

Research assistant (PhD candidate) (f/m/d) position – Microfluidics for CO₂ storage and hydrogen applications

Karlsruhe Institute of Technology (KIT) is one of the world's leading research institutions in the field of technology and engineering. The Chair of Structural Geology and Tectonics (SGT) at KIT – Institute of Applied Geosciences, focuses on advancing models of mechanical, chemical and magnetic rock properties, to predict subsurface reservoir heterogeneities.

Job description:

Geological carbon dioxide (CO₂) sequestration is a promising technology in achieving Europe's climate neutrality goals by reducing atmospheric CO₂. Beyond mere disposal, this project aims to enhance the cyclic utilisation of CO₂, exploring the potential of subsurface environments as bio-georeactors. Through microbial activity, CO₂ may be transformed into valuable gases (e.g., methane) for chemical applications. The project addresses key challenges such as injection-induced precipitation and microbe-rock interactions by optimizing CO₂ injection into deep, saline aquifers harbouring microbial populations. Using cutting-edge microfluidic experiments and phase-field modelling, we will study the multi-physical, chemical, and microbial processes involved. This interdisciplinary endeavour involves three KIT institutes spanning geosciences, biotechnology, and material science. The main focus of this position at SGT is to perform microfluidic experiments and investigate phenomena such as CO₂ injection dynamics, CO₂ reactions, and multiphase flow properties.

Responsibilities:

- Conduct advanced microfluidic experiments to study flow dynamics, microbe-rock interactions and multi-physical processes under various conditions.
- Employ imaging techniques to quantify observed phenomena.
- Collaborate with numerical simulation and microbiology groups within the project.
- Present research findings at national and international conferences.
- Publish results in high-impact scientific journals in English.
- Contribute to the preparation of joint project proposals with partners under the framework of this project
- Participate in assisting lectures as part of PhD responsibilities within the SGT department.

Qualifications:

- MSc degree (or equivalent) in petrophysics, geology, applied physics or related fields
- Strong background or keen interest in laboratory work
- Knowledge of microfluidics and microbiology is an advantage but not a prerequisite
- Willingness to collaborate in an interdisciplinary and international research environment
- High levels of motivation, independence, and personal responsibility
- Proven experience in scientific writing
- Proficiency in written and spoken English

What we offer:

- Opportunity to work on a ground-breaking project for climate change mitigation and sustainable energy
- Ambitious and varied tasks in a dynamic and international research environment
- State-of-the-art facilities and resources
- Collaboration with experts across multiple fields
- Flexible working hours and conditions

- Extensive training opportunities at KIT via KYHS - Karlsruhe House of Young Scientists

Start date: as soon as possible

Contract duration: The appointment is limited for 2 years, but with potential extension of one year depending on the following funding

Working hours: Part-time EG13 (50%) with potential extension depending on follow-up funding

Place of work: Karlsruhe

How to apply:

Interested candidates are invited to submit their application documents as a single PDF file. The application should include:

- A motivation letter (maximum 1 page)
- Curriculum Vitae (CV), including names and contact information to two referees
- Relevant certificates, including a transcript of records

Please send your application no later than 31 December 2024 via email to: Dr. Chaojie Cheng, chaojie.cheng@kit.edu. We look forward to receiving your application.

Gender balance: We prefer to balance the number of employees (f/m/d). Therefore, we kindly ask female applicants to apply for this job. Recognized severely disabled persons will be preferred if they are equally qualified.