

## HABILITATIONSVORTRAG

### EINLADUNG

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**„Mathematical Modelling of Plant and Soil  
Interactions“**

## **“Mathematical Modelling of Plant and Soil Interactions“**

### Abstract:

Future food security requires a more efficient resource use. This issue is especially important in the light of a threatening phosphate crisis and an increasing number of droughts due to climate change. Since morphological, anatomical and physiological traits are major factors for plant nutrient and water uptake, plant root architecture is crucial for the selection process in plant breeding. A deeper knowledge of the growing root system and its dynamic rhizosphere can help to determine such root system traits, and enable an agricultural management optimisation.

In this colloquium mathematical models are presented describing the growing root system, parametrisation strategies, and root system water uptake as well as water movement in soil. The models address the following research questions: (1) In which way does the root system adapt to water availability, and how can the uptake efficiency be quantified in terms of functions describing root system adaptation strategies? (2) How can root architecture models be extended to implement integral root system responses? (3) How can this be integrated into the soil environment, and how can appropriate sink terms be developed?

The models were developed in close collaboration between mathematicians and experts in water management and plant breeding. Mathematical modelling and computer simulation proved as fundamental tools in experimental planning and hypotheses development.

**Vortrag: Dienstag, 13. Oktober 2015,  
15.00 Uhr -15.50 Uhr**

**Ort: Fakultät für Mathematik,  
HS 02, EG, Oskar-Morgenstern-Platz 1**

Otmar Scherzer  
Harald Rindler