

CO₂ storage researchers at the Australian School of Petroleum focusing on the following areas:

Chief Scientist

Professor John Kaldi

Reservoir/ seal characterisation and stratigraphy

Discipline Leader	Bruce Ainsworth	ASP
Senior Researcher	Mark Bunch	ASP
Senior Researcher	Ric Daniel	ASP
Senior Researcher	Saju Menacherry	ASP
Senior Researcher	David Haberlah	ASP
Senior Researcher	Nicole Dubrinski	ASP
Earn and Learn Student	Sally Edwards	ASP
Associate Researcher	Sally Holl	CO ₂ CRC/ASP

Activity Purpose

To assess sedimentological and stratigraphic heterogeneity of reservoirs and seals, and to determine the impact on geological storage of CO₂.

Key projects

- o Gippsland Basin (onshore): Completed phase I of the identification of potential storage systems
- o Canterbury Basin: Completed and submitted report
- o Galilee Basin: writing PhD chapters 1 (introduction to CCS) and 2 (Geological Background to the Galilee Basin) of thesis
- o Sydney Basin: Prospective sites and depths for CO₂ sequestration identified.
- o Collaborative study proposed between FEI and CO₂CRC on advanced pore space characterisation of saline aquifers
- o Coordination of CO₂CRC best practice workshop & document on Reservoir Modelling for CO₂ Storage

Geomechanics and petrophysics

The Iona Gas Storage Facility – an analogue for CO₂ storage

Discipline Leader	Sandrine Vidal-Gilbert	ASP
Senior Researcher	Eric Tenthorey	Geoscience Australia
	Ranjith Gamage	Monash University
	David Dewhurst	CSIRO

Activity Purpose

The activity aims to use the Iona gas storage facility to better understand geological and geomechanical issues relating to CO₂ storage. A large emphasis of the project will be to compare the geological properties and geomechanical behaviour of the Iona reservoir to that of the nearby Otway Project. This in turn may enable more general conclusions to be drawn regarding natural gas storage at the 1000 or so sites around the world as an analogue for CO₂ storage. The Iona facility is unique in that a large dataset has been acquired over the 15 or so years of its operation. This will hopefully lead to an evaluation of the reservoir stress path, elasticity of the reservoir, and strength and transmissibility properties of the intra-reservoir faults.

Reservoir stress path and methodologies for interpretation of fault systems

Discipline Leader	Sandrine Vidal-Gilbert	ASP
Senior Researcher	Richard Hillis	ASP
Senior Researcher	Guillaume Backe	ASP
Postgraduate student	Jacques Sayers	ASP

Activity Purpose

To conduct research related to the reservoir stress path during both depletion and re-pressurisation and apply this knowledge to Naylor Field and Iona Gas Storage Facility. This issue is important in terms of reservoir compaction/expansion, surface movement, failure of intact rock, near wellbore deformation and it is necessary to identify maximum sustainable pressures for fault stability. Interpreting fault systems in the eastern Gippsland Basin and assessing impact on tectonic evolution and trap integrity with application to potential carbon dioxide storage sites.

A study of caprock integrity for CO₂ storage projects

Discipline Leader	Sandrine Vidal-Gilbert	ASP
Activity Manager	Ranjith Pathegama	Monash University
Post graduate Student	Richa Shulka	Monash University

Activity Purpose

This activity aims to study cap rock integrity by conducting experiments to determine the strength, deformability and transport properties of cap rock in a CO₂ storage reservoir and then model the fracture initiation/propagation pressures within the cap rock in the presence of stored carbon dioxide.

Reservoir modelling

Short and long term reservoir modelling

Discipline Leader	Lincoln Paterson	CSIRO
Senior Researcher	Jonathon Ennis-King	CSIRO
Senior Researcher	Yildiray Cinar	UNSW
Post Doc	Martin Leahy	CSIRO
Postgraduate Student	Ali Saeedi	Curtin University
Postgraduate Student	Myles Regan	ASP

Activity Purpose

This activity builds enhanced reservoir engineering capability to model the injection, migration and final containment of carbon dioxide stored in geological formations.

