



Job Posting

Recruiting organisation

Zürcher Hochschule für Angewandte Wissenschaft
ZHAW

Subproject title

Spectro-electrochemical electrode surface
characterisation & double layer modelling

Starting date

1st April 2026 (or earlier if preferred)

Salary

The Doctoral Network "SPACER" is financed by the European Union under the framework of the program HORIZON Europe, Marie Skłodowska-Curie Actions. The doctoral candidate will be hired for 36 months under contract by ZHAW.

Background Information

Marie Skłodowska-Curie Doctoral Networks are joint research and training projects funded by the European Union. Funding is provided for doctoral candidates from both inside and outside Europe to carry out individual project work in a European country other than their own. The training network "SPACER" is made up of 21 partners, coordinated by Fraunhofer ICT in Germany. The network will recruit a total of 17 doctoral candidates for project work lasting for 36 months.

SPACER aims to develop new architectures for porous electrodes to improve the power density and energy efficiency of redox flow batteries (RFB), enabling affordable and durable long-duration energy storage. The approach is to use hierarchical structures, i.e. complex material layers that can be optimized to specific battery chemistries and flow phenomena from the microscale up. The developed technologies will be validated in half-cells and full working batteries at industrial partners at TRL 6.

Our objectives

- Multiscale **modelling** to better understand RFB behavior and identify optimal hierarchical shaped pore- and electrode-structure to encounter optimum electrolyte as well as electrical flow.
- **Prototyping** of the identified structures via stereolithographic, 3D printing and textile techniques like tufting, machine-based embroidery techniques or non-interlaced 3D pre-forming.
- Development of **advanced imaging and characterization technologies** (X-ray micro tomography, EPR imaging and spectroscopy) to evaluate performance of electrodes and to map electrolyte chemical composition in micrometer resolution, allowing validation of the model predictions.
- **Validation and evaluation** of the RFBs with optimized hierarchical electrodes.

Job Description

The advertised subproject is fully funded by the Marie Skłodowska-Curie European Training Network "SPACER". It will be carried out by one doctoral candidate at ZHAW, (PhD supervision at Technische Universiteit Eindhoven) over a period of 36 months.

We are seeking a highly motivated PhD candidate to join our research team working on mathematical modelling of electrochemical processes in flow batteries. This project focuses on developing physics-based models of electrochemical double layers and their spectro-electrochemical characterisation, contributing to fundamental understanding in processes at the electrode-electrolyte interface, which are crucial for developing next-generation flow battery materials.

The successful candidate will work on cutting-edge research combining computational modelling with experimental validation. The project involves developing time- and position-dependent models of electrochemical double layers, and parameter estimation methods incorporating electrochemical measurements (e.g. cyclic voltammetry) and electron paramagnetic resonance (EPR) spectroscopy data.



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Benefits

The recruited researcher will have the opportunity to work as part of an international, interdisciplinary team of 17 doctoral candidates, based at universities and industrial firms throughout Europe. She/he will be supported by two mentors within the SPACER project, and will have multiple opportunities to participate in professional and personal development training. Through her/his work she/he will gain a unique skill-set at the interface between modelling and prototyping of electrode materials, including characterization of electrodes using spectroscopical and electrochemical techniques at different levels from micro-scale to macro-scale.

She/he is expected to finish the project with a PhD thesis and to disseminate the results through patents (if applicable), publications in peer-reviewed journals and presentations at international conferences.

Working at ZHAW provides an ideal environment for early-stage researchers to develop their careers within Switzerland's dynamic applied sciences landscape. PhD candidates benefit from exceptional professional development opportunities including access to over 100 free continuing education courses. ZHAW's commitment to diversity, inclusion, and flexible working arrangements, combined with its location in the economically vibrant Greater Zurich Area, creates a supportive environment where emerging researchers can thrive both professionally and personally.

Requirements

Qualifications/experience

- In accordance with the European Union's funding rules for doctoral networks, applicants must NOT yet have a PhD
- Excellent master's degree in computational science, physics, mathematics, chemical engineering, materials science, or a related discipline
- Experience in mathematical modelling and numerical methods for ordinary and partial differential equations
- Strong interest in working in a cross-disciplinary, collaborative project at the interface of electrochemistry and mathematical modelling
- Knowledge of spectroscopy is beneficial, but not required
- Experience in at least one programming language for scientific computing (C/C++, Matlab, Fortran, Python, Julia, ...)

- Good communication skills and willingness to work in collaborative projects with multiple partners and present results at conferences, project meetings and partners
- Very good English language skills (German is not required, but beneficial)
- Self-motivation and the ability to achieve goals independently as well as to contribute effectively to the team

Mobility

The applicant must not have resided or carried out her/ his main activity (work, studies etc.) in Switzerland for more than 12 months in the past 3 years.

How to apply

Please send your CV by e-mail (preferred) or by post, quoting the reference SPACER-DC17.

Contact:

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Application deadline: 30th October 2025