Forest Ecology Research Group

Postdoctoral and graduate positions available with the Forest Ecology Research Group as part of the Future Harvest Partnership

As part of the newly funded SSHRC Sustainable Agriculture Research Initiative "Future Harvest Partnership", there are funded positions for one postdoctoral researcher and three PhD positions available through Wilfrid Laurier University's Forest Ecology Research Group (https://forestecology.ca). All these positions can be based in Waterloo, Ontario or Northwest Territories. Evaluation of applications will begin in early January and continue on a rolling basis until all positions are filled.

The Future Harvest Partnership is a multi-year collaboration between Wilfrid Laurier University, the Territorial Agrifood Association and the Government of the Northwest Territories Department of Industry, Tourism and Investment. Supported by an interdisciplinary team of leading academics from across North America, and informed by Indigenous Governments and traditional knowledge, the Partnership engages with food producers and local communities of the Northwest Territories to co-create research and generate useful insights for innovation and policy that can inform the development of a climate-resilient local food system.

PhD 1: Evaluation of soil amendments for enhancing soil carbon sequestration and optimizing growth and yield

Field Locations: Fort Smith and Hay River, Northwest Territories

Background: Currently, there is relatively little established agricultural production in the NWT. However, models show that as the climate warms, southern regions of the NWT will have more favorable conditions for agriculture. At the same time, NWTs regional food supply chain is almost entirely reliant on shipping food from the south, by air, road, and barge to remote communities across the territory. To date, no studies have measured carbon emissions attributable to food distribution across the NWT. However, after oil and gas, the transportation sector was the highest emitter of GHGs in Canada in 2021, accounting for 22% of national carbon emissions and amounting to 150 Mt, primarily from heavy-duty freight and light passenger trucks. Reduction of transportation emissions associated with food import could therefore move the NWT closer to net zero goals. In this context, the broader research objectives that this PhD will be associated with will: 1) work with existing producers to establish agricultural practices that align with Canada's net-zero goals; and 2) measure the carbon-offset potential of local sustainable agriculture to help the NWT, and Canada come closer to their net zero goals by 2050.

Details: This PhD position will support work aimed at developing field tests to improve yield, protect soils, and reduce carbon emissions from NWT food production. Regenerative agriculture production methods and systems designs including conservation and cover cropping; soil amendments, including biochar and on-site compost; and forest/grassland management, among others, are implemented on farms across Canada for their potential to improve yields, protect soils and biodiversity, and reduce carbon emissions. Trialing these and other low-carbon production practices on NWT farms will identify ideal production practices for northern growers based on the efficacy of the method to reduce carbon emissions, while balancing the costs, effort, and technical knowledge needed for implementation, leading to higher adoption among producers. These practices will be trialed by the farmer-led research initiative that forms another part of the Future Harvests program. In this activity, we will quantify the carbon benefits of these practices by evaluating carbon impacts in several ways: 1) Quantifying the net carbon balance from plot-scale trials using chamber-based soil CO_2, CH_4 and N_2O measurements year-round (winter emissions can be substantial) coupled with the measurement of crop CO_2 fluxes and biomass production; 2) Evaluating the efficacy of different regenerative agriculture methods and or crop

types in supporting the sequestration of new, plant-derived carbon implement carbon dating methods combined with the abovementioned flux measures; and 3) Evaluating standing soil carbon stocks over time in these experimental plots.

Funding includes a competitive stipend for one PhD student and funds for field assistants, travel expenses, field supplies, and conference travel. The ideal candidate will have experience conducting plant physiological and/or soil gas flux measurements and working with these data. Additionally, the candidate will have strong writing and organizational skills. The ability to lead and implement field-sampling logistics is important. Fieldwork will involve extended periods in community locations in the Northwest Territories. This position will be co-supervised by Drs. Jennifer Baltzer (Wilfrid Laurier University) and Oliver Sonnentag (Université de Montréal).

Students will enroll in the graduate program of the Department of Biology at the Wilfrid Laurier University in Waterloo, ON (https://students.wlu.ca/programs/science/biology/index.html) in Dr. Jennifer Baltzer's research group (https://forestecology.ca). Ideally, students would take part in field campaigns during summer 2025 and enroll in the graduate program for the Fall 2025 semester.

Interested students should contact me directly (jbaltzer@wlu.ca) with a resume, transcript (unofficial is fine) and, if possible, a piece of your own written work. In your cover letter, please indicate your motivation for pursuing this position and highlight any barriers, career interruptions, or other life events that may have modified your path if you feel comfortable sharing these.