Hydrodynamics and geochemistry

Investigation of offshore natural analogues for CO₂ geosequestration

Discipline Leader	Jim Underschultz	CSIRO
Senior Researcher	Ulrike Schacht	ASP
Senior Researcher	Sunil Varma	CSIRO
Senior Researcher	Christine Trefry	CSIRO
Senior Researcher	Chris Boreham	Geoscience Australia

Activity Purpose

Investigate offshore natural accumulations of CO₂ with the aim of better understanding the behaviour of CO₂ in the subsurface.

Investigation of CO₂ migration in natural analogues via soil gas measurements

Discipline Leader Senior Researcher	James Underschultz Ulrike Schacht	CSIRO ASP
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Activity Purpose

Investigate migration of CO₂ with the aim of better understanding the behaviour of CO₂ in the subsurface.

Fluid-rock interaction geochemical modelling

Discipline Leader Senior Researcher Senior Researcher Senior Researcher Post Doc VACANT	James Underschultz Dirk Kirste Simon Ulrike Schacht Karen Higgs	CSIRO Fraser University ASP GNS Adelaide University
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Activity Purpose

To predict CO₂-water-rock interaction using equilibrium, kinetic and reactive transport models.

Saline aquifers and seals

Discipline Leader Senior Researcher Senior Researcher Senior Researcher Senior Researcher Senior Researcher	James Underschultz Eric Tenthorey Ric Daniel Ulrike Schacht Andy Nicol Allison Hortle	CSIRO Geoscience Australia ASP ASP GNS CSIRO
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Activity Purpose

To develop multi-disciplinary methodology and workflows for i) evaluating the impact of CO₂ on the aquifer system including saline water displacement; ii) estimating the CO₂ seal capacity of fault and top seals; and iii) provide input to more accurately estimate storage capacity and containment security.

Coal systems

Enhanced Gas Recovery

Postgraduate Student	Myles Regan	ASP
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Activity Purpose

To investigate the potential for the enhancement of natural gas recovery, specifically from water-drive dry gas reservoirs, using CO₂ injection. To investigate the effect various reservoir and fluid properties have on the effectiveness of injecting CO₂ in order to retard aquifer influx and stably displace natural gas.

Regional studies

New Zealand Regional Geology Phases 1 and 2

Project Manager	Brad Field	GNS
Senior Researcher	Steve Edbrooke	GNS
Senior Researcher	Hannah Bushe	GNS
Senior Researcher	Mark Lawrence	GNS
Senior Researcher	Malcolm Arnot	GNS
Senior Researcher	Peter King	GNS
Senior Researcher	Mark Bunch	ASP
Senior Researcher	Mark Rattenbury	GNS
Senior Researcher	John Begg	GNS
Senior Researcher	Kyle Bland	GNS
Technical Assistant	Simon Mockler	ASP

Project Purpose

This project aims to assess the CO₂ storage potential of New Zealand in order to promote deployment of Carbon Capture and Storage in New Zealand and to influence the development of New Zealand's regulatory framework.

The CO₂CRC Otway Project

Geomchanics

Project Manager	Sandeep Sharma	CO ₂ CRC
Discipline Leader	Sandrine Vidal-Gilbert	ASP
Senior Researcher	Eric Tenthorey	Geoscience Australia
Senior Researcher	Richard Hillis	Adelaide University

Activity Purpose

To conduct research related to geomchanical aspects of CO₂ storage as part of the Otway Project

Hydrodynamics and geochemistry

Project Manager	Sandeep Sharma	CO ₂ CRC
Discipline Leader	Jim Underschultz	CSIRO
Senior Researcher	Allison Hortle	CSIRO
Senior Researcher	Linda Stalker	CSIRO
Senior Researcher	Chris Boreham	Geoscience Australia
Senior Researcher	Patrice de Caritat	Geoscience Australia
Senior Researcher	Dirk Kirste	Simon Fraser University
Senior Researcher	Ernest Perkins	Alberta Research Council
Senior Researcher	Ulrike Schacht	ASP

Activity Purpose

The hydrodynamics and geochemistry work for the Otway Project aims to:

o characterise the baseline conditions (water chemistry, gas chemistry, formation pressure, formation water flow direction and rate, and microbiology) of the soil strata between the surface and Eumeralla Formation; and

o design and implement a monitoring and verification strategy for the start of injection to 2010 that will identify the location and impact of injected CO₂ at the Naylor-1 observation bore, the deep and shallow aquifers, and within the soil profile that involves all the disciplines listed in point 1.