# FABIAN KELLERMEIER

> ***I first became interested in plant science studying chemistry. I realized that plants bear the potential to become the multifunctional and cheap chemical factories of the sustainable society. I am now particularly interested in the genetic and molecular mechanisms underlying nutrient sensing.***

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| First Degree | Diploma in Biology & State Exam in Chemistry/Biology (2009)<br>University of Regensburg (Germany)<br>Graduated in 2009 |
| PhD | Sainsbury PhD Studentship<br>Environmental Genetics of Root System Architecture<br>University of Glasgow<br>Supervisor – Dr Anna Amtmann, University of Glasgow<br>Started 2009 |

## Summary of Research Project

For both agriculture and fundamental plant research it is of major interest how plants react to nutrient shortages. One strategy is an adequate adaption of root system architecture (RSA) in order to maximise uptake of minerals like potassium, nitrate or phosphate. This requires mechanisms of sensing and signalling which integrate the internal need for nutrients with the external availability and subsequently trigger a certain root growth response. In my project I investigate changes in RSA upon modifications of external nutrient concentrations in the model species *Arabidopsis thaliana*. On the one hand, studying responses to single nutrient deficiencies might reveal genetic components of specific signalling pathways. On the other hand, withdrawing several nutrients at a time, thus creating a multiple deficiency situation, might lead to the identification of shared modules in the crosstalk between individual pathways of nutrient sensing and signalling.

To elucidate the molecular mechanisms underlying RSA responses to nutrient variation I have chosen two complementing experimental approaches. In a targeted approach, the role of individual sensing and signalling pathways and crosstalk is studied with common methods of molecular and plant biology such as the analysis of mutants impaired in known regulatory and transport genes and the determination of tissue concentrations of nutrients. In addition to that, novel genes involved in sensing, signalling and crosstalk might also be identified via quantitative trait loci (QTL) analysis of a recombinant inbred line population. In both cases the software tool EZ Rhizo which allows rapid and semi-automatic detection of a whole set of parameters is used for quantification of RSA.