# PhD student in determining reactive N gas emissions from soil

**Advertising institute:** Forschungszentrum Jülich, IBG-3: Agrosphere

*Development and application of a mobile system for the determination of reactive nitrogen gases ($NH_3$ and HONO) emitted from the soil as proxies of the soil N status*

A sustainable agriculture that is able to fulfill the global demand for more food with less resource use is an important challenge, especially in view of climate change and the need to reduce nitrate losses to the groundwater and greenhouse gas emissions to the atmosphere. Within-field heterogeneity of the soil nitrogen status, related to differences in soil characteristics, lead to differences in nitrogen use efficiency of the crops. For optimization of fertilizer efficiency and minimization of nitrogen losses, detection of the soil nitrogen status with high spatial and temporal resolution is necessary.
In this PhD project, a new approach will be developed for highly sensitive detection of reactive nitrogen gases emitted from the soil as proxies for the soil nitrogen status, which will make destructive soil sampling dispensable. This approach will be used in a mobile system that will allow the near-real-time assessment of the soil N status across a crop field. The data will be used for informing a modeling system (part of PhenoRob, but not part of this PhD project), which in turn will be used for the calculation of the required management options, such as location-specific fertilizer addition and application of nitrification inhibitors.

**Your Job:**

- Research into how the size of soil N pools and soil N turnover processes are reflected in the emission of reactive nitrogen gases at the soil surface in laboratory incubation studies
- Calibrate the method for different soil types
- Develop a mobile field system comprising the analyzers for reactive N gases
- Deploy the system in the field and compare the results with those obtained with classical methods
- Exchange data and research experience with other members of the PhenoRob EXC
- Contribute to an international research team, publish in international journals and present results at international conferences

**Your Profile:**

- University degree in either geosciences, chemistry, engineering or related fields
- Knowledge in the areas of soil sciences, nitrogen cycling and gas emissions from soil
- Ability to work independently as well as collaboratively in an international, interdisciplinary team across institutes and between Forschungszentrum Jülich and University of Bonn
- Very good communication and organizational skills
- Very good command of the English language
- Willingness to perform field work

**Our Offer:**

- PhD position for 4 years (70% TVöD 13); the successful candidate will be primarily based at the Forschungszentrum Jülich
- Vibrant international and interdisciplinary 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
- An exceptional research infrastructure

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