Helmholtz-Zentrum Dresden-Rossendorf e.V.

With cutting-edge research in the fields of ENERGY, HEALTH and MATTER, around 1,500 employees from more than 70 nations at Helmholtz-Zentrum Dresden-Rossendorf (HZDR) are committed to mastering the great challenges facing society today. The Institute of Fluid Dynamics is conducting basic and applied research in the fields of thermo-fluid dynamics and magnetohydrodynamics in order to improve the sustainability, the energy efficiency and the safety of industrial processes. The Department of Fluid Dynamics Resource Technology Processes is looking for a

PhD Student (f/m/d) Interfacial flow and mass transfer at gas bubbles.

The position is limited to 3 years initially, with the option to extend it for another year. The ERC-funded project InterTrace combines the development of tracer particles intended to reveal flow at gas–liquid interfaces with applications at gas bubbles and at the air layer retained by an aquatic plant. In your PhD project within InterTrace, you will use and evaluate the new microtracers to determine how surfactants affect bubble surface mobility and gas–liquid mass transfer. The aim is to distinguish flow effects from additional mass transfer barriers caused by the surfactant layer.

City: Dresden; Starting date (earliest): 01/03/27; Duration: 3 years; Remuneration: TVöD Bund; Reference number: 2026/140; Closing date: 04/01/27

Tasks

- Design, build and commission a counterflow apparatus with bubble generation and controlled tracer loading
- Combine fluorescence imaging of the microtracers to track interfacial flow with shadowgraph imaging to determine bubble shape and volume
- Systematically investigate how microtracers, soluble and insoluble surfactants, and flow conditions affect interfacial mobility and oxygen transfer
- Develop image processing and mass transfer analysis, provide feedback to tracer particle development, and publish the results

Requirements

- Completed university studies (Master/Diploma) in the field of Process Engineering, Chemical Engineering, Mechanical Engineering, Physics, Physical Chemistry or a comparable discipline
- Good experimental skills and an interest in building and developing optical measurement systems
- Interest in multiphase flows, mass transfer, and colloid and interface phenomena
- Experience in image analysis or optical flow measurement techniques is advantageous
- Independent, careful working style and enthusiasm for solving experimental

research questions
- Good teamwork and communication skills for collaboration with the project team and technical staff
- Willingness to support measurement campaigns across the project, e.g. parabolic flights, and to present results at scientific conferences
- Good written and spoken English
- Basic programming skills for data and image analysis, e.g. using Python or MATLAB
- Good working knowledge of a standard CAD software

What we offer

- A vibrant research community in an open, diverse and international work environment
- Scientific excellence and extensive professional networking opportunities
- A structured PhD program with a comprehensive range of continuing education and networking opportunities
- Salary and social benefits in accordance with the collective agreement for the public sector (TVöD-Bund) including 30 days of paid holiday leave, company pension scheme (VBL)
- Depending on the personal qualifications, the candidate may be classified in salary group 13 according to TVöD-Bund
- We support a good work-life balance with the possibility of part-time employment, mobile working and flexible working hours
- Numerous company health management offerings
- Employee discounts with well-known providers via the platform Corporate Benefits
- An employer subsidy for the "Deutschland-Ticket Jobticket"

Application

We look forward to receiving your application documents (including cover letter, CV, diplomas/transcripts, etc.), which you can submit via our online-application-system: https://www.hzdr.de/db/Cms?pNid=490&pLang=en&pOid=79177

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By internet: https://www.hzdr.de/db/Cms?pNid=490&pLang=en&pOid=79177

More information at https://stellenticket.de/208967/TUD/
Offer visible until 27/12/26