

Job title	3 years- PhD position "Are phytohormones key regulators of root microbiome of poplar trees?"
Employer	INRA
Department & Research Team	UMR 1136 Tree-Microbe Interactions Team of Ecogenomics.
Place of work	INRA Nancy with exchanges to Oak-Ridge National Laboratory (USA)
Duration	3 years
Salary & Working hours	1757 € gross salary.
Important dates/ deadlines	Send Application before 2019 March 15th If selected, date for interview: 2019 March 27th If successful, starting date of PhD: 2019 May 1st
Job description	<p>The successful applicant will work within the frame of a joint project Plant-Microbe Interface (https://pmiweb.ornl.gov/) between INRA-Nancy-Lorraine and US-DOE-Oak-Ridge National Laboratory (ORNL). The PMI project is directed towards understanding the dynamic interface that exists between plants, microbes and their environment, using <i>Populus</i> as a model tree and its microbial consortia. The main goals of this joint project are: 1) to define the progression of molecular events that leads to selective, mutualistic plant-microbe partnerships and determine the general applicability of these mechanisms across the spectrum of potential microbiome members; 2) to identify and evaluate the components of the chemical environment that structure the community and 3) to understand the response of the community to biotic and abiotic stresses.</p> <p>The specific objectives of the thesis are (i) to analyze the respective role of the signaling pathways of major phytohormones (SA, JA, GA, ethylene) in the regulation of root microbiome using poplar as a model system, (ii) to measure the functional consequences of microbiome alteration by these hormonal signaling pathways in terms of nutrition and stress response of poplar. Poplar is an interesting model for several reasons: first, it has an important place in the French forest economy and secondly, its roots are colonized by fungi with distinct functional capacities: (mycorrhizas and endophytes) Finally, it is the only temperate tree that can be genetically manipulated to test hypotheses. In this case, we will investigate whether poplar phytohormones have a structuring role in the composition of root microbial communities.</p> <p>The main questions that the PhD Student will address are: Which roles do phytohormones play in the structuring of fungal and bacterial communities of poplar roots ? What are the functional consequences of root microbiome alterations? The following two hypotheses will be tested: (i) poplar phytohormones regulate the colonization of the root system by its microbiome; (ii) the modulation of the root microbiome and in particular the endophyte/mycorrhizal balance by phytohormones affects the poplar's nutrition and resistance to stress.</p>
Requirements	<ul style="list-style-type: none"> ▪ Master degree in Plant Sciences or Microbial Ecology or Molecular genetics with a strong interest into plant-microbe interactions ▪ Experiences in plant (tree) physiology and/or omics analysis will be an advantage ▪ Communicate in English with other members of the lab as well as other members of the project.

Working language(s)	English is a pre-requisite as travels at ORNL (USA) are planned. Basic French is not a pre-requisite, despite it will make day-life easier.
Application	<ul style="list-style-type: none"> ▪ Applicants should submit (1) a cover letter describing their research interests and background, (2) a detailed CV and (3) the contact details of two referees to Claire Veneault-Fourrey (claire.fourrey@univ-lorraine.fr) and Aurélie Deveau (aurelie.deveau@inra.fr) (Please, see important dates)
Contact	<ul style="list-style-type: none"> ▪ Claire Veneault-Fourrey / Aurélie Deveau ▪ INRA Nancy / University of Lorraine ▪ claire.fourrey@univ-lorraine.fr / aurelie.deveau@inra.fr
Research Team Publication	<p>http://mycor.nancy.inra.fr/IAM/?page_id=318 Claire Veneault-Fourrey and Aurélie Deveau http://scholar.google.fr/citations?user=szYQqz4AAAAJ&hl=fr https://scholar.google.com/citations?user=25lw7BQAAAAJ</p>