Shaping change: this is what drives us at Forschungszentrum Jülich. As a member of the Helmholtz Association with some 7,600 employees, we conduct interdisciplinary research into a digitalized society, a climate-friendly energy system, and a sustainable economy. We focus on the natural, life, and engineering sciences in the fields of information, energy, and bioeconomy. We combine this with expertise in high-performance computing and artificial intelligence using unique scientific infrastructures.

In the coming decades, climate change and land use change will have a significant impact on the performance of terrestrial ecosystems in terms of their services (food, feed, fiber, energy) and the challenges facing society. At the Institute of Bio- and Geosciences - Agrosphere (IBG-3), we are developing solutions to secure ecosystem services based on an improved understanding of hydrological and biogeochemical processes in terrestrial systems. The focus is on agricultural and forestry systems, which are coming under increasing pressure as a result of global change. Innovative observation technologies are combined with laboratory experiments and modeling to research and predict terrestrial processes across scales (from the pore scale to the field scale to the continental scale), thereby contributing to the sustainable use of natural resources such as water, soil, and the atmosphere.

We are looking to recruit a

PhD position - Soil–Plant Interactions Modelling

Your Job:
This work will be part of the project "Role of root mucilage in water and phosphorus uptake in semi-arid environment: Bridging the gap from theories on the pore scale to emergent behaviour at the plant scale (RootMucilage)" funded by the German Research Foundation (DFG). In collaboration with the Technical University of Munich, the University of Tübingen and the RPTU University Kaiserslautern-Landau, the project aims understand the emergent behaviour of mucilage on the plant scale and in particular for water and phosphorus uptake from soil by contrasting maize genotypes as well as its role in forming a moist microbial rhizosphere habitat. Your work will build on the process-based soil-rhizosphere-plant model, developed at the Agrosphere Institute, which integrates a 3D functional-structural approach (CPlantBox) to mechanistically simulate plant growth, plant-soil interactions and the rhizosphere microbiome. You will contribute to model development and apply it to disentangle the role of root architecture and the release of both mulicage and low molecular weight organic carbon compounds on root water and phosphate uptake. You will work in an interdisciplinary team with

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

researchers from the University partners as well as our partners from ICRISAT, India.

Your tasks in detail:

- Extend the existing process-based model to allow the simultaneous simulation of 3D root architecture development, release of mucilage and low molecular weight organic carbon, as well as their fate and function in soil with respect to water and phosphate uptake by the plant
- Set up virtual representations of the column and lysimeter facilities at ICRISAT, India
- Performe scenario simulations, including pre- and postprocessing
- Participation in conferences in Germany and abroad (incl. presenting your research results)
- Exchange with internal and external as well as national and international project partners
- Preparing scientific publications and project reports

Your Profile:

- Master's degree in bioengineering, environmental sciences, soil science or applied mathematics
- Knowledge of plant and soil sciences
- Solid understanding of differential calculus
- Programming skills
- Independent and cooperative working in an international, interdisciplinary team across institutes
- Very good communication and organizational skills
- Very good command of the English language (at least B2 level according to the CEFR: https://go.fzj.de/languagerequirements), ideally supported by a certificate confirming the language level
- Willingness to travel to India

Please feel free to apply for the position even if you do not have all the required skills and knowledge. We may be able to teach you missing skills during your induction.

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
- Flexible working hours
- 30 days of annual leave
- A large research campus with green spaces, offering the best possible means for networking with colleagues and pursuing sports alongside work
- 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 position is for a fixed term of 3 years. Pay is in line with 65% of pay group 13 of the Collective Agreement for the Public Service (TVöD-Bund). Additionally, you will receive a special payment (“Christmas bonus”). All information about the TVöD-Bund collective agreement can be found on the BMI website (pay scale table on page 69 and following of the PDF download): https://go.fzj.de/bmi.tvoed

Further information on doctoral degrees at Forschungszentrum Jülich (including its various branch offices) is available at https://www.fz-juelich.de/en/careers/phd

In addition to exciting tasks and a collegial working environment, we offer you much more: https://go.fzj.de/benefits

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.

The following links provide further information on diversity and equal opportunities: https://go.fzj.de/equality and and on the targeted promotion of women: https://go.fzj.de/womens-job-journey