PETROLEUM LEEDS
Centre for integrated Petroleum Engineering and Geoscience

www.petroleum.leeds.ac.uk
PETROLEUM LEEDS

Petroleum Leeds brings together the Engineering and Geoscience expertise that is relevant to the oil and gas industry at the University of Leeds, to create a world-leading research centre and offers a single point of contact for petroleum related research.

We have a flexible approach and can provide a range of collaborative research including specific projects to address a business need and pre-competitive joint industry projects.

With a diverse funding portfolio of over £40m we support over 60 PhD students and more than 10 Research Fellows with expertise spanning geology, geophysics, surface engineering, sustainability and particle science.

petroleum.leeds.ac.uk/research

We work across disciplines and collaborate with University and Industrial partners worldwide. Our experts contribute to professional bodies, act as advisors to national and international centres and their research generates demonstrable impact both to the industry and beyond.

petroleum.leeds.ac.uk/impact

We also offer postgraduate training and continued professional development through our portfolio of standard and bespoke Masters level courses. These include Exploration Geophysics, Petroleum Production Engineering and Structural Geology with Geophysics.

petroleum.leeds.ac.uk/postgraduate

FACILITIES & SERVICES FOR BUSINESS

We offer access to our facilities via research collaborations and on a consultancy or testing and analysis basis.

Capabilities include:

- In-situ visualisation, high temperature/ high pressure autoclaves and capillary cells, EQCMB and in-situ Raman for advanced surface analysis.

- Comprehensive corrosion testing facilities such as, HJ low pressure facility, jet impingement systems with in-situ electrochemistry and acoustic emission, in situ rigs for pitting corrosion visualisation, synchrontron XRD and electrochemical flow cell for high temperature and pressure, TOLC cells and rigs, under deposit test cells, autoclaves for high temperature and pressure testing and a bench top multiphase flow loop.

- State-of-the-art Sorby Environmental Fluid Dynamics facilities for experimental studies on a range of processes from flow-sediment transport links in alluvial channels to particulate transport through pipes and rig vessels.

- World leading core analysis facilities specialising in the analysis of low permeability samples including a bespoke high pressure mercury injection porosimeter.

FACILITIES & SERVICES FOR BUSINESS

FOR BUSINESS

COLLABORATION OPPORTUNITIES

We have a proven track record delivering industry-focussed research through MSc and PhD Projects, CASE studentships, joint industry consortium projects (JIPs) and stand-alone research projects.

We have a flexible approach to collaboration with industry and would like to speak to companies who are interested in working with us and individuals who are considering Fellowship applications.

<table>
<thead>
<tr>
<th>Programme</th>
<th>Company Investment &amp; Timescale</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSc Sponsorship and Projects</td>
<td>1 year. Provision of data, project management, reports, stipend. Up to £40k.</td>
<td>Company relevant projects and graduate training.</td>
</tr>
<tr>
<td>Joint Industry Projects</td>
<td>3 years. £20k to £40k per project.</td>
<td>A project co-funded by a group of companies to support pre-competitive research.</td>
</tr>
<tr>
<td>Company specific PhD-Projects</td>
<td>3 to 4 years. Minimum £20k per annum plus research project costs.</td>
<td>PhD programme co-designed between your company and Leeds. Flexible IP arrangements dependent on price.</td>
</tr>
<tr>
<td>Industrial Co-operative Awards in Science &amp; Technology (CASE)</td>
<td>3 to 4 years. Top-up funding to support research council Funded PhD project. Up to £40k plus 3 month placement</td>
<td>PhD students with excellent research training in the context of collaboration.</td>
</tr>
<tr>
<td>Centre for Doctoral Training Partners</td>
<td>4 years. Up to £20k per annum to be part of a Research Council Funded Centre for Doctoral Training.</td>
<td>PhD programme offering pre-competitive and company specific research. Access to competitors and customers.</td>
</tr>
<tr>
<td>Postdoctoral Research Associate (PDRA)</td>
<td>Dependent on project, minimum £20k per annum plus project costs.</td>
<td>A researcher dedicated to your research project.</td>
</tr>
<tr>
<td>Knowledge Transfer Partnerships</td>
<td>10 to 20 years. £40k to £100k per annum dependent on company size and project.</td>
<td>Knowledge transfer associate embedded within your company and access to academic time.</td>
</tr>
<tr>
<td>Individual Research Project</td>
<td>Dependent on-project, normally minimum of 1 year.</td>
<td>Research tailored to your business needs and technology challenges.</td>
</tr>
<tr>
<td>Innovate UK project partner</td>
<td>Dependent on scheme.</td>
<td>Support for business-led innovation in collaboration with Universities.</td>
</tr>
<tr>
<td>Project Partners in EU and UK projects</td>
<td>In-kind support required as minimum, some schemes require company matching funding. Access to highly qualified network of researchers.</td>
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</tr>
<tr>
<td>Fellowships</td>
<td>We are happy to discuss hosting all types of fellowship at Leeds.</td>
<td>Attract world-class researchers to Leeds to enhance our research groups.</td>
</tr>
<tr>
<td>Consultancy</td>
<td>Dependent on project. We offer consultancy, testing and analysis and short course provision.</td>
<td>Access to expert advice and training.</td>
</tr>
</tbody>
</table>

