

A Two-year postdoctoral position available at INRAE Grignon / Paris-Saclay University, France

Identification of molecular functions and cellular processes targeted by effectors from a plant pathogenic fungus

The EPLM team, in the BIOGER Institute dedicated to fungal pathogens of crops (UR BIOGER INRAE - University Paris-Saclay), is looking for a postdoc with experience in plant-pathogen interactions and protein/protein interactions to join us on a project funded by the French Research Agency (ANR) on the structural and functional characterization of fungal effectors in order to propose knowledge-driven plant resistance management.

Research: Our group is interested in the molecular interactions between oilseed rape and its most important fungal pathogen, *Leptosphaeria maculans*. One of our research projects focusses on the interactions between fungal effectors and plant resistances. We have recently characterized a structural family of effectors in *L. maculans*, also present in other fungal pathogens. Remarkably, this family encompasses all the avirulence proteins (referred to as AvrLm in *L. maculans*) for which corresponding resistance proteins have been recently used in French commercial varieties to control *L. maculans*. The STARlep ANR project aims at exploring structural and functional diversity among *L. maculans* avirulence proteins to propose knowledge-driven plant resistance management. It is organized in four tasks: (i) structural characterisation of AvrLm effectors and classification into structural families, (ii) in-depth analysis of the interactions between AVR proteins and their cognate R proteins, (iii) determination of the plant proteins and cellular processes targeted by the AVR effector families, and physical understanding of effector-target interactions and (iv) identification of resistances recognizing effectors with contrasted structural patterns and functional mechanisms. The project involves teams with internationally acknowledged expertise in the complementary fields of fungal genomics / fungal effector biology (UR BIOGER) and structural biology (UMR I2BC and UMR ICSN) and a private company developing screening of Brassica material to identify new resistance sources (Innolea). The Postdoc scientist will be involved in the identification of molecular functions and cellular processes targeted by *L. maculans* effectors through a combination of transcriptomics, biochemistry and cytological approaches.

Environment: The successful applicant will join the EPLM team, comprising 7 scientists, 4 technicians / assistant engineers, 3 PhD students and 1 post-doc. We offer a scientifically stimulating environment with access to state-of-the-art infrastructures, including plant and fungus growth facilities as well as equipment for molecular biology, protein biochemistry, bio-informatics analyses and cell imaging. The AgroParisTech Campus of Grignon is a center for research in agronomy / agro-ecology located 40 km from Paris and will move at autumn 2022 to the new campus of Paris-Saclay University.

Requirements/Qualifications: We are looking for a talented Postdoc scientist with demonstrated experience in research topics related to plant-microbe interactions and/or plant molecular biology. An expertise in protein-protein interaction analyses (pull-down, Co-IP, yeast two-hybrid) is required. Expertise in transcriptomics analyses and protein localization by confocal microscopy imaging would be acknowledged. Excellent English communication skills are expected. Great emphasis will be placed on personal qualities such as creativity, motivation and ability to work in a team.

Duration & starting date: The appointment will be for two years. The salary is depending on experience. The starting date is January-February 2022 at the earliest but may be postponed if necessary.

Application: If interested, please contact Isabelle Fudal at Isabelle.Fudal@inrae.fr. Provide a single PDF containing a CV and a brief statement of research interests and qualifications, and arrange to have two letters of recommendation sent. Review of applications will begin immediately and will continue until a suitable candidate is found.

Relevant publications:

- Lazar N, et al. (2020) A new family of structurally conserved fungal effectors displays epistatic interactions with plant resistance proteins. *bioRxiv* <https://doi.org/10.1101/2020.12.17.423041>
- Petit-Houdenot Y., et al. (2019). A two genes for one gene interaction between *Leptosphaeria maculans* and *Brassica napus*. *New Phytologist* 223: 397-411. DOI: [10.1111/nph.15762](https://doi.org/10.1111/nph.15762)
- Blondeau K., et al. (2015). The avirulence gene AvrLm4-7 of *Leptosphaeria maculans*: linking crystal structure to functional and adaptive characteristics. *The Plant Journal* 83(4):610-624. DOI: [10.1111/tjp.12913](https://doi.org/10.1111/tjp.12913)