Microclimatic buffering of plant responses to macroclimate warming in temperate forests (FORMICA)

ERC Starting Grant project (http://www.formica.ugent.be/)

Project background

Recent climate warming is acting on ecosystems across the globe and affecting biodiversity. Yet, due to slow responses, many biological communities are lagging behind warming of the macroclimate (the climate of a large geographic region). The buffering of microclimates near the ground measured in local areas, arising from terrain features such as vegetation and topography, can explain why many species are lagging behind macroclimate warming. However, most studies ignore the effects of microclimates and key uncertainties still exist about this mechanism. Microclimates are particularly evident in forests, where the canopy buffers understorey habitats. In temperate forests, the understorey contains the vast majority of plant diversity and plays an essential role in driving ecosystem processes. The overall goal of FORMICA (FORest MICroclimate Assessment) is to quantify and understand the role of microclimatic buffering in modulating forest plant responses to macroclimate warming. In one of the work packages, we perform experimental heating and illumination in a large-scale transplant experiment in temperate forests across Europe and closely monitor the microclimate with in-situ loggers. The results will be integrated in models to forecast plant diversity of temperate forests in a warming macroclimate. FORMICA is thus a large integrative study on biotic effects of microclimatic buffering in forests.

Here, we advertise for a postdoctoral or PhD candidate to advance the experimental and especially modelling aspects of this work, and join a dynamic team of four PhDs and a postdoc, together with research technicians and collaborators, led by Prof. Pieter De Frenne.

Vacancy Description and Candidate Profile

The successful candidate will develop/adapt and implement a (demographic) distribution model to assess how forest plants will react to microclimate and macroclimate change. Our already collected data will allow us to accurately predict microclimates under a range of environmental conditions and forest management regimes occurring in temperate forests throughout Europe. Both microclimatic effects on temperature, light and vital rates of plants, collected along the latitudinal gradient in the observatory and experiments across much of the distribution ranges of the understorey plants in WP1-3, will be incorporated in the models. In addition to the existing data, measurements of the composition and function of the vegetation in the existing experimental set-up in Italy, France, Belgium, and Sweden will be performed to identify the significance of microclimate buffering. Depending on experience, the candidate will actively engage with existing collaborators and pursue appropriate opportunities, within and outside Ghent University, to further their research.

Research Environment

The successful candidate will be based, along with the rest of the FORMICA team, at the Forest & Nature Lab (www.fornalab.ugent.be) of Ghent University, Belgium. ForNaLab consists of 30 staff members and is headed by Prof. Kris Verheyen, Lander Baeten, Jan Mertens and Pieter De Frenne. The research group is part of the Department of Environment at the Faculty of Bioscience Engineering, Ghent University (https://www.ugent.be/bw/environment).

The Forest & Nature Lab aims at understanding the interactions between the ecological processes, composition, and structure of terrestrial ecosystems, with a clear link to management and policy. ForNaLab is actively involved

in numerous national and international projects and networks, including FLEUR (www.fleur.ugent.be), forestREplot (www.forestreplot.ugent.be), TreeDivNet (www.treedivnet.ugent.be), TreeDivBelgium (www.treedivbelgium.ugent.be) FunDivEUROPE (www.fundiveurope.eu) and smallFOREST (http://u-picardie.fr/smallforest/uk/).

Interested?

Please send us your CV, transcript of records and a one-page cover letter explaining how you would approach the position, and answering the following selection criteria, to Pieter.DeFrenne@ugent.be and Pieter.Vangansbeke@ugent.be by **19 December 2019** (all documents should be merged together into one single PDF file):

PhD Candidate

- You have a Masters, or Honours, degree in Bioscience Engineering, Mathematics, Biology, Ecology or equivalent degree in Life or Mathematical Sciences with some background in Ecology (*also candidates that will obtain an equivalent degree in June 2020 are invited to apply*)
- You have excellent study grades
- You are an enthusiastic and highly motivated student with a strong interest in utilizing mathematical theory to aid ecological understanding
- You are a team player with good (English) communication skills and are motivated to work in a collaborative project with other PhD students, postdocs and technical assistants
- You have knowledge of, and preferentially experience with, model development, parameterization and validation.
- You have good knowledge of both the biotic and abiotic components and processes in temperate forest ecosystems
- You have a strong interest in vegetation, ecology, climate change and botany

Our offer:

- We offer a PhD scholarship for four years (full time, ca. €1900 net per month)
- Preferable start date is March 2020
- Collaboration in a young and dynamic scientific team
- The possibility to gain experience in doing scientific research, with many travelling opportunities and field work across Europe
- The opportunity to obtain a PhD degree at Ghent University in a topical field of applied environmental sciences and climate change

Post-doctoral Candidate

- You have a PhD in Bioscience Engineering, Mathematical Biology, Mathematical Ecology or an equivalent degree in Life Sciences with a solid background in Ecology and Modelling (*also candidates that will obtain their PhD degree soon are invited to apply*)
- You have a strong publication record, relevant to the subject of the project
- You have a strong interest in vegetation, ecology, climate change and botany
- You are an enthusiastic and highly motivated person with a strong interest and experience in ecosystem modelling. Knowledge of plant trait frameworks would be an advantage.
- You are a team player with good (English) communication skills and are motivated to work in a collaborative project with PhD students, other post-docs, and technical assistants

- You have experience in, or are keen to develop, networking opportunities to develop your research career
- You have leadership capacities
- To be able to offer you a tax-free international post-doc position, you may not have resided in Belgium for more than 24 months in the 3 years prior to the start date of your contract. In addition, you may not have obtained your PhD at a Belgian institution.

Our offer:

- We offer a post-doc position for 18 months, with a possible extension for another 17 months (full time, ca. €2300 net per month)
- Start date is March 2020
- Collaboration in a young and dynamic scientific team, hosted in a highly active research group and the possibility to participate in international networks with academic partners across Europe