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School of Mechanical Engineering, 1st in the UK
2018 Guardian university league tables
ENGINEERING RESEARCH

In the Oil and Gas sector numerous challenges exist in relation to cost-effective operational performance and asset integrity management. Our Engineering research focuses on the fundamental processes that impact oil and gas industry assets such as pipelines and valves.

Through a combined experimental and theoretical approach we seek to advance our understanding of the complex systems that lead to flow assurance challenges. We then use this knowledge, in collaboration with our sponsors, to generate engineering solutions to these global issues.

ASPHALTENES, EMULSIONS AND WAX

Our research is focussed on the characterisation and control of interfacial structures that are formed by the native components of crude oil. These structures lead to a greater insight to address flow assurance issues such as deposition, corrosion, transportation and separation.

petroleum.leeds.ac.uk/research/particle-science

CORROSION, EROSION-CORROSION AND SCALE

Corrosion is one of the major life-limiting factors for energy supply and in environmental pollution control. Internal corrosion in oil wells and pipelines is one of the key problems. The produced oil and gas can contain numerous impurities such as carbon dioxide and/or hydrogen sulphide. These species can lead to pipeline failure which affects production and results in health and safety concerns.

Industry-driven collaborative research at Leeds focuses on understanding the fundamental physics of material degradation mechanisms and on the surface processes that facilitate the crystallisation of foulants such as mineral scale, waxes and asphaltenes on engineering surfaces.

Our research has a distinct focus on providing outputs which industry can utilise to ensure safer and more efficient hydrocarbon transport. It is not only directed towards understanding and predicting the corrosion and scale processes, but also on novel approaches for mitigation.

Key academic contacts:
Prof. Anne Neville
Dr Richard Barker
Dr Thibaut Charpentier
Dr Mark Wilson

NANOTECHNOLOGY

Nanotechnology underpins our research in scale formation, enhanced oil recovery and particle science. Our research benefits from both industry sponsorship and collaboration and government funding.

Current Projects
- Development of green chemicals for scale inhibition
- Investigation of the use of nano-structured polymer surfaces to reduce mineral scale deposition
- Development of nanoparticles to enhance the life time of squeeze treatments (patented)
- Experimental and modelling approach to engineer nanoparticles as tracers, within enhanced drilling fluids and to study their transport, collection and analysis

Key academic contacts:
Prof. Anne Neville
Prof. Dongsheng Wen
Dr Thibaut Charpentier

petroleum.leeds.ac.uk/research/nanotechnology
GEOSCIENCE RESEARCH

BASINS AND STRUCTURAL GEOLOGY
The Basins and Structural Geology Group focuses on an integrated approach to researching the evolution and deformation of sedimentary basins. Using seismic reflection interpretation, field studies and structural modelling we aim to develop a better understanding of basins in a variety of tectonic settings. In addition, many of our studies involve integration of structural basin analysis with a broader tectonic framework and petroleum systems modelling in both extensional and compressional margins.

