



PhD Student Opportunity — *Advanced in situ characterization of CO₂R electrodes*

The [Bazylak group](#) at the University of Toronto and the [Higgins group](#) at McMaster University are seeking qualified **PhD** candidates to work on co-supervised research projects pertaining to electrochemical energy conversion and storage technologies in collaboration with our industry, academic and government research partners. While the position will be co-supervised by Professors Bazylak and Professor Higgins, the student's home institution will be at the University of Toronto within the Mechanical and Industrial Engineering Department. We are looking for applicants that are excited to address global sustainability challenges by tackling research on the forefront of science and engineering. Successful applicants will apply principles of electrochemistry (catalysts and reactors) and advanced *in situ* characterization to enable the development of next-generation clean energy technologies to minimize the carbon footprint of conventional processes. Particularly, we are searching for interested individuals to play an instrumental role in the following area:

- Advanced *in situ/operando* spectroscopy, tomography and spectro-microscopy characterization to understand electrochemical CO₂ conversion processes occurring in electrodes under electrochemical operating conditions. Will require travel to synchrotron facilities within Canada and abroad and the ability to spend time at both McMaster University and the University of Toronto.

Position Requirements and Expectations:

- Completed or close to completion Bachelor's or Master's degree in a related area of science or engineering.
- Interest and strong motivation to address sustainability challenges facing the world.
- Strong analytical skills and the ability to think critically and creatively.
- The ability to work well as part of a team, get along with colleagues and foster collaborations across two academic institutions (McMaster and the University of Toronto)
- Capable of independent problem solving and industriousness to solve new research challenges.
- Strong oral and written communication skills.
- Skillful working with the hands, tools or advanced instrumentation (i.e., an aptitude for hands-on work).
- The ability to work safely and responsibly in a laboratory environment.
- The ability to split work tasks between McMaster University and the University of Toronto.

Experience in the Following Areas is Desirable:

- Experimental electrochemistry and electrochemical technologies, such as electrolyzers, batteries, supercapacitors or fuel cells.
- Materials characterization, with experience using X-ray spectroscopy techniques considered an asset
- Experience with synchrotron-based measurements.
- Working in a wet chemical laboratory.
- Design, assembly and use of equipment or experimental apparatuses, and in particular working with new instrument design and/or utilizing existing instruments in new ways
- Experience with experimental research and development.
- Contributing to the preparation of peer-reviewed publications.



What You Can Expect:

Successful applicants will receive experience and training in experimental research relating to the development, understanding and integration of advanced characterization techniques towards CO₂ conversion technologies that will be integral components of a sustainable energy future. Researchers will work in a diverse and multi-disciplinary research environment with tremendous opportunities for collaboration, and will network and interact with world leading academic, industrial, and government researchers through programs such as the NFRF funded CANSTOREnergy project.

Start Date: Anytime according to the availability of the applicant and potential visa processing times.

Application process: Interested applicants should send their cover letter, CV and the names of up to three prospective referees to (higgid2@mcmaster.ca) with the subject line stating 'PhD – Advanced Characterization'. Review of applications will begin immediately and continue until all positions are filled. Only applicants selected for an interview will be contacted. The Higgins group, Bazylak group, McMaster University and the University of Toronto are committed to building a diverse and inclusive community. While all qualified applicants are invited to apply, we particularly welcome applications from individuals that identify with groups traditionally underrepresented in Engineering, and we will strive to hire individuals who share our commitment to equity, diversity, and inclusion.