NEW PHD POSITION IN FOREST ECOPHYSIOLOGY

Ecosystem fluxes and growth scenarios for boreal tree species

We are looking for a student for a PhD project on the boreal forest. The boreal ecosystems have a central place in Canada's natural environment, history, culture and economy, but today they face rapid climate and environmental changes that can modify their structure and functioning and that can open up new perspectives for the forest industry. To better predict the responses of northern forest ecosystems to these changes, we must obtain a detailed knowledge of the ecophysiological functioning of emblematic tree species. Our research project exploits a unique dataset on intra-annual forest growth, combined with mechanistic modeling, to study key forest processes in a context of climate change. The results will help characterizing and anticipating the effects of climate change on boreal forest ecosystems.

Objectives and methodology: The main objective of the PhD project will be to provide our public and industrial partners with potential growth scenarios for mature boreal forest stands, including detailed descriptions of water and carbon fluxes. We have access to the longest and most comprehensive intra-annual monitoring of boreal forest growth (up to 20 years of intra-annual monitoring on some sites). These data mainly include phenological and xylogenesis monitoring (i.e. wood formation). In some cases, we also have access to data on sap flow, non-structural carbohydrate concentration and photosynthesis. We will also use spatial data (e.g. ecoforestry maps, satellite data such as NDVI) and climate projections with our ecophysiological modeling to study how the seasonal climate (current and future) potentially affects the functioning of mature forests in Quebec. We will mainly use the MAIDEN ecosystem model developed by researchers from our team. We will be interested in detecting new opportunities for forest management in a context of climate change.

Keywords: Climate change; mechanistic ecophysiological model; water and carbon functioning; forest vulnerability and thresholds; growth scenarios.

Hosting laboratory: The student will be based at the Forest Research Institute (Institut de recherche sur les forêts; IRF; https://www.uqat.ca/programmes/irf/) at the Amos campus, under the supervision of Fabio Gennaretti (http://bit.ly/2TTGTLB) and the co-supervision of Sergio Rossi (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 (Quebec Ministry of Forests, Wildlife and Parks and Resolute Forest Products).

Position requirements: We are looking for a student with a master's degree in ecology or forestry with an interest in modeling and statistics OR a master's degree in mathematics, physics, statistics or computer science with an interest in their applications in ecology in a climate change context. 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, have good team spirit, and excellent writing skills. A driving license and scientific communication skills are an asset.

Supervisors: Fabio Gennaretti (UQAT), Sergio Rossi (UQAC) et Etienne Boucher (UQAM)

Project collaborators: Yves Bergeron (UQAT), Louis Duchesne et Pierre Grondin (MFFP, DRF), Sonia Légaré (MFFP, Nord du Québec), Jean-Felix Villeneuve (MFFP, Alma), François Levesque et Francis Perreault (Produits Forestiers Résolu), Hubert Morin, Maxime Paré et Annie Deslauriers (UQAC).

Study program: PhD program with specialisation in forest ecology, University of Quebec in Abitibi-Temiscamingue (Université du Québec en Abitibi-Témiscamingue; UQAT; https://www.uqat.ca/recherche/doctorat-sur-mesure/).

Registration date: Summer 2021

Financial support: Scholarship of 21 000 $/year over three 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@uqat.ca). We will continue to review applications until the position is filled.

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