

## **ZHAW - Institute of Computational Physics (ICP)**

Zürcher Hochschule  
für Angewandte Wissenschaften



Zurich University of Applied Sciences ZHAW is one of Switzerland's largest multidisciplinary universities of applied sciences, with over 14'000 students and 3'400 faculty and staff. ZHAW is committed to gender-mixed and diverse teams in order to promote equality, diversity and innovation. As one of the leading Engineering Faculties in Switzerland, the ZHAW School of Engineering emphasises topics which will be relevant in the future. Our 14 institutes and centres guarantee superior-quality education, research and development with an emphasis on the areas of energy, mobility, information and health. At the Institute of Computational Physics (ICP), physicists, mathematicians and engineers work on applying methods and results from basic research to industrial problems. For more than 20 years, the ICP has been developing multiphysics computer models for industrial applications (e.g. in the field of hydrogen technology, photovoltaics or coupled-physics modelling). Together with its partners from science and industry, the ICP develops solutions in applied research and development.

### **PhD in electrochemical double layer and meso-scale modelling 100 %**

City: Winterthur; Starting date (earliest): At the earliest possible; Duration: 36 months;  
Remuneration: According to the guidelines.

#### **Working field**

The goal of this doctoral thesis is to develop scale-specific models to be included in a multi-scale framework for computational high-throughput screening of organic redox pairs. The recruited researcher will develop new models for the electrochemical double layer that capture important surface processes, including surface coverages of adsorbed species and multi-step reactions. In a second step, the formulated double layer model will be integrated into a pore-scale model describing the transport of mass, momentum, and charge through a porous electrode. The pore-scale model will be used to identify limiting factors of the electrochemical conversion and evaluate effective transport properties, including diffusion coefficients and effective reaction rates, which can be used in macrohomogeneous cell models. The developed models will be integrated into a multi-scale modelling framework in collaboration with other doctoral students.

#### **Requirements**

- In accordance with the European Union's funding rules for doctoral networks, applicants must NOT yet have a PhD
- 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.
- Excellent master's degree in computational science, physics, mathematics, engineering, or a related discipline
- Familiarity with mathematical modelling and numerical methods for ordinary and partial differential equations

- Experience in modelling and simulation of physical- and/or chemical- processes based on thermodynamics
- Strong interest in working in a cross-disciplinary, collaborative project at the interface of electrochemistry and mathematical modelling
- Experience in at least one programming language for scientific computing (C/C++, Matlab, Wolfram Language (Mathematica), 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 beneficial)
- Self-motivation and the ability to achieve goals independently as well as to contribute effectively to the team

## **What we offer**

<https://www.zhaw.ch/en/jobs/working-at-the-zhaw>

## **Application**

Applications can only be considered via our application tool:

<https://www.zhaw.ch/en/jobs/vacant-positions/job-details/job/detail/3532315>

More information at <https://stellenticket.de/192827/TUBS/>

Offer visible until 01/05/25