Key academic contacts:
Prof. Douglas Paton
Dr Taija Torvela
Dr Estelle Mortimer
Dr Richard Collier
Dr Emma Bramham
Prof. Jeff Peakall
Dr Richard Collier
Dr Vernon Manville

We have three ongoing JIPs in this area that are open to new sponsors.
petroleum.leeds.ac.uk/research/basins-and-structural-geology

SEDIMENTOLOGY
The Sedimentology Research Group carries out a broad range of work into modern and ancient surface processes using field-based, experimental and theoretical approaches.

We host the Sorby Environmental Fluid Dynamics Laboratory and have strong collaborative links with the hydrocarbon industry.

Key academics:
Prof. David Hodgson
Prof. Bill McCaffrey
Prof. Nigel Mountney
Prof. Jeff Peakall
Dr Richard Collier
Dr Vernon Manville

We have three ongoing JIPs in this area that are open to new sponsors.
petroleum.leeds.ac.uk/research/sedimentology

GEOPHYSICS
In addition to supporting the world class MSc in Exploration Geophysics our research focuses on improving the theory and practice of geophysical techniques for subsurface energy, engineering and environmental problems. Current research projects include:

- Integrated seismic and hydro-mechanical modelling
- Modelling and monitoring geological storage of CO2 (Carbon Capture and Storage) and nuclear waste storage
- Seismic attenuation of reflected wave amplitudes and their variation with angle of incidence
- Seismic characterization of unconventional hydrocarbon reservoirs.

Key academic contacts:
Dr Adam Booth
Dr Mark Hidayat
Dr Roger Clark

petroleum.leeds.ac.uk/research/geophysics

GOVERNANCE RESEARCH
Our research seeks to bridge the academic-practitioner divide by pursuing action-oriented research that aims to maximise policy and pro-poor development impacts.

For example, a three-year (2012-2015) donor-funded project with local partners that explores opportunities for community-driven accountability in Uganda’s oil-bearing regions. Working closely with development partners, policy makers and regulatory agencies at the international, national and local levels, as well as with industry, NGOs and communities. Research spans the Global North and South, including Brazil, Ghana, Ireland, South Africa, Uganda, United Kingdom, United States and Zambia.

Key academic: Dr James Van Alstine
petroleum.leeds.ac.uk/research/governance

JOINT INDUSTRY PROJECTS
Our joint industry projects (JIPs) exploit our research and knowledge transfer expertise and utilise the specialist facilities available in our research laboratories.

We are happy to speak to potential new sponsors for all projects.

- Basin Structure Group
  beg.leeds.ac.uk
  Contact: Prof. Douglas Paton
- FAST (Flow Assurance and Scale Team)
  fast.egis.hw.ac.uk
  Contact: Prof. Anne Neville / Dr Thibaut Charpentier
- Fluvial and Eolian Research Group
  frg.leeds.ac.uk
  Contact: Prof. Nigel Mountney
- Impacts of Fault Rocks in Carbonate Reservoirs
  Contact: Prof. Quentin Fisher
- LOBE 3, Lobes and stratigraphic traps – a field, subsurface and virtual project
  lobes.leeds.ac.uk (phase 3 website)
  Contact: Prof. David Hodgson
- PETGAS: Petrophysics of Tight Gas Sandstone Reservoirs
  pegas.leeds.ac.uk
  Contact: Prof. Quentin Fisher
- Shallow Marine Research Group
  smrg.leeds.ac.uk
  Contact: Prof. David Hodgson
- Turbidites Research Group
  trg.leeds.ac.uk
  Contact: Prof. Bill McCaffrey

petroleum.leeds.ac.uk/sponsors

Ranked 14th in the World for Earth and Marine Sciences
2018 QS World University Rankings