



Conducting research for a changing society: This is what drives us at Forschungszentrum Jülich. As a member of the Helmholtz Association, we aim to tackle the grand societal challenges of our time and conduct research into the possibilities of a digitized society, a climate-friendly energy system, and a resource-efficient economy. Work together with around 7,100 employees in one of Europe's biggest research centres and help us to shape change!

At the Institute of Bio- and Geosciences – Agrosphere (IBG-3) we conduct research to improve our understanding of biogeochemical and hydrological processes in terrestrial systems. Specific studies focus on environmental controls on biogeochemical cycling of elements, the analysis of exchange processes and nutrient dynamics in the soil-plant-atmosphere continuum. A combination of experiments, modelling and innovative observation technologies is used to bridge the gap between model, process and management scale. Its research contributes to the sustainable and resource-conserving use of soils and water and to the quantification of the effect of climate and land use change on terrestrial ecosystems.

We are offering a

PhD position - Mathematical modelling of the soil-root-mycorrhiza system

Your Job:

The work will be part of the DFG project “Texture Dependency of Arbuscular Mycorrhiza Induced Plant Drought Tolerance (TeAM-uP)” in collaboration with the Leibniz Institute of Vegetable and Ornamental Crops, the University of Bayreuth, the Technical University of Munich, and the Czech Academy of Sciences.

The TeAM-uP project will investigate the effects of arbuscular mycorrhizal fungi (AMF) on soil and rhizosphere hydraulic properties and its consequences for host plant water and nutrient uptake as well as carbon flows under drought conditions.

You will be responsible for extending the functional-structural plant model CPlantBox to include mycorrhization, growth of extraradical hyphae in soil, and water flow and nutrient transfer in the soil-plant-mycorrhiza system. Model parameterisation and evaluation will be based on the experimental data from this project.

Your Tasks in Detail:

- Implementing a model of root architecture, AMF infection and hyphal growth through soil within the CPlantBox modelling framework

The job will be advertised until the position has been successfully filled. You should therefore submit your application as soon as possible. We look forward to receiving your application via our

Online-Recruitment-System!

Questions about the vacancy?

Get in touch with us by using **our contact form**.

Please note that for technical reasons we cannot accept applications via email.
www.fz-juelich.de

- Parameterization of this model based on experimental data
- Perform in silico experiments to understand and disentangle the joint effect of root system development and AMF and their effects on soil hydraulic properties and on root water and nutrient uptake
- Use the model to quantify the carbon investment into AMF and the related water and nutrient uptake efficiencies
- Present and publish results at national and international conferences and peer reviewed journals

Your Profile:

- Masters degree in bioengineering, environmental sciences or applied mathematics
- Knowledge of plant and soil sciences
- Mathematical modelling skills
- Ability to work independently as well as collaboratively in an international, interdisciplinary team across institutes
- Very good communication and organizational skills
- Very good command of the English language

Our Offer:

We work on the very latest issues that impact our society and are offering you the chance to actively help in shaping the change! We offer ideal conditions for you to complete your doctoral degree:

- Competent and interdisciplinary working environment, as well as an excellent framework in the areas of experiments and modelling
- Vibrant international work environment on an attractive research campus, ideally situated between the cities of Cologne, Düsseldorf and Aachen
- Attendance at national and international conferences and workshops
- Possibility for further scientific and technical training through international experts
- Exceptional research infrastructure
- Further development of your personal strengths, e.g. through an extensive range of training courses; a structured program of continuing education and networking opportunities specifically for doctoral researchers via JuDocS, the Jülich Center for Doctoral Researchers and Supervisors: <https://www.fz-juelich.de/en/judocs>
- Targeted services for international employees, e.g. through our International Advisory Service

The employment of doctoral researchers at Jülich is governed by a doctoral contract, which usually has a term of three years. Pay is in line with 75% of pay group 13 of the Collective Agreement for the Public Service (TVöD-Bund) and additionally 60 % of a monthly salary as special payment („Christmas bonus“). Further information on doctoral degrees at Forschungszentrum Jülich including our other locations is available at: https://www.fz-juelich.de/gp/Careers_Docs

We welcome applications from people with diverse backgrounds, e.g. in terms of age, gender, disability, sexual orientation / identity, and social, ethnic and religious origin. A diverse and inclusive working environment with equal opportunities in which everyone can realize their potential is important to us.