MiRA: Microbe induced Resistance to Agricultural pests

PhD scholarships in Ecology of Plant-Microbe-Insect Interactions (MiRA)
Insect Biology Research Institute (IRBI)
National Center for Scientific Research / University of Tours

The University of Tours is offering one PhD scholarship in Plant-Microbe-insect Interactions with expected start date 1st April 2018 or as soon as possible thereafter.

PhD **(**ESR3)
Project title: Impact of plant-associated Arbuscural Mycorrhizal Fungi (AMF) on insect endosymbionts and consequences for resistance-induction and performance of tomato

Project description
The aim of the project is to test whether plant-associated microorganisms affect insect symbionts and insect performance as herbivores. The position will involve i) experiments with combinations of plants, microbes and insect pests, ii) identification of microbial communities associated with insects exposed to plants with or without AM fungi and iii) evaluation of plant resistance (plant hormone and metabolite induction) and pest performance. Results will be integrated with parallel experiments done by other Early-Stage Researchers (ESRs) to evaluate context dependency of microbe-induced plant resistance. Candidates should have a strong background in plant, microbe and/or insect ecology and solid knowledge in molecular biology / bioinformatics.
The PhD position is associated to a larger European training network, MiRA: www.miraitn.eu, with 14 other PhD positions at other participating institutions. We strongly encourage candidates to also apply for other similar positions within the MiRA network, see www.miraitn.eu.

Principal supervisors: CNRS Research Director David Giron, david.giron@univ-tours.fr, Phone: +33 662214382, Associate Professor Géraldine Dubreuil, geraldine.dubreuil@univ-tours.fr, Phone: +33 247366911, and Full Professor Elisabeth Huguet, elisabeth.huguet@univ-tours.fr, Phone: +33 2 47 36 69 11 ; Insect Biology Research Institute, CNRS/University of Tours

Planned secondments: CSIC, Spain: Inoculation and mycorrhiza methods (2 months), evaluation of phytohormonal balances (2 months); CASI, Spain: Test of interactions under commercial field conditions (3 months)

Required qualifications for PhD: bioinformatics, experimental experience with plants, microorganisms, and/or insects, microbiology, molecular biology
Relevant skills: microbiology, plant physiology, insect ecology

MiRA
MiRA is an International Training Network (ITN) funded by the European Union's Horizon 2020 research and innovation programme under Marie Skłodowska-Curie grant agreement.

Plants are intimately associated with a diversity of beneficial microorganisms in their root zone, some of which can enhance the plant's resistance to insect pests. Thus, *the use of Microbe-induced Resistance (MiR) to reduce pest losses in agriculture has emerged as a promising possibility to improve crop resilience and reduce use of harmful pesticides.* European companies have therefore started to develop and market beneficial microbes. However, MiR appears to be strongly context dependent, with reduced benefits under certain biotic and abiotic conditions and in some crop varieties. Further, it is a challenge to deliver and ensure stable associations of beneficial microbes and plants, and avoid undesired effects on beneficial insects. Thus *we absolutely must improve our understanding of MiR mechanisms and context-dependency*, in order to improve context stability of MiR and promote the use of MiR for crop protection. The MiRA project will train early stage researchers in basic and applied research on context-dependency of MiR, mechanisms, and impacts on plant performance and other biocontrol organisms, and use this understanding to improve our ability to predict the effectiveness of MiR under different conditions, to select plant and microbial strains with improved context-stability, and to develop better methods for the formulation of microbial inoculants and their application in agriculture. Finally, we will analyse economic prospects and constraints for MiR development and use. We have assembled a consortium of academic institutions and companies, including microbial inoculant producers and agricultural advisors. Our ESRs will be trained within this multi-sectoral interdisciplinary network for a future career in research, product and service development in European horticulture and agriculture, pushing boundaries in European research and innovation.

Job description

Your key tasks as a PhD student in MiRA are:

- Participate in the research environment at the IRBI and the network activities of MiRA
- Manage and carry through your research project
- Take PhD courses
- Write scientific articles and your PhD thesis
- Participate in congresses
- Teach and disseminate your research

Key criteria for the assessment of candidates

- A master's degree related to the subject area of the project
- Academic results
- Professional qualifications relevant to the PhD programme
  - Primary skills: experimental experience with plants, microorganisms, and/or insects, microbiology, molecular biology, bioinformatics
  - Relevant skills: microbiology, plant physiology, insect ecology
- Previous research publications
- Other professional activities
- Language skills: fluency in English

Formal requirements and eligibility

At the time of commencement, it is required that the candidate has not been awarded a doctorate degree and is within the first 4 years (full-time equivalent) of their research careers. Furthermore, the candidate **must not** have resided or carried out their main activity (work, studies, etc.) in France for more than 12 months in the 3 years immediately prior to their recruitment. Short stays, such as holidays, are not taken into account. The candidate is required to spend part of their project period at other institutions in the MiRA consortium on secondments.

Terms of employment

Terms of appointment and payment follow the rules of the National Center for Scientific Research, the agreement between the CNRS and the University of Tours, and according to the rules and regulations laid down by European Union's Horizon 2020 Marie Curie Initial Training Networks.

Place of Employment

Insect Biology Research Institute, Faculty of Science, University of Tours

Please notice that this PhD fellowship entails secondments, see above.

Application Procedure
The application, in English, must be submitted electronically to david.giron@univ-tours.fr, geraldine.dubreuil@univ-tours.fr and elisabeth.huguet@univ-tours.fr

Please include

- Cover Letter, stating which PhD project you are applying for and detailing your motivation and background for applying for the specific PhD project
- CV
- Diploma and transcripts of records (BSc and MSc)
- 3 professional referees (Name, address, telephone & email)
- Documentation of English language qualifications
- Other information for consideration, e.g. list of publications (if any)

The IRBI wishes our staff to reflect the diversity of society and thus welcomes applications from all qualified candidates regardless of age, gender, race, religion, sexual orientation or ethnic background.

The deadline for applications is **14.01.2018**. Applications received later than this date will not be considered.

After the expiry of the deadline for applications, the authorized recruitment manager selects applicants for assessment on the advice of the Interview Committee. An assessment committee will be appointed to evaluate the selected applications. The applicants will be notified of the composition of the committee and the final selection of a successful candidate will be made based on the recommendations of the Interview Committee.

By the end of February, all applicants will have received information regarding the evaluation of their application.

Questions
General information about MiRA is available at www.miraitn.eu or by contacting Project Coordinator, Associate Professor Thure P Hauser, Dept. Plant and Environmental, University of Copenhagen, tpha@plen.ku.dk**,** Phone: +45 3533 2818

General information about PhD programmes at the University of TOURS is available in the Faculty PhD Rules. For specific information about the phD scholarship, please contact the principal supervisor David GIRON at david.giron@univ-tours.fr