



Job Posting

Recruiting organisation

University of Padua, Padova, Italy

Subproject title

Activation techniques and experimental characterization of advanced high-performance porous electrode architecture for next-generation redox flow batteries

Starting date

1st April 2026

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 University of Padua, with a monthly gross salary of approx. 3500 € (including mobility allowance, but excluding other allowances that depend on eligibility, e.g. family allowance, special needs allowance).

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 University of Padua, (PhD supervision at University of Padua) over a period of 36 months.

The University of Padua, founded in 1222, is one of the oldest and most prestigious universities in Europe. Known for its tradition of academic freedom and innovation, it was the home of groundbreaking figures like Galileo Galilei, who taught there. Today, the university offers a wide range of programs across science, engineering, medicine, humanities, and social sciences, and it's internationally recognized for its research excellence and vibrant student life.

The DC10-UPA will work on the analysis and development of activation techniques for porous electrodes, based on different techniques. The DC will also be involved in high-level education classes, communication and dissemination of the obtained results and their possible exploitation also in near sectors. Collaborations with other partners and secondments are expected on plasma activation of felt electrodes and test in VRFB cells and plasma, hydrothermal and chemical activation and testing of VRFB full stacks. The final goal of these activities is



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to contribute to the creation of new electrodes which provide a basis for a new generation of more powerful, more efficient, more durable, and more cost-effective vanadium flow batteries. To develop the research program, top-level laboratory instrumentation and equipment are available at the Department of Industrial Engineering of the University of Padua, notably in the EESCoLab and CheMaMse Groups, which are working since more than 20 years on the electrochemical energy storage and conversion at material level development and engineering scaling-up. In addition, potential collaborations can be developed with other top-level Padua Laboratories

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.

The University of Padua offers the opportunity of work in one of the oldest universities in Europe in an environment full of history, monuments and cultural events. The candidate will have the chance to profit from scientific exchanges within the vast research lines and doctoral programs of a large multidisciplinary university, with plenty of opportunities for discussions, collaborations, and internal scientific events, boosting motivation and healthy competition. The candidate can rely on the university's language center offering Italian for foreigner classes; sports facilities, initiatives for work-life balance; nursery agreements for students with children, an international DC guide to help navigate bureaucracy, logistics, and practical matters.

World-famous historical cities such as Venice, Verona, Florence, Milan and Rome are at day-travel

distance, offering the possibility of enjoying the unique Italian historic heritage.

Requirements

Qualifications/experience

- In accordance with the European Union's funding rules for doctoral networks applicants must NOT yet have a PhD
- Additional requirements are:
- A strong academic track record in a master's degree in materials science, chemistry, electrical engineering, mechanical engineering, or a related discipline.
- Familiarity with instrumental techniques in chemistry, physics, and engineering
- A keen interest in working on a cross-disciplinary, collaborative project
- A high commitment to collaborative work and the ability to contribute effectively.
- Fluency in English.
- CD positions are open to researchers of any nationality
- CD recruitment must follow open, merit-based and transparent processes

Mobility

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

The program requires *secondments* (temporary stays) in other institutions, possibly in non-academic sectors.

How to apply

Please send your CV by e-mail (preferred) or by post, quoting the reference SPACER-DC10-UPA

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Application deadline: 15th October 2025