

Microbial impacts on shale gas exploitation

NERC Industrial Case PhD (fully funded, Sept 2017 start)

Supervisors: Prof Jon Lloyd, Prof Kevin Taylor and Dr Julian Mecklenburgh (Manchester) and Dr Bob Eden (Rawwater Engineering, CASE Partners)

Understanding how microbial communities will respond to future exploitation of the subsurface is a key uncertainty, which cuts across many areas of science and technology, including the provision of clean water, the safe disposal of waste materials (e.g. CO₂ and radwaste), harvesting geothermal energy and fracking for nonconventional gases. The development of a shale gas industry is seen as crucial to delivering a reliable and secure energy mix to the UK. However, microbial impacts during and after fracking are very poorly understood and could have major implications for the technology. For example, existing or introduced microorganisms could have beneficial impacts, enhancing gas recovery or helping “bioremediate” large volumes of water contaminated during fracking. They could also have negative impacts through ‘souring’ reactions and reduced fluid/gas flow caused by biofilm formation. Making maximal use of expertise and infrastructure at Manchester and Rawwater (and building on a recently completed NERC IAA project between the partners), the objective for this multidisciplinary NERC Industrial CASE PhD is to address these key knowledge gaps

The student will be based primarily in Manchester’s Geomicrobiology Group, which is one of the largest of its kind in Europe, with 30+ cross-disciplinary researchers working in recently refurbished and newly equipped laboratories in the Williamson Research Centre for Molecular Environmental Science (WRC). Embedded in the group is an ethos of working across the geo-bio interface, with regular in house training covering all the major techniques available within the WRC laboratories. Courses are also made available to incoming PhD students including BSc/MSc courses on Geomicrobiology, Organic Geochemistry, Hydrogeology, Mineralogy and Research Techniques, to ensure that our PhDs have a rigorous and comprehensive training. The student will also benefit from working in a state of the art rock deformation laboratory, access to microbial characterisation techniques (including DNA, protein and metabolite profiling), laboratories for X-Ray tomographic and biological imaging, mineralogical and geochemical (organic/inorganic) analyses, and a pressurised bioreactor suite and wet analysis facility at Rawwater Engineering. Outputs will be captured in a thesis of peer reviewed publications, and upon graduation the student will be well equipped for a career in either academia or industry.

For additional details please contact: jon.lloyd@manchester.ac.uk

How to apply:

<http://www.manchester.ac.uk/study/postgraduate-research/admissions/how-to-apply/>