

PhD Position in Pore-Scale Multi-phase Reactive Transport Modeling for Hydrogen Storage (m/w/d)

We invite applications for a PhD position in the Hydrogeology workgroup at the University of Tübingen, Germany, to work on a joint project with Helmut Schmidt University Hamburg that has recently been funded by the German Research Council (DFG). The aim of this project is to investigate how microbially mediated pore-scale processes affect the overall efficiency of underground hydrogen storage systems. The PhD candidate will be supervised by Dr. Tao Yuan and co-supervised by Prof. Olaf A. Cirpka.

Responsibilities:

- 1) Develop a pore-scale model for two-phase flow of hydrogen gas and brine
- 2) Develop a bioreactive-transport model and couple it with the two-phase flow framework
- 3) Investigate pore-scale coupled interactions between hydrogen gas, brine, solutes, minerals, and microbes
- 4) Collaborate with the project partner to develop an upscaling workflow that implements pore-scale results into Darcy-scale models
- 5) Validate the models using literature data
- 6) Publish high-quality articles in peer-reviewed journals in the field
- 7) Present research outcomes at national and international conferences

Basic Qualifications:

- 1) A completed M.Sc. degree in Hydrogeology, Geosciences, Fluid Mechanics, Applied Mathematics, or a related field
- 2) Strong proficiency in English
- 3) Capability to work independently and collaboratively

Preferred Qualifications:

- 1) Experience with multi-phase flow simulation, reactive-transport simulation, groundwater flow simulation, and model development
- 2) Basic knowledge of numerical methods for solving nonlinear systems of partial differential equations (e.g., finite volume method, finite element method)
- 3) Experience with open-source CFD software such as OpenFOAM, PFLOTRAN, or DuMux, and geochemistry software such as PHREEQC

This is a **three-year** fixed-term position with a preferred start date of **June 2026 or as soon as possible thereafter**. Employment (TV-L E13, 75%) will be arranged by the administration of the University of Tübingen. The university is committed to equal opportunities and diversity. It therefore takes an individual's situation into account and asks for relevant information. People with disabilities will be given preferential consideration if they are equally qualified. The University of Tübingen strives to increase the proportion of women in research and strongly encourages qualified women to apply.

Applicants should submit a single PDF file containing (1) a CV, (2) a motivation letter describing your research interests and reasons for applying, (3) copies of transcripts (BSc and MSc degrees), and (4) names and email addresses of two references. Applications should be sent to Dr. Tao Yuan, tao.yuan@uni-tuebingen.de by **March 15, 2026**.

For further information regarding the position, please contact Dr. Tao Yuan, tao.yuan@uni-tuebingen.de, or Prof. Olaf A. Cirpka, olaf.cirpka@uni-tuebingen.de.