

Open PhD Position: Electrical Modelling of the Soil-Root System

Applications are invited for a Doctoral Researcher position at University of Bonn in the project „Non-invasive electrical sensing of root structural-functional phenes” as part of the DFG funded Cluster of Excellence “PhenoRob: Robotics and Phenotyping for Sustainable Crop Production” (<http://www.phenorob.de>). The project aims at the development of an electrical structural-functional soil-root model for the simulation of electrical impedance signatures measured in spectral electrical impedance tomography (sEIT) on soil-root systems. The model will be used for scenario analyses to identify root structural and functional phenes in sEIT signals. The project in particular contributes to PhenoRob’s Core Projects CP4 (“Soil-Root-Interactions for Crop Performance”) and CP6 (“Fusing Information from Sensing and Modeling Across Spatio-Temporal Scales”). The project is supervised by Prof. Andreas Kemna (University of Bonn) and Prof. Andrea Schnepf (Forschungszentrum Jülich).

The position is to be filled as soon as possible and is limited to December 31, 2029.

Your tasks include:

- Development of soil-root electrical model at the plant scale
- Model implementation on HPC system
- Simulation of soil-root sEIT responses and identification of root structural-functional phenes
- Presentation of results at conferences and publication in peer-reviewed journals

We expect:

- Excellent Master or an equivalent degree in Physics, Biophysics, Geophysics, or Engineering Sciences
- Background in flow and transport modelling
- Experience in programming and data management
- Excellent writing and oral communication skills along with the ability to work within an interdisciplinary research team

We particularly welcome:

- Knowledge of finite-element modelling
- Knowledge of soil physics, plant physics and/or fundamentals of machine learning

We offer:

- An open, stimulating and interdisciplinary working environment
- The opportunity of conducting research towards a PhD
- Opportunity to attend international conferences and for a research stay abroad with a cooperating partner
- Specialized courses, summer schools, seminars by renown experts
- Salary according to the German Federal pay scale (75% TV-L E13)

Please send your application in electronic form (as a single pdf) with the relevant documentation (including letter of motivation, curriculum vitae, copy of Master’s degree certificate and transcript of record, names and contact details of two referees) to Prof. Dr. Andreas Kemna (E-mail: kemna@geo.uni-bonn.de). Applications will be assessed starting March 1, 2026. Later applications may be considered until the position is filled.

The University of Bonn is committed to diversity and equal opportunities. It is certified as a family-friendly university and has a Dual Career Service. Its aim is to increase the proportion of women in areas where women are underrepresented and to particularly promote their careers. It therefore strongly encourages applications from relevantly qualified women. Applications from suitable persons with proven severe disabilities and persons of equal status are particularly welcome.