

IMPERIAL COLLEGE LONDON

Department of Earth Science and Engineering

Geomechanical Fracture Network Modelling and Characterisation

Industry Funded PhD Studentship: 36 months duration

The itf-ISF3 project 'Upscaling gravity-assisted recovery of NFRs' is building numerical technology for reservoir flow simulation and is funded by a consortium of leading oil companies. The research is conducted on three university sites. Imperial College London applies in-house geomechanical solids modelling software based on combined finite element – discrete element (FEMDEM) methods. Guided by mechanical principles, these are used to numerically generate fracture patterns with fracture walls and fracture apertures. Montan University Leoben and Heriot-Watt University work with these geomechanically constrained fractures to address the flow simulation physics, software development and reservoir simulation.

Technical Scope: The objective of this project is to undertake and disseminate research in the use of computational modelling of rock fracturing, deformation and block sliding in response to tension and compression. The student will aim to develop fracture patterns with aperture characteristics applicable to fractures found in reservoir rocks at in-situ stress and formation fluid pressure conditions. The fractures will include those associated with fracturing in virgin rock and the straining of mapped fracture patterns. Major challenges are to include fluid pressure effects and to provide fracture network characterisations from which fracture and matrix flow simulations can give appropriate upscaling properties at decimetre and larger scales.

Requirements: Applicants should have an undergraduate degree in engineering, physics, geology, geophysics, applied mathematics, or computer science. The successful candidate will have most of the following knowledge and skills: • Structural geology and brittle failure in the Earth's crust: knowledge of continuum mechanics and fracture mechanics. • Numerical methods: knowledge of finite element methods and/or discrete element methods. • Communication: excellent writing and presentation skills. • Scientific programming: ability to program in a scientific programming language such as C/C++, Fortran, Matlab.

Other details: This is a 3-year PhD studentship, paying a non-taxable bursary of £16,000 per year. The student will work under the supervision of Dr. J-P Latham and Dr. Jiansheng Xiang, with frequent interaction with the itf-ISF3 team, geologists and other members of the department's PERM and AMCG research groups.

Application forms and instructions of where to send CVs, references etc can be obtained from our website:

<http://www3.imperial.ac.uk/earthscienceandengineering/courses/phdopportunities/phdapplicationprocedure>) or from Ms Samantha Delamaine (E-mail: sam.delamaine@imperial.ac.uk, Tel: +44 (0) 207 594 7339). Further information about the project can be obtained from John-Paul Latham (j.p.latham@imperial.ac.uk).

Please send a copy of your CV, including academic transcripts, to Dr J-P Latham, Department of Earth Science and Engineering, Imperial College London.

Closing date: is 21 December 2011

Consistently rated amongst the world's best universities, Imperial College London is a science based institution with a reputation for excellence in teaching and research.