

# Carbon Capture and Storage Research Portfolio

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The unabated combustion of the known commercial resources of oil, gas and coal will easily surpass the environmental limits calculated for a secure climate and a healthy ocean. Nations outside the EU (US, Canada, Australia, China) and the UK are subsidising Carbon Capture and Storage (CCS) to demonstrate that this climate change mitigation effort is technologically and economically viable.

It is an exciting time for CCS in the North East of Scotland, particularly with news that the Peterhead CCS Project has secured design funding. The University of Aberdeen has recently joined Scottish Carbon Capture and Storage (SCCS), one of the largest communities worldwide delivering world-class research and knowledge exchange between industry and academia to facilitate the commercial deployment of carbon capture and storage.

Aberdeen has developed its own portfolio of cutting-edge research on all aspects of CCS, from capture engineering and offshore storage to social perceptions, law and petroleum economics. The following outlines some of our ongoing programmes, areas of expertise and contact details.

### **CO<sub>2</sub> Capture Engineering and Utilization**

- CO<sub>2</sub> Hydrates: useful construction products from sequestered CO<sub>2</sub>.  
[Dr Mohammed Imbabi [m.s.imbabi@abdn.ac.uk](mailto:m.s.imbabi@abdn.ac.uk)]
- Carbon Capture Optimization in Solids: understanding surface-fluid interactions. [Professor Jim Anderson [j.anderson@abdn.ac.uk](mailto:j.anderson@abdn.ac.uk)]
- Catalytic CO<sub>2</sub> reduction.  
[Dr Angel Cuesta Ciscar [angel.cuestaciscar@abdn.ac.uk](mailto:angel.cuestaciscar@abdn.ac.uk)]
- Synthesis and characterization of materials for carbon capture  
[Professor Jan Skakle [j.skakle@abdn.ac.uk](mailto:j.skakle@abdn.ac.uk)]

### **CO<sub>2</sub> Transportation**

- CO<sub>2</sub>-mixtures thermophysical properties. Impact of impurities in CCS chain.  
[Dr David Vega-Maza [d.vega-maza@abdn.ac.uk](mailto:d.vega-maza@abdn.ac.uk)]
- Structural analysis and corrosion studies of CCS pipelines.  
[Dr Alfred Akisanya [a.r.akisanya@abdn.ac.uk](mailto:a.r.akisanya@abdn.ac.uk)]

### **CO<sub>2</sub> Storage and Injection**

- 4D Seismic Monitoring and CSEM Survey at the Sleipner CO<sub>2</sub> Storage Site  
[Dr Clare Bond [clare.bond@abdn.ac.uk](mailto:clare.bond@abdn.ac.uk)]
- Geological Storage of CO<sub>2</sub>: Suitability analysis and potential implementation challenges in the Niger [Dr David Iacopini [d.iacopini@abdn.ac.uk](mailto:d.iacopini@abdn.ac.uk)]

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- The fracture properties of shales, how impermeable are reservoir seals for CO<sub>2</sub> storage? [Dr Christine Sand [c.sands@abdn.ac.uk](mailto:c.sands@abdn.ac.uk)]
- Development of an Adaptive Unstructured-Mesh Multiphase Flow Simulator: [Dr Jefferson Gomes [jefferson.gomes@abdn.ac.uk](mailto:jefferson.gomes@abdn.ac.uk)]
- Fundamental study of migration of supercritical CO<sub>2</sub> in porous media under conditions of saline aquifers [Dr Dubravka Pokrajac [d.pokrajac@abdn.ac.uk](mailto:d.pokrajac@abdn.ac.uk)]
- Chemical stability of carbonates under CO<sub>2</sub> storage condition [Dr Joyce Neilson [j.neilson@abdn.ac.uk](mailto:j.neilson@abdn.ac.uk)]

### **Policy, Economics**

- Third Party Access in Carbon Capture and Storage (CCS) Systems [Professor Euan Phimister [e.phimister@abdn.ac.uk](mailto:e.phimister@abdn.ac.uk)]
- The need for an international framework for the resolution of *in situ* tortuous and contractual liability [Professor John Paterson [j.paterson@abdn.ac.uk](mailto:j.paterson@abdn.ac.uk)]
- Integrated Returns to Investment in CO<sub>2</sub> capture, transportation and Storage. [Professor Alex Kemp [a.g.kemp@abdn.ac.uk](mailto:a.g.kemp@abdn.ac.uk)]

