

## Open Ph.D. projects

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**Title of the research topic:** Identification of friend or foe during invasion of symbiotic root nodules

**Description of the research topic:** Legume nodules are massively invaded organs but do not develop defense against the microsymbionts, despite rhizobial populations reaching densities that are superior to the ones of many very efficient plant pathogens. However, the induction of plant immune responses and their quick suppression could be observed during the initiation of nodule development and infection. Mutations in certain genes expressed in the invasion zone and interzone of nodules result in the death of internalized bacteria released from the infection threads, in the expression of defense-related genes and in the accumulation of phenolic compounds that identified a second defense line. A model for "gate-keeping" during the colonization of nodule cells by rhizobia was proposed: Recognition of bacterial markers by plant receptors serves as an alarm signal for the presence of a foe and induces defense reactions. Competent rhizobia, however, present "friend" markers that are recognized by plant receptors leading to the suppression of defense reactions. In the plant mutants, where the defense suppression is believed to be compromised, defense reactions reach their full extent. The current project aims to identify with the help of mutant rhizobium strains and populations those bacterial molecules and the genes/proteins required for their production 1) that classify the infecting bacteria as a foe and induce defense reactions; 2) that serve as friend signal for the plant to suppress the foe signal induced defense reactions. We also plan 3) to identify with the help of suppressor mutations the elements of the defense reactions induced by the foe markers and not attenuated in the plant mutants.

