2 PhD positions to study root communication with the (a)biotic environment

The Department of Plant-Microbe Interactions at the Max Planck Institute for Plant Breeding Research (MPIPZ) in Cologne, Germany, invite applications for two positions to investigate plant-environment communication in a newly established Max Planck Research group led by Dr. Tonni Grube Andersen.

Background
In nature, the roots of healthy plants are intimately communicating with their surroundings. This is necessary to integrate (a)biotic input into stress responses or growth, and thus allocate resources optimally. While we understand some aspects of this, our current models are lacking sufficient resolution to explain how individual cells of different tissues partake in these decisions. Understanding this is highly relevant for agriculture, as knowledge of the underground plant-associated (a)biotic environment will lead to more efficient nutrient use schemes and increased yields in a future where artificial fertilizers are likely to be scarce.

In the group we aim to utilize the recently described xylem pole-associated endodermal passage cells in Arabidopsis thaliana (Andersen et al. 2018, Nature) as a model to address root communication. Passage cells are developmentally controlled and nutrient-responsive, but intriguingly their presence in the endodermis give rise to expression of a sub-set of nutrient transporters in associated cortex and epidermal cells in a “funnel-like” manner. This is a completely novel insight into root cell specialization, and suggests that passage cells serve as organizing “hubs” that facilitate trans-cellular (a)biotic communication between the inner root tissues and the rhizosphere.

The two positions are specified as follows:

1) Physiological characterization of candidate regulatory factors involved in integrating passage cell development with hormonal and nutritional responses in the model systems Arabidopsis thaliana and Lotus japonicus.

2) Characterization of passage-cell related candidate genes involved in sensing of external stimuli with a developmental output such as volatile perception and hydrotropism.
**Requirements**
We seek highly motivated applicants with a background in molecular biology, physiology, microbiology, bioinformatics or other relevant fields. Candidates will be expected to demonstrate strong interest in the field of plant physiology. Prior knowledge on plant-microbe interactions, bioinformatics and experience with nitrogen-fixing plant species will be advantageous.

**Payment/Position**
The positions are available immediately and successful candidates would be expected to start at the beginning of 2020. Salary and working hours are in accordance with the funding guidelines of the Max Planck Society for junior scientists. Working hours are fulltime; salary is 50 % of E13 TVöD-Bund. The Max-Planck Society is committed to increasing the number of individuals with disabilities in its workforce and therefore encourages applications from such qualified individuals. Furthermore, the Max Planck Society seeks to increase the number of women in those areas where they are underrepresented and therefore explicitly encourages women to apply.

**Application**
For specific questions concerning the respective projects please contact tandersen@mpipz.mpg.de

Please use our online application platform: [https://lotus2.gwdg.de/mpg/mkzf/andersen_phd_1.nsf/Bewerbungen](https://lotus2.gwdg.de/mpg/mkzf/andersen_phd_1.nsf/Bewerbungen)

clearly stating which position you are applying for, and include a curriculum vitae, list of publications, a statement of research interests and letters of recommendation by September 30, 2019.

Shortlisted candidates will be invited for interview in the autumn of 2019.