

## PhD position in forest ecology

(~October 2018-September 2021)

*Does increased tree diversity improve nutrient use in plantations under climate change?*

### Description of the position:

Multiple lines of evidence have led to the conclusion that climate is changing. Assessing the resistance and the resilience of forests to climatic disturbance is increasingly recognized as a key question to predict the production and stability of forests under different climatic scenarios. Conversely, understanding to what extent climate changes can alter nutrient cycling in forests and the positive effect of tree diversity on biogeochemical cycles remain unresolved questions.

This position will be focused on two field experiments. These large, ongoing, experimental platforms are forest ecosystems where biodiversity and climate are manipulated (TreeDivNet and IDENT international networks). One is an experimental plantation with *Pinus pinaster*, *Betula pendula*, *Quercus robur* and their mixtures in all possible combinations, located in a sandy plain in SW-France. An irrigation system enables manipulating water supply and consequently to assess the effects of summer droughts on nutrient cycling and tree nutrition. The second field experiment is in northern Ontario, Canada in boreal plantations with *Betula papyrifera*, *Larix laricina*, *Picea glauca*, *Pinus strobus*, *Quercus rubra*. In the latter, rainfall exclusion is in place to simulate severe summer drought. Nutrient cycling will be studied in these ecosystems using several methods: soil nutrients will be quantified through conventional analyses (e.g. total carbon and nutrient contents, nutrient availability), but also with incubation resins and incubation cores. Isotopes will be used to assess nutrient uptake by trees (root bioassay method). The natural abundance of nitrogen isotopes will be measured in trees to assess the functioning of nitrogen cycling. Finally, the way trees efficiently use and store nutrients will be studied through the monitoring of foliage composition and litterfall.

The project will be a co-tutelle between France (U Bordeaux) and Canada (U Laval, Quebec City). The candidate will be provided an effective working environment at the INRA-Bordeaux: office and computer facilities, technical assistants and engineers for field and lab work, and lodging during field work at the two study sites. Field work will be supported by access to digital data resources on and around the experiments: detailed microclimate and climate records. In addition, he (she) will have access to a high-quality laboratory for the different analytical methods.

### Hosting conditions:

The host teams ([http://www6.bordeaux-aquitaine.inra.fr/ispa\\_eng/](http://www6.bordeaux-aquitaine.inra.fr/ispa_eng/)) have significant experience in forest ecology and biogeochemistry, including dedicated laboratories, field facilities, and experienced permanent staff. This PhD position is part of a 4-yr project, funded by the French national agency for research (ANR). The salary of the PhD position will be provided by the University of Bordeaux, provided that the applicant is selected by the committee of the local "Ecole Doctorale" (based on merit ranking). The hired person will receive the standard PhD student rate (net rate in early 2017 = approx. 1400 Euros monthly).

### Supervisors:

Laurent Augusto ( [laurent.augusto@inra.fr](mailto:laurent.augusto@inra.fr) ; [https://www.researchgate.net/profile/Laurent\\_Augusto](https://www.researchgate.net/profile/Laurent_Augusto) )

Nicolas Fanin ( [nicolas.fanin@inra.fr](mailto:nicolas.fanin@inra.fr) ; [https://www.researchgate.net/profile/Nicolas\\_Fanin](https://www.researchgate.net/profile/Nicolas_Fanin) )

Alison Munson ( [alison.munson@sbf.ulaval.ca](mailto:alison.munson@sbf.ulaval.ca) ; [www.researchgate.net/profile/Alison\\_Munson](https://www.researchgate.net/profile/Alison_Munson) )

### Applicants:

We look for a candidate highly motivated by ecological and environmental issues. More specifically, knowledge and/or experience in ecology, forest science, plant ecophysiology, or biogeochemistry is required. (S)he has good writing skills, a background in statistical analysis, and high capability to work within a team. Because many days will be spent in forest ecosystems, we expect that the hired person is tough enough to compete for a scientific pentathlon competition (i.e. orientation race, soil digging, sample carrying, tree cutting, and black fly swatting). To apply, it is not mandatory to meet all the requirements listed above. Applicants should send a detailed curriculum and a motivation letter explaining their expectations. Please send material for January 26, 2018.