



POSITION: MASTER OF SCIENCE IN FOREST ECOPHYSIOLOGY

The dynamics of carbon sequestration in jack pine wood

We are looking for a student for a master's project on the boreal forest. Climate and environmental changes in the boreal forest are already having significant repercussions on carbon sequestration at the regional level, on the distribution of plant and animal species, and on the economy of the timber industry. However, recent research shows the existence of strong contradictions in our knowledge of the functioning of boreal trees and of their possible responses to environmental changes, particularly with respect to their vulnerability to drought. To better understand the resource use of boreal trees, we propose a research project that will use isotopic tracers as a means of understanding ecophysiological processes. We want to define the intra-annual dynamics and potential limitations of carbon sequestration along the leaf to wood uptake pathway of a species characterizing the boreal landscape.

Objectives and methodology: The main objective of the project will be to better define the temporal successions and the integration processes in the carbon assimilation pathway of jack pine (*Pinus banksiana* Lamb.). This will help to refine the understanding of processes such as carbon dynamics and water use during the growing season. Intra-annual monitoring of cellulose carbon and oxygen isotopes will be carried out over two summers for six trees on a humidity gradient (three trees on clay soil and three trees on sandy soil). The plant tissues analyzed will include leaves, cambium and xylem from the current year. We want to determine how soil and weather conditions interact to influence the dynamics of carbon sequestration in jack pine wood.

Keywords: Climate change; water and carbon functioning; forest vulnerability and thresholds; stable isotopes; jack pine.

Hosting laboratory: The student will be based at the Forest Research Institute (Institut de recherche sur les forêts; IRF; <https://www.ugat.ca/programmes/irf/>) at the Amos campus, under the supervision of Fabio Gennaretti (<http://bit.ly/2TTGTLB>) and the co-supervision of Annie Deslauriers (UQAC) and Etienne Boucher (UQAM). The Forest Research Institute is a dynamic, multicultural, and international institute, which provides a quality environment for students to develop research. The institute includes 13 professors and more than 60 graduate students working on a wide range of topics such as modelling, silviculture, genetics, biodiversity, ecophysiology, remote sensing, and sustainable forest management. The student will be a member of the Centre for Forest Research (Centre d'étude de la forêt; CEF; www.cef-cfr.ca), and of the Abitibi Regional County Municipality ecology research group (GREMA). Amos is an expanding campus with state-of-the-art infrastructures and a dynamic student life (<https://destinationamos.com/page/1191356>). The student will collaborate actively with our partners (the Quebec Ministry of Forests, Wildlife and Parks and Resolute Forest Products).

Position requirements: Bachelor's degree in ecology, biology, forestry, or a related discipline with an interest in ecology and climate change. The student must be able to work with autonomy, curiosity, rigour and motivation within a multidisciplinary team. He/she should be willing to carry out fieldwork in remote locations, have good team spirit, and excellent writing skills. A driving license and aptitudes in statistical analyses and scientific communication are an asset.

Supervisors: Fabio Gennaretti (UQAT), Annie Deslauriers (UQAC) and Etienne Boucher (UQAM).

Project collaborators: Yves Bergeron (UQAT), Louis Duchesne et Pierre Grondin (MFFP, DRF), François Levesque et Francis Perreault (Produits Forestiers Résolu), Hubert Morin, Maxime Paré et Sergio Rossi (UQAC).

Study program: Master of ecology, University of Quebec in Abitibi-Temiscamingue (Université du Québec en Abitibi-Témiscamingue; UQAT; <https://www.ugat.ca/etudes/irf/maitrise-en-ecologie/>).

Registration date: Summer 2021.

Financial support: Scholarship of 17,500 \$/year over two years.

Information: Send your application in a single pdf containing a curriculum vitae, a cover letter, academic transcripts, and contact details for three references to Fabio Gennaretti (fabio.gennaretti@ugat.ca). We will continue to review applications until the position is filled.



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