



**Posting Date:** February 2023

Department of Civil and Mineral Engineering,  
Faculty of Applied Science and Engineering,  
University of Toronto

## **JOB POSTING – Multiple Postdoctoral Fellows: Analysis of Energy Systems, Carbon Dioxide Removal and Life Cycle Thinking**

**Areas of Research:** Carbon dioxide removal, national bioenergy potential, life cycle assessment, techno-economic modeling, energy systems optimization, technology deployment, climate modeling, carbon capture and utilization, environmental tradeoffs, alternative fuels and chemicals.

### **Overview of the positions:**

Multiple openings (2-4) are available for postdoctoral fellows (or PhD students) with a focus on macro-scale energy systems modeling (i.e., national & regional energy systems) and/or sustainability assessment. Ongoing projects involve collaborators from across Canada and international institutions, including both academia, government and private sector partners. Current anticipated project openings are listed below (however others may arise):

1. Assessment of **national bioenergy potential**, together with **life cycle assessment and techno-economic assessment** of different options for bioenergy with carbon capture and storage. Expected outcomes will inform large-scale mitigation potential from this technology in Canada.
2. Development of **deployment scenarios for CDR technologies** (e.g., direct air capture and bioenergy with carbon capture & storage), together with resulting emission profiles and other impacts (e.g., land use, changes to water cycles, albedo change). This project will work alongside with **Climate Science** collaborators who will use the results as an input into climate models, to assess the true impacts of CDR technologies on the climate & climate change.
3. Development of a Canadian **national energy optimization model**, using the [TEMOA](#) framework and related models. The model will broadly cover all sectors of the Canadian economy, with greater resolution on the **heavy industry and transport sectors**, and a focus on the role of **chemical fuels** such as hydrogen, electrofuels and petroleum for the low carbon transition.
4. Sustainable systems assessment of **carbon capture and utilization technologies**, including carbon conversion using electrolytic and thermal routes for the production of fuels, chemical and energy storage applications.

**Description of duties:**

- Proposing and conduct novel research related to the areas described above.
- Developing new frameworks and tools and disseminating results via publications and conference presentations.
- Supporting student supervision, including definition of research directions, review of abstracts and manuscripts, and assistance with analytical methods
- Coordinating research projects and managing relationships with industry, government and academic partners, including communication of results, setting research priorities, organizing meetings and developing progress reports.

**Required qualifications:**

- PhD degree in chemical engineering, civil engineering, mechanical engineering, climate science, environmental science, physics, economics or related field awarded within the past 5 years.
- Experience in one or more of the topic areas or methods listed above, including relevant publications
- Some programming experience (e.g., Python, MATLAB, R) is strongly recommended
- Experience with life cycle assessment, techno-economic analysis, optimization, data analysis, climate modeling, energy systems modeling and/or integrated assessment modeling are strong assets
- Interest and experience with team management
- Excellent verbal and written communication skills in English, including ability to communicate with multidisciplinary audiences
- Ability to build relationships and collaborate with others, both internally and externally.

**Salary: \$50,000-75,000 / year + benefits, depending on qualifications and experience**

*Please note that should the minimum rates stipulated in the collective agreement be higher than rates stated in this posting, the minimum rates stated in the collective agreement shall prevail.*

**Supervisors:** Heather MacLean and/or Daniel Posen, depending on the project of interest.

**Expected start date:** The positions are available immediately, but start date is flexible.

**Term: 1 year with potential for renewal**

**FTE: 1**

Employment as a Postdoctoral Fellow at the University of Toronto is covered by the terms of the CUPE 3902 Unit 5 Collective Agreement.

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The normal hours of work are 40 hours per week for a full-time postdoctoral fellow (pro-rated for those holding a partial appointment) recognizing that the needs of the employee's research and training and the needs of the supervisor's research program may require flexibility in the performance of the employee's duties and hours of work.

### **Application instructions**

Applicants should upload the information below using the following [link](#), and notify Heather MacLean ([heatherl.macleam@utoronto.ca](mailto:heatherl.macleam@utoronto.ca)) and Daniel Posen ([daniel.posen@utoronto.ca](mailto:daniel.posen@utoronto.ca)) once you have done so. Please use “PDF Application Energy Systems” as the subject of your email.

1. A single electronic file consisting of:
  - a. A cover letter;
  - b. Detailed CV;
  - c. The names and contact information for three references.
2. Copies of up to 3 relevant publications

In your cover letter, please discuss reasons for your interest in this position; indicate which open projects listed above are of most interest; and describe your past research experience or skills and their relevance to this opening.

**Closing date:** Applications will be considered on a rolling basis. Interviews will commence in March/April 2023. The search will continue until the position is filled.

*The University of Toronto is strongly committed to diversity and intentional inclusion within its community and encourages applications from racialized persons / persons of colour, women, Indigenous / Aboriginal People of North America, persons with disabilities, and LGBTQ2S+ persons.*