

**School of Energy, Geoscience, Infrastructure and Society – Lyell Centre**

**PDRA 1 - DETECT - Risk of CO2 leaking along fractures**

**£31,076 - £38,183**

**Project Title: “Experimental and field determination of stress-dependent fracture networks and fracture permeability of mudrocks”**

Heriot-Watt University and the British Geological Survey (BGS) have joined forces to create a new research centre for Earth and Marine Science and Technology. Based at Heriot-Watt's Edinburgh Campus, the Lyell Centre will be one of Europe's leading centres for research and expertise in the earth and marine sciences. Jointly funded by UK and Scottish funders; Natural Environment Research Council (NERC), Scottish Funding Council (SFC) and Heriot-Watt, The Lyell Centre will promote innovative research at the core of geoscience, marine and terrestrial ecology, computing, mathematics and engineering.

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:

- Characterising mudrock fracture patterns from field data and develop general concepts of fracture patterns in fault damage zones
- Determining stress-dependent fracture permeability in the laboratory on a wide number of different mudrocks to produce model input data to be implemented in fracture flow models my PDRA 2
- Contribute to qualitative and quantitative risk assessment for caprock leakage
- 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](http://www.hw.ac.uk/apply-jobs)

Ref: IRC11176 Closing Date: 20<sup>th</sup> September 2017