

The Max Planck Institute for Biogeochemistry (MPI-BGC) in Jena is dedicated to interdisciplinary basic research in the field of Earth System Sciences with a focus on climate and ecosystems. The internationally renowned institute, which currently employs around 230 people, will celebrate its 25th anniversary in 2022. Jena is known for its high-tech industry, internationally renowned research facilities and a modern university. But it also has a beautiful natural setting in the green Saale valley with steep limestone slopes. The city of Jena has an active student scene and a diverse cultural life. In our Flora Incognita group we are looking for

## 2 PhD positions (m/f/d)

(limited to 3 years)

### Background and position description:

Citizen Science approaches combined with latest machine learning are cutting-edge research topics embraced by the research group "Flora Incognita" at the MPI for Biogeochemistry. Our interdisciplinary team including botanists, computer scientists, physics, and media experts is working on transferring traditional plant identification into the digital age. In the long term, the data of the Flora Incognita app will enable us to investigate ecological and conservation issues. When do which species bloom? How much do morphological features of plant species vary? What is the relationship between plant occurrence and climate and land use change? Pressing questions of this kind will be addressed in two PhD projects starting early 2021:

### Position I: Flora Incognita data for phenological modeling

Phenology is an important bioindicator of climate change. Flora Incognita provides us with important information about when, for example, plants are flowering. This PhD thesis will investigate to what extent Flora Incognita observations are suitable for phenological monitoring. Specific research topics are:

- Comparison of Flora Incognita observations with high-level phenological observations
- Integration of Flora Incognita observation data into process-based phenological models
- New development of phenological models with new methods (e.g. deep learning)
- Automatic image-based recognition of phenological states

### Position II: Flora Incognita for species distribution modeling

Predicting species distribution plays an important role in many ecological applications and nature conservation issues. The PhD project aims to explore whether Flora Incognita data allow predictions of temporal and spatial species distribution patterns.

Research topics are:

- Integration of Flora Incognita observations into species distribution models at the level of single species and communities
- Improving automatic recognition of plant species by integration of additional metadata (e.g. location and time)

## Both doctoral projects combine the following key aspects:

- analysis of high-dimensional ecological and environmental data with novel predictive methods
- data integration across scales (e.g. in-situ and remote sensing satellite observations) and sources (e.g. crowdsourced vs. structured)
- application of the latest machine learning methods in ecological modelling

The projects are carried out in close cooperation with the computer scientists at the chair of Prof. Mäder at the TU Ilmenau, with the "Biosphere-Atmosphere Interactions and Experimentation" group at the MPI-BGC (Dr. Mirco Migliavacca), and the "Earth System Data Science Group" (Prof. Miguel Mahecha) at the Leipzig University.

## Your Profile:

- Master degree (or equivalent) in Biology, Environmental Sciences, Remote Sensing, Computer Sciences, Applied mathematics, or any related field
- Very good knowledge in statistics
- Very good knowledge of at least one scripting language (e.g. R, Python, Julia)
- Good communication skills in English and strong interest to work in an interdisciplinary research team

## Our offer:

Become part of an internationally connected and renowned research environment. The conditions of employment, including upgrades and duration follow the rules of the Max Planck Society for the Advancement of Sciences and those of the German civil service. Remuneration follows in accordance with the TVöD public-sector pay grade 13 (65%).

The Max Planck Society strives for equality between women and men and for diversity. It aims to increase the proportion of women in those areas in which they are underrepresented. Women are therefore expressly encouraged to apply. We welcome applications from all areas. The Max Planck Society has set itself the goal of employing more severely disabled people. Applications from severely disabled persons are expressly welcome.

## Your application:

For further enquiries please contact Dr. Jana Wäldchen ([jwald@bgc-jena.mpg.de](mailto:jwald@bgc-jena.mpg.de)). Please send your applications including a letter of interest, CV, copies of certificates and the names and contact information of two references by **30th November 2020** with **reference number 26/2020** to:

Max-Planck-Institut für Biogeochemie  
Personalbüro: Kennwort "Flora Incognita"  
Hans-Knöll-Straße 10  
07745 Jena

or preferably as a coherent pdf document with the corresponding subject: [bewerbung@bgc-jena.mpg.de](mailto:bewerbung@bgc-jena.mpg.de).

Please do not use any application folders, but submit copies only, as your documents will be destroyed in accordance with data protection laws after the application process is completed.

We are looking forward to your application!