a personnel policy objective of achieving a balanced gender composition. Furthermore, we want employees with diverse professional expertise, life experience and perspectives.

If there are qualified applicants with disabilities, employment gaps or immigrant background, we will invite at least one applicant from each of these categories to an interview.

Contact information

For questions and further information about the project and reqruitment process, please contact:

PhD, Matylda N. Guzik (main supervisor at ITS), e-mail: m.n.guzik@its.uio.no

PhD, Amin Hajizadeh (co-supervisor at AAU), e-mail: aha@energy.aau.dk

For technical questions regarding our recruitment system JobbNorge, please contact:

HR Advisor, Olga Holmlund, e-mail: olga.holmlund@mn.uio.no

About the University of Oslo

The University of Oslo is Norway's oldest and highest rated institution of research and education with 28 000 students and 7000 employees. Its broad range of academic disciplines and internationally esteemed research communities make UiO an important contributor to society.

The University of Oslo (UiO) is expanding the activity at Campus Kjeller to strengthen our education, research, and innovation in technology for a sustainable future. UiO is a well-ranked research university where the **Department of Technology Systems** at Kjeller **(ITS)** is focused on applied research in sustainable energy, autonomous systems, space, and security. At Kjeller, ITS is co-located with the Norwegian Defense Research Establishment (FFI) and the Institute for Energy Technology (IFE), which both offer rich opportunities for collaboration. ITS also has a range of interdisciplinary research collaborations that include the UiO Blindern Campus and Oslo Science City, as well as many other national and international institutions and industries.

ITS offers several master level programmes, alone and jointly with other departments: Renewable energy systems, Cybernetics and autonomous systems, Robotics and intelligent systems, and Information security. ITS also hosts the Centre for Space Sensors and Systems (CENSSS), which incorporates operation of an instrument on the NASA Perseverance rover on Mars. A new master program in Space systems is in the planning stage. The department currently has 9 permanent scientific staff, approximately 35 adjunct staff from the research institutes at Kjeller and from industry, as well as about 20 PhD candidates.

This position is part of an ongoing expansion of the UiO activity at Campus Kjeller. Campus Kjeller is located 20 km northeast of Oslo, between the city center and Oslo Airport. It is a 20 minutes commute with public transportation from Oslo city center to the campus.

Additional information

Place of service:

Gunnar Randers vei 19 2007 Kjeller (Lillestrøm Municipality)