Léa Monge-Waleryszak, PhD

Plant-Microbe Molecular Interactions | she/her | Toulouse, France | https://leamw.science

SUMMARY

Early career scientist with a strong interest in uncovering microbial effectors functions in host plants. My main focus is the study of protein-protein interactions. I notably used *in planta* proximity labelling to gain insights on target diversity of several bacterial effectors. My academic background in evolution and ecology provides me with an integrative view of molecular biology. I am now eager to broaden my skill set and contribute to impactful projects that advance our understanding of plant–microbe interactions. In addition, I have received training in university-level pedagogy, as well as in ethics and integrity in research. I also actively support equality, diversity, and inclusion in science.

EDUCATION

2025 - **PhD in Plant development, Biotic and non-biotic Interactions**, Faculty of sciences and engineering, University of Toulouse, France.

2021 - **MSc in Plants Adaptation, Development & Improvement in presence of Microorganisms**, Faculty of sciences and engineering, University of Toulouse, France.

2019 - **BSc in Biology of Organisms, Populations & Ecosystems**, Faculty of sciences and engineering, University of Toulouse, France.

RESEARCH EXPERIENCE

2021-2025 - **PhD in Plant-Microbe molecular interactions**, University of Toulouse, France. Laboratory of Plant-Microbe-Environment Interactions, INRAE, Auzeville-Tolosan, France. Supervisors**: Dr. Valerie Pacquit** & **Dr. Laurent Deslandes.** Project : Investigating the proximal proteome of two YopJ family acetyltransferases from two plant vascular pathogenic bacteria.

2021 - **Master 2 Internship**, Laboratory of Plant-Microbe-Environment Interactions, INRAE, Auzeville-Tolosan, France. Supervisor: **Dr. Andreas Niebel**. Project : Functional study of a long non coding RNA potentially targeted by NF-YA1 and involved in nodule development in *Medicago truncatula.*

2020 - **Master 1 Internship**, Laboratory of Plant-Microbe-Environment Interactions, INRAE, Auzeville-Tolosan, France. Supervisor: **Dr. Andreas Niebel**. Project: Study of an homeodomain transcription factor family (TALEs) in *Medicago truncatula* and other model organisms.

2018 - **Undergraduate Internship**, Laboratory Geosciences & Environment of Toulouse, France.
Supervisor: **Dr. Guillaume Dera**. Project: Morphometric analyses of clade representative organisms.

2018 - **Undergraduate Internship**, Laboratory of Evolution & Biological Diversity, Toulouse, France. Project: Intraspecific and interspecific variations in elytral hydrocarbon composition in *Coccinellidae.*

FUNDINGS

2024 - **French Society of Phytopathology travel grant** (600€), Research communication at TSL Summer Conference 2024, Norwich (UK).

2024 - **TULIP Graduate School mobility grant** (2.2k€), Research communication at TSL Summer Conference 2024, Norwich (UK).

2023 - **TULIP Graduate School mobility grant** (3k€), Research communication at the SI-MPMI Congress, Providence (RI, USA).

2022 - **FRAIB Young Scientist Grant** (5k€), project: Elucidating XopJ6 proximal proteome with proximity labelling.

2021 - **PhD Fellowship** (100k€), SEVAB Doctoral school (Sciences of Ecology, Veterinary, Agronomy and Bioengineering), Faculty of sciences and engineering, University of Toulouse, France. Project: Identification and functional characterization of *Arabidopsis thaliana* proteins targeted by YopJ family acetyltransferases from *Ralstonia solanacearum* and *Xanthomonas campestris*.

TEACHING AND MENTORING

2024 - **Mentor (MSc Intern)**, Laboratory of Plant-Microbe-Environment Interactions, INRAE, Auzeville-Tolosan. Project: Characterization of a newly discovered targets of PopP2 using *Nicotiana benthaminia*.

2023 - **Co-supervisor (MSc Intern)**, Laboratory of Plant-Microbe-Environment Interactions, INRAE, Auzeville-Tolosan. Project: Investigation of PopP2 proximal proteome using *Pseudomonas fluorescens*-mediated effector delivery in *Arabidopsis thaliana*.

2021-2023 - **Assistant lecturer**, Faculty of sciences and engineering, University of Toulouse, France. Practical training and exercises sessions for BSc students. Subjects: Plant physiology, Methods & Technics applied to biology.

2022-2023 - **Assistant lecturer, "Student becoming" University program for 1st year BSc students,** Faculty of sciences and engineering, University of Toulouse, France. Subjects: Learning Methodology, Career advisement.

RESEARCH OVERVIEW

From the study of biology at all scales, I specialized in molecular biology in plant-microbe interactions and first focused on the *Medicago-Sinorhizobium* nitrogen fixing symbiosis. I notably worked on the characterization of a lncRNA, located within a symbiotic island. Phenotyping of *Medicago truncatula* KO and OE lines inoculated with the symbiote suggested a role of the lncRNA in nodule organogenesis and development, reinforcing the concept of symbiotic island and the importance of ncRNAs in plant-microbe interactions.

