



CALL FOR APPLICATIONS

Are you trained in engineering or natural sciences and have a passion for the major sustainability issues facing our society? Do you strive for excellence and are you motivated to join a dynamic team that develops sustainability metrics, with a strong emphasis on the life cycle assessment of products and services?

The CIRAIG is currently recruiting for 17 positions (MSc, PhD, postdoc) in interdisciplinary sustainability projects in Montréal (Québec), Canada.

The CIRAIG is an interdisciplinary research center on the life cycle assessment of product, processes and services conducting leading edge research in modeling and assessing the sustainability of production and consumption systems to support strategic decision-making toward a full circular and carbon neutral sustainable transition. The CIRAIG brings together the expertise of two universities in Montréal, Canada - Polytechnique Montréal and UQÀM -, as well as two universities in Sion, Switzerland - HES-SO and EPFL - (<http://www.ciraig.org/en/>).

Working environment and conditions

We offer challenging and rewarding positions in an internationally recognized research center for its solid scientific research and applied experience working in partnership with industry and governments. We strive for academic excellence performed in a dynamic and pleasant community characterized by collegial respect and academic freedom.

Depending on the project, the candidates will be enrolled either at UQÀM or at Polytechnique Montréal. The financial aid is granted based on research funding amounts recommended at each university.

Equity, diversity and inclusion

We welcome and encourage applications from racialized persons/visible minorities, women, Indigenous persons, persons with disabilities, ethnic minorities, and persons of minority sexual orientations and

gender identities, as well as from all qualified candidates with the skills and knowledge to engage productively with diverse communities. To remove potential unconscious bias in the first selection step, we ask the applicants to submit anonymized CVs and motivation letters (see application guidelines).

Application

Interested candidates should [send their pre-application here](#) no later than September 15, 2022. **For the CV and motivation letter, please make sure to submit an anonymized version (no name, photo, gender, nationality or age).** The application can be submitted in English or French.

Please note that the scholarship for the Master and PhD studies is subject to academic approval following an official application through the Office of the Registrar at the university - either UQÀM or Polytechnique Montréal, depending on the project.

Research projects

Prioritizing vehicle electrification investments in Quebec: a focus on municipal fleets (Cécile Bulle UQAM, ESG and Anne de Bortoli, Polytechnique Montreal)

One master student and one postdoctoral researcher will work for 2 years on building a tool to help cities and other public authorities prioritize their investments to decarbonize as fast as possible. The project aims to model the carbon footprint and life cycle cost of electric vehicles - including microvehicles, cars, and all kinds of utility vehicles - using life cycle assessment and costing, supported by the non-profit organization IVEO and dozens of municipalities in Quebec. You want to develop science to fight climate change now? Join the crew, this project is for you!

Inclusive DIALOGUES towards an operational concept of energy citizenship (Cécile Bulle, UQÀM, ESG, and Laure Patouillard, Polytechnique)

[DIALOGUES](#), a European Horizon2020 project in which CIRAIG is a partner, aims to enable citizens to take a central role in the energy transition. In Canada (mostly at CIRAIG-UQÀM), 4 PhD and 4 MSc will contribute to different multidisciplinary aspects of this project with research topics related to :

- Mainstreaming and communication of life cycle assessment toward non expert citizens;
- Building a life cycle assessment inventory database of consumption in Quebec (focusing on energy and transport);
- Building a behavioral model allowing to assess the impact of transport;
- Contextualizing energy citizenship in Canada and explore its critical dimensions;
- Operationalizing life cycle assessment simplified tools toward decision making to enlighten energy transition at the community or the municipality level.

Life Cycle Assessment and Carbon Capture and Use (CCU) (Polytechnique Montreal, Chemical Engineering department, Prof. Anne-Marie Boulay)

PhD position: As part of the FONCER/CREATE program Centre for Innovation and Research on Carbon Utilization in Industrial Technologies (CIRCUIT, www.circuitco2.ca), the student will join CIRAIG and the CIRCUIT multidisciplinary team and be trained as a Carbon expert, while developing the potential for decision making with LCA for CCU technologies.

Impacts of Plastics on the environment (Polytechnique Montreal, Chemical Engineering department, Prof. Anne-Marie Boulay)

MSc and/or PhD: In the context of the MarILCA working group (Marine Impacts in LCA, www.marilca.org) the student will join the CIRAIG's life cycle impact assessment team to contribute to the development of impact pathway modelling (on human health and/or ecosystem quality) for the emissions of plastics in the environment (soil and freshwater).

Using artificial intelligence (AI) to fill gaps in prospective LCAs and guide the ecodesign of chemicals (1 Ph.D.) (Polytechnique Montreal, Chemical Engineering department, Prof. Guillaume Majeau-Bettez & Bruno Blais)

In an ecodesign process, hundreds of potential design candidates can be considered, and *there is never enough time* to perform life-cycle assessments on all these options. This project will develop innovative, AI-based strategies to make LCAs more efficient, rapid, and useful in anticipating impacts for ecodesign teams. The case study will focus on the green chemistry and ecodesign of chemicals, automatically linking the characteristics of their synthesis pathways and their chemical properties to the determinants of their potential environmental impacts. *A highly innovative project with interesting methodological and technical challenges!*

Develop and analyze material-focused transition scenarios toward a circular economy (2 Ph.D. or M.Sc.) (Polytechnique Montreal, Chemical Engineering department, Prof. Guillaume Majeau-Bettez)

While policy-makers can rely on relatively detailed models of the coming *energy* transition and its potential to fight climate change, we really do not have an overview of the implications of the coming *material* transition toward a more circular economy. This project will develop and analyze large-scale transition scenarios and estimate the climate benefits that can be achieved through a smarter use of our materials and resources. *Let's get serious about circular economy and make sure we see the big picture to prioritize action!*

Integration of chemical engineering and LCA process modelling (1 Ph.D. and 1 M.Sc.) (Polytechnique Montreal, Chemical Engineering department, Prof. Guillaume Majeau-Bettez)

LCA studies and LCA databases are extremely useful to guide the choice of technologies or the design of products, but LCAs rarely help guide the development or the improvement of *industrial processes*, despite their massive environmental importance. The oversimplification of process models in LCA software tools and the lack of parametrization of inventories prevent an effective engagement with that kind of optimization. This project will spearhead the integration of LCA and chemical engineering

models, with the development of novel, more flexible data structures and open-source software tools. A *unique chance to change how engineering is done!*

To submit your application

Please fill out the form here: <https://airtable.com/shryGEp5aMDGcUYxb>