PhD Student Opportunity — *Advanced in situ electron microscopy characterization of clean energy materials*

The Bassim group and the Higgins group at McMaster University are seeking qualified **PhD** candidates to work on co-supervised research projects pertaining to advanced characterization of sustainable energy conversion and storage materials, including materials for electrochemical technologies and/or catalysis. We are looking for applicants that are excited to address global sustainability challenges by tackling research on the forefront of science and engineering in collaboration with our industry, academic and government research partners. Successful applicants will develop the capacity to carry out advanced transmission electron microscopy (and related spectroscopy) measurements and apply them *in situ* to understand the morphological, structural and chemical changes occurring in nanostructured materials under operating conditions as well as their impacts on performance.

Position requirements and expectations:

- Completed or close to completion Bachelor's or Master's degree in a related area of science or engineering.
- Skillful working with the hands, tools or advanced instrumentation (i.e., an aptitude for hands-on work), including the advanced sample preparation facilities and electron microscopes within the Canadian Centre for Electron Microscopy.
- 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 research groups.
- Capable of independent problem solving and industriousness to solve new research challenges.
- Strong oral and written communication skills.
- The ability to work safely and responsibly in a laboratory environment.

Experience in the following areas is desirable:

- Experimental electrochemistry and electrochemical technologies, such as electrolyzers, batteries, supercapacitors or fuel cells.
- Experimental thermal catalysis and related chemical conversions.
- Materials characterization, with experience using electron microscopy and related techniques considered an asset.
- 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.

Start date: Anytime according to the availability of the applicant and potential visa processing times. Graduate students typically begin at the beginning of January, May or September, as that coincides with the start of an academic term.

What you can expect as a graduate student:

Successful applicants will receive experience and training in experimental research relating to the development, understanding and integration of advanced characterization techniques towards energy 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.

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 – In situ EM 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, Bassim group and McMaster University 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.

What to expect during the recruitment and interview process:

Applicants that are selected for an interview will be contacted by email to arrange a suitable time for a ~45min interview. We will do our best to accommodate different time zones and work/personal/family responsibilities, so please let us know if the selected time does not work for you. During the interview process we will ask you several questions to learn more about your professional goals, interests, motivations, experiences and capabilities as a student, researcher and professional. We will likely also request that you prepare a short 5-10min presentation on your previous research experiences and achievements, and we will ask questions to gain a better understanding of your past contributions to research. After the interview, we will request the contact information of 2-3 references that have worked closely with you so that we can arrange to have a discussion with them. We will also get you in touch with 2-3 current graduate student researchers for a discussion so that you can ask questions about what it is like to be a researcher at McMaster University and so that they can get to know you as a prospective colleague. All candidates will be assessed based on four criteria: (1) Enthusiasm/motivation for the research area and research program; (2) Critical thinking capabilities and aptitude for research; (3) Communication; (4) Interpersonal skills.