

**Title:**

Design of fiber reinforced thermoplastic composites for energy applications

**Description:**

The global shift toward climate solutions has positioned Carbon Capture and Storage (CCS) as a critical technology for reducing industrial CO<sub>2</sub> emissions. Polymer composites, with their lightweight nature, corrosion resistance, and design flexibility, are promising candidates for use in CCS infrastructure - including pipelines, liners, and sealing systems. This project focuses on the design, processing, and evaluation of advanced polymer composite materials specifically tailored for CCS technologies.

The goal of this project will be the design and development of short-fiber reinforced thermoplastic composites focusing on dynamic mechanical properties, fatigue resistance, and adhesive properties. This project is in collaboration with an industrial sponsor and will have the opportunity to perform both experimental and finite element modelling work. The successful candidates will gain experience in:

- Design of experiments (DOE) for material formulation and processing
- Polymer composite processing including compounding
- Mechanical and thermal characterization techniques including
- Finite element modelling

This project offers a unique opportunity to contribute to sustainable materials development in support of clean energy and emission-reduction technologies, which will help you build a strong foundation in polymer processing, materials characterization, and applications in the energy sector.

**Research Area:** Advanced Manufacturing, Mechanics and Materials

**Start Date:** Fall 2025

**Application:** Please submit your CV and a single paragraph describing your interest in the project in one file within a single email to Prof. Hani Naguib (naguib@mie.utoronto.ca) and Dr. Adam Pearson (adam.pearson@mail.utoronto.ca). Shortlisted applicants will be contacted thereafter.