MSc positions in Biogeochemistry / Environmental chemistry / Ecology

Biological dinitrogen fixation in boreal forest in response to anthropogenic stress; global climate change and silviculture.

The Laboratory of Terrestrial Biogeochemistry of the Université de Sherbrooke (Qc, Canada) is seeking for applicants to fill two MSc positions in Biogeochemistry / Environmental chemistry / Ecology.

Presentation of the University:

The Université de Sherbrooke is situated in the southern part of Quebec, 150 km from Montréal, 220 km from Québec City and some 40 km from the American border.

http://www.usherbrooke.ca/

Presentation of the Laboratories:

The projects will be developed at the terrestrial biogeochemistry laboratory at UdeS (http://labbellenger.recherche.usherbrooke.ca/) in close collaboration with Pr. Robert Bradley (Dept. of Biology, UdeS - https://www.usherbrooke.ca/biologie/personnel/professeurs/ecologie-terrestre/robert-bradley/)

The research developed in the Laboratory aims to characterize the response of boreal ecosystem to anthropogenic stresses, with a specific interest for biological nitrogen fixation. The research projects developed in our laboratory offers great opportunities to students willing to complete their multidisciplinary formation.

Description of project #1:

Study the effect of global climate change on N2 fixation in boreal forest floor.

Specific aims of the project: The aims of the project are (i) to better understand the parameters controlling N2 fixation in boreal forest floor, with a specific interest in deadwood, lichen and moss and (ii) evaluate the effect of global climate change (increasing CO2 concentration, temperature and humidity) on N2 fixation in boreal forest floor.

Context: Biological nitrogen fixation (BNF) is the main source of new nitrogen (N) to unmanaged terrestrial ecosystems. BNF is catalysed by the enzyme nitrogenase which activity strongly relies on key metals (iron, molybdenum, vanadium). How metal dynamics in soil controls BNF is still unclear. In the context of global climate change, it is imperative to better characterise parameters controlling BNF (i.e. metals) in boreal forest floor and to better evaluate the impact of global climate change on BNF.

Description of project #2:
Study the effect of stand thinning on biological nitrogen fixation.

Stand thinning is widespread in black spruce forests in Québec. It been applied to 1,500,000 ha of regenerating forests over the last 25 years. This silvicultural treatment consists of removing a proportion of the smaller tree stems and competing vegetation before stand maturity, in order to promote the growth of the remaining bigger stems. Results have shown that the long-term growth response to these treatment exceed the yields that are predicted for untreated plots. Nitrogen is most often reported as the limiting nutrient for boreal forest productivity. In pristine boreal ecosystems, N inputs strongly rely on biological nitrogen fixation by microorganisms. The positive effect of stand thinning could reflect significant changes in N availability to plants and biological nitrogen fixation. The aim of the project is to evaluate the effect of stand thinning on biological nitrogen fixation.

**Candidate Profile**

The research requires good skill in ecology, microbiology or analytical chemistry. Knowledge on biogeochemistry, bryology, lichenology would be appreciated but is not obligatory.

**Candidate are expected to start in January 2016**

**How to apply?**

Send: CV, official reprint, a cover letter (please indicate the project of interest) and 2 letters of reference (if possible).

to jean-philippe.bellenger@usherbrooke.ca.

******* Complete files will be reviewed within few days after reception. *******

******* Positions will be filled as soon as possible. *******

//////// Incomplete files will not be considered //////////