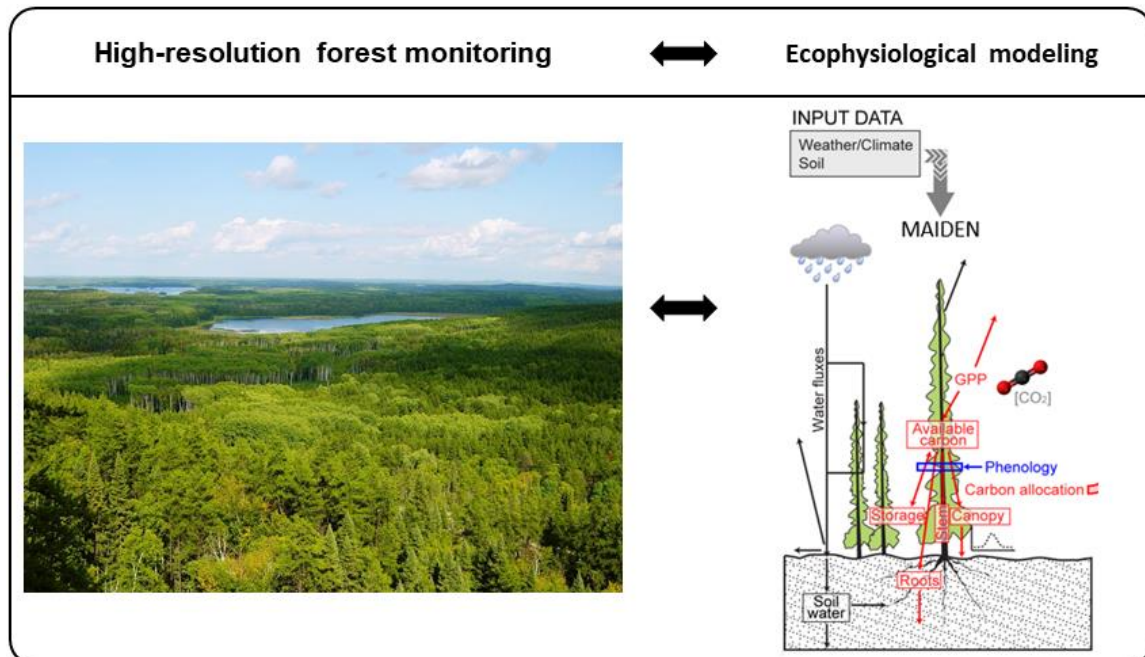


## New PhD position - Predicting growth responses of boreal forests: an approach based on analysis and modeling of ecophysiological processes

We are looking for a student for an exciting PhD project in the boreal forest. The main objective of the project is to improve understanding of the ecophysiological functioning of selected forest species (mainly black spruce, balsam fir, trembling aspen and jack pine) in order to characterize and anticipate the effects of climate change on northern forest ecosystems. We have access to the longest and most comprehensive intra-annual monitoring of the growth of boreal forests (up to 15 years of intra-annual monitoring at some sites). These data mainly include monitoring of phenology and xylogenesis (i.e. wood formation). In some cases, we also have data on sap flow, concentration of non-structural carbohydrates and photosynthesis. These data will allow the validation and improvement of mechanistic ecophysiological models that will be used to test hypotheses on the water and carbon functioning of the studied forest sites, both at the tree scale and at the stand scale.

**Objectives and methodology:** The scientific approach will merge the use of experimental data and mechanistic modeling to be able to provide information on several forest processes linked to endogenous factors (aging, physiological state of trees) and environmental factors (climate, CO<sub>2</sub>, nutrient availability, soil properties). The improved model simulations will allow better predictions of ecosystem responses to future climate change. We will mainly use the MAIDEN ecosystem model developed by our team.



**Keywords:** Climate change; long-term monitoring; intra-annual growth; mechanistic ecophysiological model; water and carbon functioning; forest vulnerability and thresholds.

**Location:** The student will join the Forest Research Institute (IRF; <https://www.uqat.ca/programmes/irf/>) at the Rouyn-Noranda UQAT university campus, and will work under the supervision of Fabio Gennaretti (<http://bit.ly/2TTGTLB>) and Yves Bergeron (<http://bit.ly/2GjuKrr>). The IRF has a dynamic, multicultural and international work environment, with 13 professors and more than 60 graduate students working on complementary disciplines, such as modeling, forestry, genetics, biodiversity, ecophysiology and sustainable forest management. The IRF students also benefit from resources and opportunities (scholarships, conferences, workshops) offered by the Centre for Forest Research ([www.cef-cfr.ca](http://www.cef-cfr.ca)). The hired student will also be a member of the Research Chair in Sustainable Forest Management (<http://chaireafd.uqat.ca/accueilF.asp>) and will actively collaborate with our partners (Minister of Forests, Wildlife and Parks, Resolute Forest Products, University of Quebec in Chicoutimi, University of Quebec in Montreal, Environment and Climate Change Canada).

**Required expertise and skills:** 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, discipline and motivation within a multidisciplinary team. He / She must be willing to do field work in remote areas, and must have a good team spirit and excellent writing skills.

**Supervisors:** Fabio Gennaretti and Yves Bergeron

**Project collaborators:** Louis Duchesne and Pierre Grondin (MFFP, DRF), Sonia Légaré (MFFP, North of Québec), François Levesque and Francis Perreault (Resolute Forest Products), Hubert Morin (UQAC), Etienne Boucher (UQAM), Daniel Houle (Environment and Climate Change Canada - ECCC).

**PhD program:** PhD in environmental sciences, University of Quebec in Abitibi-Témiscamingue (<http://bit.ly/30Kn1Mu>).

**Beginning of studies:** Summer or autumn 2020

**Funding:** Fellowship of Can\$ 21000 per year for a total of 3 years.

**Interested candidates:** Interested candidates must apply by e-mail ([fabio.gennaretti@uqat.ca](mailto:fabio.gennaretti@uqat.ca)) by sending (1) a cover letter outlining their academic background and research experience, as well as (2) a detailed CV including name and contact information of three references, and (3) their academic transcripts. The application review will begin on February 1, 2020 and will continue until the position is filled.