### **Environmental Impact and MMV**

- Environmental impacts of carbon capture and storage facilities and oil spillage in shallow and deep ecosystems [Dr Daniel Mayor [dan.mayor@abdn.ac.uk](mailto:dan.mayor@abdn.ac.uk)]
- A Life Cycle analysis of Carbon Capture and Storage, from Peterhead and Longannet to the geological Storage Site(s) [Professor Pete Smith [pete.smith@abdn.ac.uk](mailto:pete.smith@abdn.ac.uk)]
- Down-hole monitoring and control. [Dr David Hendry [d.c.hendry@abdn.ac.uk](mailto:d.c.hendry@abdn.ac.uk)]

### **CO<sub>2</sub> Enhanced Oil Recovery**

- Economics of CO<sub>2</sub> EOR in UKCS [Professor Alex Kemp [a.g.kemp@abdn.ac.uk](mailto:a.g.kemp@abdn.ac.uk)]
- Impact of wettability on two-phase flow phenomena relevant to enhanced oil recovery and geological CO<sub>2</sub> storage. [Dr Yukie Tanino [ytanino@abdn.ac.uk](mailto:ytanino@abdn.ac.uk)]
- The effect of EOR oil chemistry in carbonate reservoirs. [Dr Stephen Bowden [s.a.bowden@abdn.ac.uk](mailto:s.a.bowden@abdn.ac.uk)]

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## **CCS State-of-the-Art Facilities**

- 3D-microscope (MicroCT scanner). Digital pore networks and multiphase fluid in core samples at submicron resolution.  
[Dr Dubravka Pokrajac [d.pokrajac@abdn.ac.uk](mailto:d.pokrajac@abdn.ac.uk)]
- In-house Interfacial Tension and Wettability rig at HPHT. Corrosive resistant.  
[Dr David Vega-Maza [d.vega-maza@abdn.ac.uk](mailto:d.vega-maza@abdn.ac.uk)]
- 5-independent Core Flooding loops. [Dr Yukie Tanino [ytanino@abdn.ac.uk](mailto:ytanino@abdn.ac.uk)]
- HPHT Rheometer. [Professor Donald Macphee [d.e.macphee@abdn.ac.uk](mailto:d.e.macphee@abdn.ac.uk)]
- HPHT Vibrational Spectroscopy Lab.  
[Professor Jim Anderson [j.anderson@abdn.ac.uk](mailto:j.anderson@abdn.ac.uk)]
- Multichannel Potentiostat. Corrosion studies.  
[Dr Euan Bain [evan.bain@abdn.ac.uk](mailto:evan.bain@abdn.ac.uk)]
- HPHT Materials Test facilities. [Dr Alfred Akisanya [a.r.akisanya@abdn.ac.uk](mailto:a.r.akisanya@abdn.ac.uk)]
- 3D seismic interpretation and visualization facilities.  
[Dr Clare Bond [clare.bond@abdn.ac.uk](mailto:clare.bond@abdn.ac.uk)]

**General Email Address (CCS Aberdeen):** Dr Jen Scott [j.scott@abdn.ac.uk](mailto:j.scott@abdn.ac.uk)

**Scottish Carbon Capture & Storage (SCCS):** Gordon Sim [gordon.sim@sccs.org.uk](mailto:gordon.sim@sccs.org.uk)



**Scottish Carbon Capture & Storage (SCCS)** is the largest carbon capture and storage (CCS) research group in the UK.

Our partner institutes are recognised worldwide for the quality and scope of their research, and our researchers are involved in all aspects of CCS - from capture engineering and geoscience to public engagement, policy and economics.

SCCS recently welcomed the University of Aberdeen to our partnership of the British Geological Survey, Heriot-Watt University and The University of Edinburgh.

SCCS also works collaboratively with other universities across Scotland. Funding comes from the Scottish Funding Council (SFC) and the Energy Technology Partnership (ETP).

As well as providing a single point of contact for research excellence, SCCS also provides consultancy for industry and government, and access to a wide range of cutting-edge research facilities.

Find out more at [www.sccs.org.uk](http://www.sccs.org.uk)