

PDRA 2 - DETECT - Determining risk of CO2 leakage

£31,076 - £38,183

Project Title: “Modelling the flow and geomechanical and geochemical coupling in fracture and matrix at fracture and fracture network scale”

The position will be based at IPE’s Carbonate Reservoir Group (<http://carbonates.hw.ac.uk/>), which is world-renowned for its applied and fundamental research on improving the predictability of hydrocarbon recovery from (fractured) carbonate formations and applying the techniques to similar problems such as geological carbon storage. The Carbonate Reservoir Group currently comprises approximately 20 PhD students and postdocs with backgrounds in reservoir engineering, geoscience, physics, and mathematics who work on the characterisation, modelling, and simulation of carbonate reservoirs and collaborate closely with several leading international universities and many oil and gas companies around the world.

The project is funded for 36 months by the ACT (Accelerating CCS Technology) program and will perform a risk-based approach to evaluate leakage from deep CO2 storage sites. The aim of this project is to generate guidelines for determining the risk of CO2 leakage along fractures across the primary caprock using an integrated monitoring and hydro-mechanical-chemical modelling approach. For this purpose, we will perform laboratory studies to provide relevant parameters for CO2 leakage modelling at small, meso, and large scales for several case studies, incorporating analogue data where possible. The intention is to improve our understanding of realistic leakage geometries and rates for several representative scenarios and to identify containment monitoring technologies that are capable of detecting such caprock integrity issues. We will build on experience gained from the risk-based Measurement, Monitoring and Verification (MMV) programme for the current Quest and the former Peterhead CCS projects. This, together with the insights gained from DETECT, will be integrated within a risk assessment framework using the bowtie method which will allow both a qualitative and quantitative assessment of the risk of CO2 leakage along fractures in the caprock. The resulting bowties will serve CO2 storage operators as guidelines for site-specific risk assessments. Further, the integrated results of this work can be used for communication regarding leakage from CO2 storage in a clear, logical, and substantiated manner.

The post holder is required to:

- Modelling the flow in fracture and matrix as well as its geomechanical and geochemical coupling on the fracture and fracture network scale
- Use and implementing advanced modeling concepts in the Matlab Reservoir Simulation Toolbox (MRST)
- Present research results at conferences and internal project meetings
- Publish peer-reviewed and conference papers

The successful candidate should have a PhD in Earth sciences, including but not limited to in petrophysics, geophysics, rock physics or related topic and a 2.1 or higher in an undergraduate degree in geoscience, petroleum or civil engineering.

For application details and further information please go to: www.hw.ac.uk/apply-jobs
Ref: IRC11252 Closing Date: 20th September 2017