

NERC Centre for Doctoral Training in Oil & Gas (2017 start)

Project Title: Quantifying the biological effects of leakage from Carbon Capture and Storage sites to optimize early warning indicators for CO₂ leakage

Host institution: Institute of Life and Earth Sciences, Heriot-Watt University

Supervisor 1: Dr. Andrew K. Sweetman

Supervisor 2: Dr. Mark Hartl

Additional Supervisor (s): Prof. Teresa F. Fernandes

Project description: Oil and gas companies in the North Sea are preparing for CO₂ capture and storage (CCS) in offshore saline aquifers. CCS is one of the most promising measures for immediate reduction of CO₂-emissions whilst the world is searching for non-petroleum energy-sources. In the event of CO₂ leakage, CO₂ may push other fluids (e.g., anoxic fluids enriched in heavy metals) to the seafloor ahead of it, which will interact with overlying marine sediments. Although a number of research projects have explored the effects of leakage from CCS sites into marine environments, they have largely only focused on the effects of leaking CO₂, rather than the effects of CO₂ and other contaminant leakage. Moreover, most environmental studies have only tested the benthic system response by exposing animals/ sediments to CO₂-rich seawater from above the sediment-water interface. This type of research, while interesting, sheds little information on the types of biological and chemical responses that will occur across the seafloor sediment profile when subjected to leakage from below. There is thus very little knowledge of the effects of this leakage, and which indicators may be relevant, such that effective seafloor monitoring of leakage is limited. In this PhD project, the student will undertake research to assess the effects of CO₂ and contaminated pore-waters on seafloor organisms and sediments. Exposures will be made from above and below the sediment-water interface, thereby allowing the identification of (bio)indicators of CO₂ leakage from CCS sites.

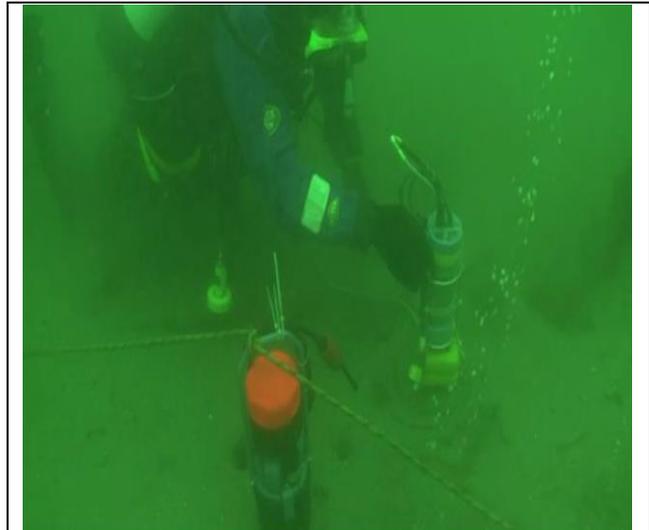
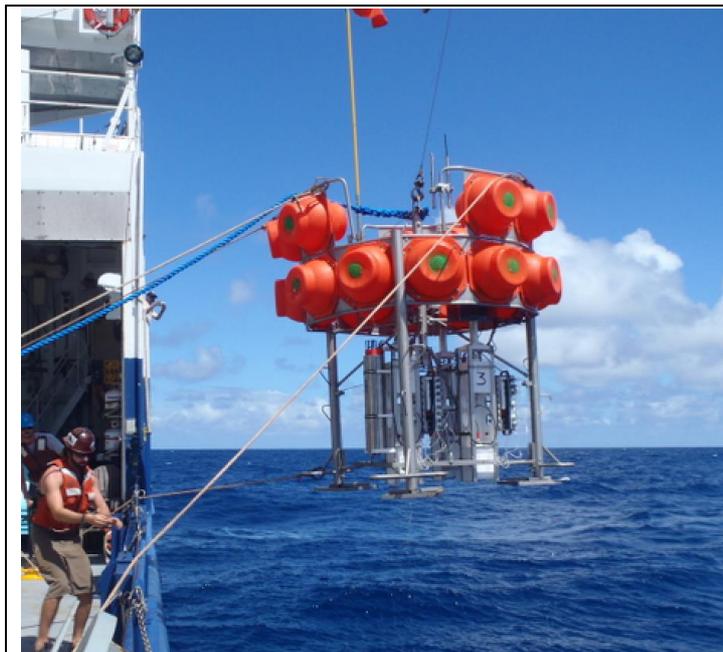


Image source: bgs.ac.uk.



The student will be based in the Marine Benthic Ecology and In-situ Technology group at the Lyell Centre for Earth and Marine Science and Technology – a new pioneering global research centre set up between Heriot-Watt University and the British Geological Survey (BGS). The PhD student will undertake experiments in the field, as well as in the brand new Wolfson Climate Change Research Aquarium facility at the Lyell Centre. This PhD project, hosted at

HWU, is part of the CDT in Oil and Gas.

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Eligibility

Submissions must conform to this single-sided A4 format. The Awards Committee reserves the right not to consider submissions that do not adhere to this condition.

PhD Proposal: UK Oil and Gas Collaborative Doctoral Training Centre (2014 start)

Applicants should have at least a BSc/MSci 2:1 **and/or** Masters (MSc or MRes) at Merit/Distinction level (>60%) **and/or** evidence of significant relevant professional experience equivalent to Masters level. Applicants with applied interests in marine ecology or biogeochemistry are particularly encouraged. Scholarships will be awarded by competitive merit, taking into account the academic ability of the applicant.

Each CDT project comes with a fully funded studentship for UK students and EU students who meet the RCUK eligibility criteria. To be eligible for a full award (stipend and fees) a student must have settled status in the UK, meaning they have no restrictions on how long they can stay **and** been 'ordinarily resident' in the UK for 3 years prior to the start of the grant **and** not been residing in the UK wholly or mainly for the purpose of full-time education. (This does not apply to UK or EU nationals).

How to Apply

Please complete our online application form: <http://www.hw.ac.uk/student-life/how-to-apply/postgraduate.htm>

You must quote the full project title and reference number on your application form. You will also need to provide a CV, supporting statement, copy of your degree certificate and relevant transcripts; proof of your ability in the English language (if English is not your mother tongue or if you have not already studied for a degree that was taught in English) and references from two academic sources (please enter your full name and the project title on the **Referee Report Form** and forward to your referees for completion and return).

Informal enquiries should be addressed to Professor Andrew K. Sweetman at A.Sweetman@hw.ac.uk

Timetable

The closing date for applications is 31st January 2017.