PhD Opportunity

Geochemical Interactions Related to Geological Carbon Storage (GCS) - Carbonates

The Departments of Process Engineering and Earth Science, Memorial University of Newfoundland are seeking a strong candidate for research related to geological carbon storage in depleted carbonate reservoirs. The position is in person at Memorial University, St. John's, NL, Canada under the supervision of Dr. Lesley James in collaboration with Dr. Fritz Neuweiler (Laval University, Quebec-City), and Dr. Karem Azmy (Memorial University). This research forms part of a larger multidisciplinary Canadian effort on Transforming Climate Action (TCA); see: https://www.ofi.ca/programs/transform-climate-action.

Project Description

Objective: Identify and characterize structural and geochemical interactions during geological carbon storage within a depleted carbonate gas reservoir (Abenaki Formation, Jurassic, off-shore Nova Scotia).

Activities:

- Assess and compile basic rock properties (poro-perm, texture, mineralogy, etc.) of cored intervals of Abenaki members 4,5,6 + Antimon cap rock. A full set of logging data and several sets of thin-sections are available from cores Margaree F-70, Demascota G-32, Acadia K-62 and Cohasset L-97.
- Perform experimental diagenesis ($scCO_2$ injection, coreflooding, fluid-chem-pressure monitoring; poro-perm and structure - before-after) on representative samples and cores mimicking the stratigraphic intervals and variations to understand the geochemical/geomechanical changes in the rock based on exposure to CO_2 brine.
- Identify & quantify CO_2 storage geochemical reaction risks and the efficiency of different trapping mechanisms.
- Validate experimental observations and geochemical changes using geochemical modelling software such as PHREEQC, TOUGHREACT, PFLOTRAN.
- An effort for up-scaling at regional scale via modeling using reservoir simulation software.

Position

PhD student – starting January 2026

Application Requirements

Please submit applications as a single pdf file containing Curriculum Vitae including publication list, a statement of interest, copies of degrees certificates and transcripts, English language proficiency certificate (if applicable), a copy of thesis/publications (may send a list to a link of downloadable documents), and names and contact information of three referees to: hiberniaadmin@mun.ca.

Maximum attachment file size is 8 MB. If larger, please send a link.

We thank all applicants for their interest, however, only those selected for an interview will be contacted.

Required Selection Criteria

You must possess a professionally relevant background (MSc) in Engineering (Petroleum, Chemical, Geological) or Science (Geochemistry, Geology, Chemistry, Surface Chemistry) with specialty in experimental or modelling and simulation approaches.

For candidates with degrees from schools where English is not the primary teaching/research language, a recent English language proficiency certificate with strong scores in writing and speaking modules is necessary.

All the degrees certificates and transcripts should be in English language.

You must meet the admission requirements set forward by the School of Graduate Studies, Memorial University of Newfoundland: https://www.mun.ca/become/graduate/

Preferred Selection Criteria

We are seeking qualified candidates with relevant background in engineering and science, and strong knowledge in fundamentals and applications.

Industry experience is an asset.

We are particularly interested in interviewing candidates with working experience and knowledge in including geology, diagenesis, chemistry of minerals, high-pressure high-temperature lab environment, and capable of operating rock and fluid characterization equipment (coreflooding, IFT/wettability, porosimetry and permeametry with He and Hg, capillary centrifuge, PVT, SEM-MLA, rheometer, XRD, XRF, and AFM, among other equipment).

Familiarity with engineering software applications, simulation packages and programming language(s) is an asset (PHREEQC, PFLOTRAN, TOUGHREACT, ChemStation, ECLIPSE, PETREL, CMG, Python, MATLAB, COMSOL Multiphysics, among other software packages).

Personal Characteristics

- Ability to work independently as well as in teams
- Good communication/networking skills and strong writing capabilities
- Motivated and able to engage in theoretical and practical research and interdisciplinary collaboration

Equity, Diversity and Inclusion (EDI) Statement

Memorial University is committed to employment equity, diversity, inclusion and anti-racism, and encourages applications from all qualified candidates, including: women; people of any sexual orientation, gender identity, or gender expression; Indigenous Peoples; visible minorities, and racialized people; and people with disabilities. Memorial is committed to providing an inclusive learning and work environment. If there is anything we can do to ensure your full participation during the application process, please contact equity@mun.ca directly and we will work with you to make appropriate arrangements.

About the Faculty of Engineering and Applied Science and Department of Earth Sciences

Depending on your background, you can be accepted into The Faculty of Engineering and Applied Science (FEAS) or Earth Sciences.

FEAS offers accredited undergraduate programs in civil engineering, computer engineering, electrical engineering, mechanical engineering, ocean and naval architectural engineering and process

engineering, following a fully integrated co-operative education model. At the graduate level, the department of process engineering offers thesis-based master's and doctoral programs in oil and gas engineering, and process engineering, as well as course-based master's programs in oil and gas engineering and safety and risk engineering. For more information, please visit https://www.mun.ca/engineering/. For more information about the Hibernia Research Group, please visit https://www.mun.ca/engineering/research/eor/

Similarly, the department of Earth Sciences offers thesis-based MSc and PhD programs in geology and geophysics as well as environmental sciences. For more information, please visit https://www.mun.ca/earthsciences/

About Memorial

Perched on Canada's North Atlantic coast, Memorial University of Newfoundland is a destination for discovery. A beacon for the 21st-century explorer, Newfoundland and Labrador's university is a unique learning community founded in 1925 as a living memorial to those who lost their lives in the First World War – "that in freedom of learning their cause and sacrifice might not be forgotten." Today more than 18,000 students from nearly 110 countries come together to discover. From the classics to advanced technology, the comprehensive university offers certificate, diploma, undergraduate, graduate and postgraduate programs across five campuses, numerous locations and online. A global network of almost 95,000 accomplished alumni throughout the world strengthens Memorial University's capacity and reputation for leadership in world-class research, teaching and public engagement. To take a closer look, visit www.mun.ca.

Land Acknowledgement

We acknowledge that the lands on which Memorial University's campuses are situated are in the traditional territories of diverse Indigenous groups, and we acknowledge with respect the diverse histories and cultures of the Beothuk, Mi'kmaq, Innu, and Inuit of this province.