PhD Opportunity
Two PhD Positions at University of Waterloo and Laurentian University

We invite applications for two PhD positions to participate in a research project to evaluate the impact of winter warming mitigation in controlling carbon losses from pan-Canadian wetland and permafrost ecosystems. The goal of this project is to advance the fundamental, process-based understanding of the function of soil biogeochemical processes in cold region environments during the fall-winter and winter-spring transitions and during the non-growing season (NGS) by creating the foundation for the predictive modelling of winter carbon losses in cold region wetland and permafrost ecosystems under current and future climates. The main tasks of the PhD students will be conducting field and laboratory experiments and modeling analyses. We are looking for 2 PhD students for this project.

PhD 1 will focus on establishing the temperature-dependencies of carbon and nutrient mineralization rates in relation to soil hydrophysical parameters such as unfrozen water content, and the associated effects on winter microbial soil communities. This PhD student will also be involved in developing a bioenergetic model for simulating microbial reaction systems under variable geochemical winter conditions and project NGS emissions under current and future climate scenarios to quantify future northern wetland and permafrost ecosystems carbon balances.

PhD 2 will focus on assessing the rates and mechanisms of wetland and permafrost soil biogeochemical processes under variable winter conditions and examine the drivers of NGS emissions to determine the effects on carbon and nutrient cycling under variable snow cover and flowpaths during the winter conditions. This PhD student will also be involved in developing a reactive transport model to simulate the biogeochemical transformations of carbon and nutrients under winter warming scenarios and estimate the carbon budgets for the wetland and permafrost ecosystems during the period of NGS respiration and incorporate into Canada’s Carbon Budget Model.

The students will be guided by a team of researchers from the University of Waterloo, Wilfrid Laurier University, Laurentian University and collaborators from Canadian Forest Service Great Lakes Forestry Centre-Natural Resources Canada.

Applicants must have specialization in biogeochemistry, hydrology, soil science or a related field. Preference will be given to candidates with demonstrated skills and experience in experimental work and numerical mathematical modeling in biogeochemistry, and environmental sciences, or a related field. MSc student positions can be created in lieu of a PhD position for exceptional candidates who prefer to undertake a Master’s degree.

For further information regarding these positions, or to submit an application, please contact Dr. Pascale Roy-Leveillee (proyleveillee@laurentian.ca) for PhD position 1 and Dr. Fereidoun Rezanezhad (frezanez@uwaterloo.ca) for PhD position 2. In your application email, please include “ACCS-PhD#_yourname” in the subject line and attach a single PDF file that contains:
- Your motivation for applying to the position and your research interests
- Curriculum vitae
- Copy of transcript(s)
- Contact information for up to 3 references

Closing date: Applications will be reviewed as they are received. The positions will remain open until filled. We thank all applicants for their interest, however, only those individuals selected for an interview will be contacted.