To explore another facet of plant-microbe interactions, I joined Laurent Deslandes team to work on the *Arabidopsis-Ralstonia* pathosystem. During my PhD, we revealed new targets of the *Ralstonia pseudosolanacearum* effector PopP2: the ARID proteins. These targets are core components of chromatin remodelling complexes, which suggest a novel virulence strategy for PopP2, one that differs from the previously known direct targeting of WRKY transcription factors. As our results uncovered PopP2 as a multitargeting effector, I developed an *in planta* proximity labelling approach to provide further insights on the diversity of PopP2 targets. I also applied this approach to the newly discovered effector XopJ6 (close homolog of PopP2) from *Xanthomonas campestris*. Results were particularly exciting and several putative specific and shared targets of PopP2 and XopJ6 are currently being characterized.

COMMUNICATIONS

PUBLICATIONS

Monge-Waleryszak L., Girard M., Carcagno M., Culerrier R., Vicédo C., Martinez Y., Vérin C., Couté Y., Pacquit V., Deslandes L. (2025). Three ARID Proteins Involved in Chromatin Remodeling PEAT Complexes Are Targeted by the Ralstonia Solanacearum Effector PopP2 and Contribute to Bacterial Wilt Disease. ***The Plant Journal***, 122, e70205.

Monge-Waleryszak L. et al. ***in preparation***. TurboID-based proximity labelling reveals specific and shared virulence strategies of two YopJ effectors from xylem-colonizing bacteria.

Dera G., Nardin E., Risser L., Albino M., Garnier Q., Kardacz M., **Monge-Waleryszak L**. ***in preparation***. Limited and directional evolution of life within the field of possibilities.

CONFERENCES

Monge Waleryszak L., Pichereaux C., Lauber E., Noël L., Pacquit V., Deslandes L. (2024). Unravelling the proximal proteome of two YopJ acetyltransferases from vascular phytopathogenic bacteria. Poster session & Flash talk session. **TSL Summer Conference**, Norwich (United Kingdom).

Monge Waleryszak L., Pichereaux C., Lauber E., Noël L., Pacquit V., Deslandes L. (2023). Deciphering the proximal proteome of two YopJ family acetyltransferases from two plant vascular pathogenic bacteria. P-339, Poster session. **IS-MPMI congress**, Providence (Rhode Island, USA).

Monge Waleryszak L., Lauber E., Noël L., Pacquit V., Deslandes L. (2023). Project Explain: Elucidating XopJ6 proximal proteome with proximity labelling. FRAIB young scientist grant awardee session. **Agrobiosciences, Interactions and Biodiversity Research Federation Forum**, Toulouse (France).

Monge Waleryszak L., Pichereaux C., Pacquit V., Deslandes L. (2022). Identifying PopP2 proximal proteome with TurboID. **Molecular Dialogue in Plant biotic interactions Congress** (MoDip INRAE), Montpellier (France).

SKILLS

PROTEIN BIOLOGY

***In planta* Proximity labelling**: Biotin ligase, *N.benthamiana, A. thaliana*
Post-translational modification identification: immunoblotting, LC-MS/MS analysis
Protein-protein interaction : Split-luciferase assays, (Co)-IP

PHENOTYPING

Root Inoculation: IGC, Disease index kinetics, Survival curves
Leaf Infiltration: Cell death responses

CLONING

Gateway method
Bacterial transformation : *A. tumefasciens, A. rhizogenese, R. pseudosolanacearum, P. fluorescens*

COMPLEMENTARY TRAINING

Ethics and integrity in scientific research
Scientific **publishing and copyrights**
University-level **Pedagogy**
First aid measures

SERVICE

INSTITUTIONAL RESPONSIBILITIES

2021-2025 - **CNRS Corresponding Agent for Equality and Diversity**, National Centre for Scientific Research - West-Occitania delegation, Laboratory of Plant-Microbe-Environment Interactions, INRAE, Auzeville-Tolosan, France.

2021-2024 - **Member of the Young Scientific Association**, Laboratory of Plant-Microbe-Environment Interactions, INRAE, Auzeville-Tolosan, France.

OUTREACH

2023 - **European Researchers Night 2023,** Cité de l'espace, Toulouse, France.

MEMBERSHIP

2021-2025 - **French Society of Phytopathology (SFP)**
2023-2025 - **International society of Molecular plant-microbe interactions (IS-MPMI)**

REFERENCES

Dr. Laurent Deslandes (he/him)
PhD co-supervisor and Group Leader, team Dynamics of the Immune Response and Climate Change Adaptation, Laboratory of Plant-Microbe-Environment Interactions, INRAE, Auzeville-Tolosan, France.
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Dr. Valerie Pacquit (she/her)
PhD co-supervisor and Senior lecturer, team Dynamics of the Immune Response and Climate Change Adaptation, Laboratory of Plant-Microbe-Environment Interactions, INRAE, Auzeville-Tolosan, France.
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Dr. Fabien Mounet (he/him)
Head of the "Plant physiology" teaching department at the University of Toulouse and Group Leader, team Regulation and dynamic of wood formation, Laboratory of Research in Plant Sciences, INRAE, Auzeville-Tolosan, France.
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