Job Posting

Recruiting organisation

University of Innsbruck

Subproject title

Development of three-dimensional (3D) fibre electrodes with defined geometric structure via embroidery-based, scalable textile technologies

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 a full-time employment contract with the University of Innsbruck. The monthly gross salary amounts to approx. **3700 € (paid 14 times per year)** in accordance with the Austrian Collective Bargaining Agreement.

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

- Characterization of potential precursor and carbon **fibre materials.**
- Investigations on 3D fibre placement processes for **electrode production** using embroidery-based techniques to achieve optimised electrode structures.
- Construction of 3D fibre electrodes with planned area size 20-cm^2 **scaling-up** to 300 cm^2 and optimized fibre types and fibre arrangements for uniform electrolyte flow and current distributions – special emphasis on cellulosic materials as **bio-based precursor** as replacement of petroleum-based precursors.
- **Electrochemical characterization** of electrode materials.

Job Description

The advertised subproject is fully funded by the Marie Skłodowska-Curie European Training Network "SPACER." It will be carried out by a doctoral candidate over a period of 36 months at the University of Innsbruck, specifically at the Research Institute of Textile Chemistry and Textile Physics in Dornbirn, Vorarlberg, Austria (www.uibk.ac.at/textilechemie).

The Research Institute of Textile Chemistry and Textile Physics is part of the Faculty of Chemistry and Pharmacy at the University of Innsbruck. It is located in Dornbirn, Vorarlberg — approximately 180 km from the university's main campus in Innsbruck — in the Austrian Alps and Lake Constance region, where a significant portion of the Austrian textile industry is based. The Institute offers approximately 1000 m^2 of office and laboratory space and has been designated as Key Enabling Technologies Center (KETs). It is also part of the University of Innsbruck's Advanced Materials Platform, which provides access to additional infrastructure (www.uibk.ac.at/advancedmaterials).

The Institute currently focuses on three primary research areas: polymer interfaces and hybrids, advanced functional materials for energy conversion and storage, and sustainable textile concepts for textile circularity. The Institute has conducted extensive research on textile-based 3D

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porous electrodes for electrochemical energy storage systems, providing a solid base for doctoral research.

The goal of this doctoral thesis is to investigate how the morphological and physicochemical properties of carbon fibres, along with electrode structural variables, influence the electrochemical performance of redox flow batteries, and to develop strategies for performance enhancement through optimization of fibre properties and electrode assembly design.

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 comprehensive skill-set at the intersection of materials characterization, textile processing, and electrode design. This includes developing expertise in textile-based fabrication methods, optimizing fibre properties and electrode architectures, and applying a range of experimental techniques such as spectroscopy, microscopy and electrochemical analysis across multiple scales.

She/he is expected to finish the project with a PhD thesis, complete the Doctoral Programme in Chemistry at the University of Innsbruck, including 180 ECTS-Credits (https://www.uibk.ac.at/en/programmes/phd-chemistry/2009w), and disseminate the results through patents (if applicable), publications in peer-reviewed journals and presentations at international conferences.

The selected candidate will be employed full time (40h/week) by the University of Innsbruck as a doctoral student, with full social security coverage and a competitive salary in accordance with the Collective Bargaining Agreement. The University also offers attractive additional benefits (www.uibk.ac.at/en/career). The University of Innsbruck is committed to increasing the representation of women in science and explicitly encourages qualified female candidates to apply. Where qualifications are equal, preference will be given to women.

Requirements

Qualifications/experience

- In accordance with the European Union's funding rules for doctoral networks, applicants must NOT yet have a PhD.
- Very good master's degree in materials science, chemistry, chemical process engineering, or a related discipline.
- Familiarity with instrumental analytical techniques, prototyping, and electrochemical methods is advantageous.
- Experience and interest in working in a chemical laboratory within a cross-disciplinary, collaborative project.
- Willingness to cooperate with project partners involved in modelling and data management, and to present results at conferences and project meetings.
- Self-motivation, a well-structured working style, and the ability to contribute effectively to the team.
- Fluency in English (German is beneficial).
- **Applicants must be eligible for enrolment in the Doctoral Programme in Chemistry at the University of Innsbruck:** https://www.uibk.ac.at/en/programmes/phd-chemistry/2009w
  For further questions, please contact noemi.aguilo-aguayo@uibk.ac.at or the Examination Office: https://www.uibk.ac.at/fakultaeten-servicestelle/pruefungsreferate/standorte/innrain52d.html

Mobility

The applicant must not have resided or carried out her/ his main activity (work, studies etc.) in Austria 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-DC8-UIN

Email: noemi.aguilo-aguayo@uibk.ac.at

Application deadline: 30th September 2025