

Two PhD positions studying interactions between oak-leaf traits, the environment and the leaf microbiome

Within the Tree-M priority program (see <https://www.uni-marburg.de/en/fb17/tree-m>) there are several PhD positions available on topics ranging from genomics to plant ecophysiology and ecology.

For project C1, “Intraspecific, intraindividual and temporal variation of leaf traits”, we are looking for two PhD students interested in the **ecology and ecophysiology of oak leaves** in interaction with the leaf microbiome.

Trees modify the shape and structure of their leaves to counter site-specific environmental conditions as well as intraindividual environmental gradients of the crown. How this variability is influenced also by the leaf microbiome, and vice-versa, how the leaf traits influence the microbiome, is not understood. We will determine to what extent structural, biochemical and physiological properties of oak leaves can be predicted by (micro-)environmental conditions. For this purpose, we will analyze the spatial and temporal organization within the leaf, within the three-dimensionality of the canopy, and between trees and how these properties change under drought and heat. We will then assess to what extent leaf traits in combination with microclimate can predict the diversity and functions of the leaf microbiome. Finally, we will investigate the reciprocal influence of the microbiome on drought- and heat-stress-related changes in oak leaves.

Two positions for doctoral students are available in this project.

Candidate profiles specific to this project: Required is a MSc degree or equivalent university degree in plant ecology or a related field. Beneficial is hands-on experience in collecting empirical data on plants in the field or in experimental settings, experimental design, statistical analyses (preferably with R) and the willingness to learn tree-climbing.

Further requirements are described in the profile in the general job announcement below.

Tasks will be partly shared and partly divided between the two positions and include sampling oak leaves from tree crowns (requiring tree climbing), measuring leaf traits, modelling leaf traits in dependence of microclimatic gradients and tree architecture, modelling leaf microbiome traits in dependence of leaf traits and microclimate, setting up and running experiments on leaf-microbiome interactions both in the forest and in the lab, involving experimental design, plant care, microbiological manipulation, phenotyping, and statistical analysis of the results. Of course, tasks also include writing and publishing scientific papers and presenting the results on scientific conferences.

Contact persons: Maaike Bader, Faculty of Geography (maaike.bader@uni-marburg.de), and Lars Opgenoorth, Faculty of Biology (opgenoorth@uni-marburg.de).

Applications for these two positions are accepted until **January 8, 2023** and should be sent as a **single pdf**, mentioning registration number **fb17-0031-Tree-M-wmz-2022**, to both **contact persons**.



Entry date:
as soon as
possible



Application
deadline:
2022-12-04
(extended for
subproject C1
to 2023-01-08)



Salary:
E 13 TV-H



Duration:
3 years



Volume of
employment:
part-time (65 %)

The Philipps University, founded in 1527, offers multiple award-winning teaching for around 22,000 students and tackles the important issues of our time with excellent research across a broad spectrum of science.

The newly founded Tree-M research cluster at the Philipps-Universität Marburg, the Justus-Liebig-Universität Gießen, and the Max-Planck Institute for terrestrial Microbiology now offers positions for talented and highly motivated doctoral students in cutting-edge research projects. The interdisciplinary research cluster, funded by the LOEWE excellence program of the State of Hesse, investigates the network of microbial interactions with the biotic and abiotic environment in the tree *phyllosphere*. Tree-M combines expertise of academic groups from the fields of microbiology, biochemistry, ecology, geography, and bioinformatics. Research activities involve experiments in the laboratory and field work, and bridge scales from individual bacterial cells (molecular mechanisms of bacterial enzymes, metabolic activities and their regulation) and microbial communities (interactions within the leaf microbiome) to cross-kingdom organismic interaction networks (microbiota-leaf-herbivore interactions).

The Research Cluster Tree-M is currently accepting applications for 9

Doctoral Researchers

The positions are to be filled subject to the approval of funds and offered for a period of 3 years. The starting date is as soon as possible. The positions are part-time (65 % of regular working hours) coming with a salary and benefits commensurate to a public service position in the state Hesse, Germany (TV-H E 13).

Tasks:

- performing groundbreaking research at the interface of microbiology and environmental sciences. Find short project descriptions on the [Tree-M website](#)
- applying cutting-edge technologies and methods such as remote sensing, high resolution hyperspectral and proximate sensing, (meta)genomics, (meta)proteomics, metabolite profiling, fluorescence and electron microscopy including super resolution methods, mass spectrometry imaging, structural molecular biology, molecular genetic engineering and synthetic biology, computational biology, machine learning and modeling

The position is limited to a time period deemed adequate for the completion of a doctoral degree. As part of the assigned duties, there will be ample opportunity to conduct independent scientific research necessary for the completion of a doctorate. The limitation complies to § 2, 1 WissZeitVG.

Profile:

- MSc degree (or equivalent university degree) in microbiology, biochemistry, ecology, geography, bioinformatics or a related field
- strong interest in studying the dynamic composition and function of bacterial leaf microbiota and their (a)biotic interactions at multiple spatial and temporal scales
- being highly motivated, creative, and critical thinking
- enthusiastic about working in a multidisciplinary team
- having good communication skills and being fluent in English

Willingness to pursue own scientific qualification (e.g. a doctorate project in the research area of Tree-M) is expected. For Doctoral Researchers, we offer a structured supervision program, including methods training, training in transferable skills and career path mentoring, priming of networking in science and career, and the possibility to participate in scientific conferences.

We actively support the professional development of junior researchers, e.g. by the offers of Marburg Research Academy (MARA), the International Office, the Higher Education Didactics Office and the Human Resources Development Office.

Contact for further information

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We support women and strongly encourage them to apply. In areas where women are underrepresented, female applicants will be preferred in case of equal qualifications. As a certified family-friendly university, we support our employees in balancing family and career. A reduction of working time is possible. Applicants with a disability as described in SGB IX (§ 2 Abs. 2, 3) will be preferred in case of equal qualifications. Application and interview costs cannot be refunded.

Please send your application mentioning the registration number above as one single PDF file (motivation letter, CV, copies of relevant certificates) to jobs@synmikro.uni-marburg.de before December 4th, 2022.

