

PhD candidate: Foam Generation & Propagation in Fractured Reserves

Department/faculty: Civil Engineering and Geosciences

Level: Master degree

Working hours: 38 hours per week

Contract: 4 years

Salary: €2222 to €2840 per month gross

Civil Engineering and Geosciences

The Faculty of Civil Engineering and Geosciences of Delft University of Technology (TU Delft) provides leading international research and education, with innovation and sustainability as central themes. Research and education are closely interwoven and address societal challenges. The Faculty consists of the departments of Transport and Planning, Structural Engineering, Geoscience and Engineering, Water Management, Hydraulic Engineering, and Geoscience and Remote Sensing.

The Department of Geoscience and Engineering resides within the Faculty of Civil Engineering and Geosciences and encompasses five sections: Applied Geology, Applied Petrophysics and Geophysics, Geo-Engineering, Resource Engineering, and Petroleum Engineering. Within the Department there is considerable scope and encouragement for interdisciplinary research.

PhD candidates, post-docs and staff in the Petroleum Engineering section cooperate in a collegial atmosphere in a fundamental research programme directed towards developing cutting-edge technology for production, storage and remediation of underground fluid resources, including petroleum and natural gas, geothermal resources, groundwater, and sequestration of CO₂. PhD candidates are stimulated to present their research at international conferences, to publish in high-ranked scientific journals, and to form an international professional network. Graduates of the section find employment in the petroleum industry and related fields and in the academic world.

Job description

The candidate will conduct research on foam for Enhanced Oil Recovery (EOR), specifically on spontaneous foam generation and flow, and foam mobility, in fractured geological formations. The research will focus on laboratory experiments in a variety of model fractures to represent the range of fracture geometries encountered in nature, followed by numerical modelling of the results. Foam is a promising means of controlling gas and liquid flow in geological formations in processes for enhanced oil recovery and aquifer remediation. It is difficult, though, to observe foam directly in opaque geological fractures and to extrapolate results from one fracture to another. Recently, we developed a set of model fractures in glass with a wide range of geometrical properties and modelled trapping and flow in these fractures. Foam generation, propagation, bubble size and mobility can all be observed directly in these fractures. Experimental studies are exploring the mechanisms of foam generation and foam mobility in the model fractures. The candidate will work on extending these model fractures to longer lengths (at least 1 m), in order to verify that foam has reached local steady state, and to combine the results for all the various geometries in one overall model for foam mobility as a function of fracture aperture, roughness, and correlation scales for roughness along the fracture. The ultimate goal is a model for foam in natural fractures that can be applied widely to fractured geological formations with a wide variety of fracture geometries.

Requirements

Applicants should have a Master of Science degree in a quantitative science or engineering field, as well as experience and demonstrated aptitude in experimental work, and an analytical approach to problem-solving. Moreover, the candidate should be a good communicator, have broad interests and learn quickly. The candidate should also possess excellent writing and verbal communication skills in English.

Conditions of employment

TU Delft offers an attractive, customisable compensation and benefits package, including a discount for health insurance and sport memberships, and a monthly work costs contribution. Flexible work schedules can be arranged. An International Children's Centre offers day care, before- and after-school care and an international primary school. Dual Career Services offers support to accompanying partners. Salary and benefits are in accordance with the Collective Labour Agreement for Dutch Universities.

As a PhD candidate you will be enrolled in the TU Delft Graduate School. The TU Delft Graduate School provides an inspiring research environment; an excellent team of supervisors, academic staff and a mentor; and a Doctoral Education Programme aimed at developing your transferable, discipline-related and research skills. Please visit <http://graduateschool.tudelft.nl/> for more information.

Information and application

For more information about this position, please contact Sebastian Vincent-Bonnieu, S.Y.F.Vincent-Bonnieu@tudelft.nl or William Rossen, w.r.rossen@tudelft.nl. Please e-mail your application in one single pdf entitled Lastname_ CITG17-15.pdf by 31 August 2017 to Recruitment-CITG@tudelft.nl. The application should include: a letter of motivation, a detailed CV, summary of academic record or research experience, abstract of your MSc thesis (1 page), list of any publications, grades list, proof of English language proficiency and names of three references.

Enquiries from agencies are not appreciated.

Factsheet

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CITG17-15

Information

For more information about this job, please contact Sebastian Vincent-Bonnieu, Contact Person.

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For more information about the application procedure, please contact Bill Rossen/Geoscience & Engineering.

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