

MASTER IN ENVIRONMENTAL BIOLOGY

Master Week

10.03.26

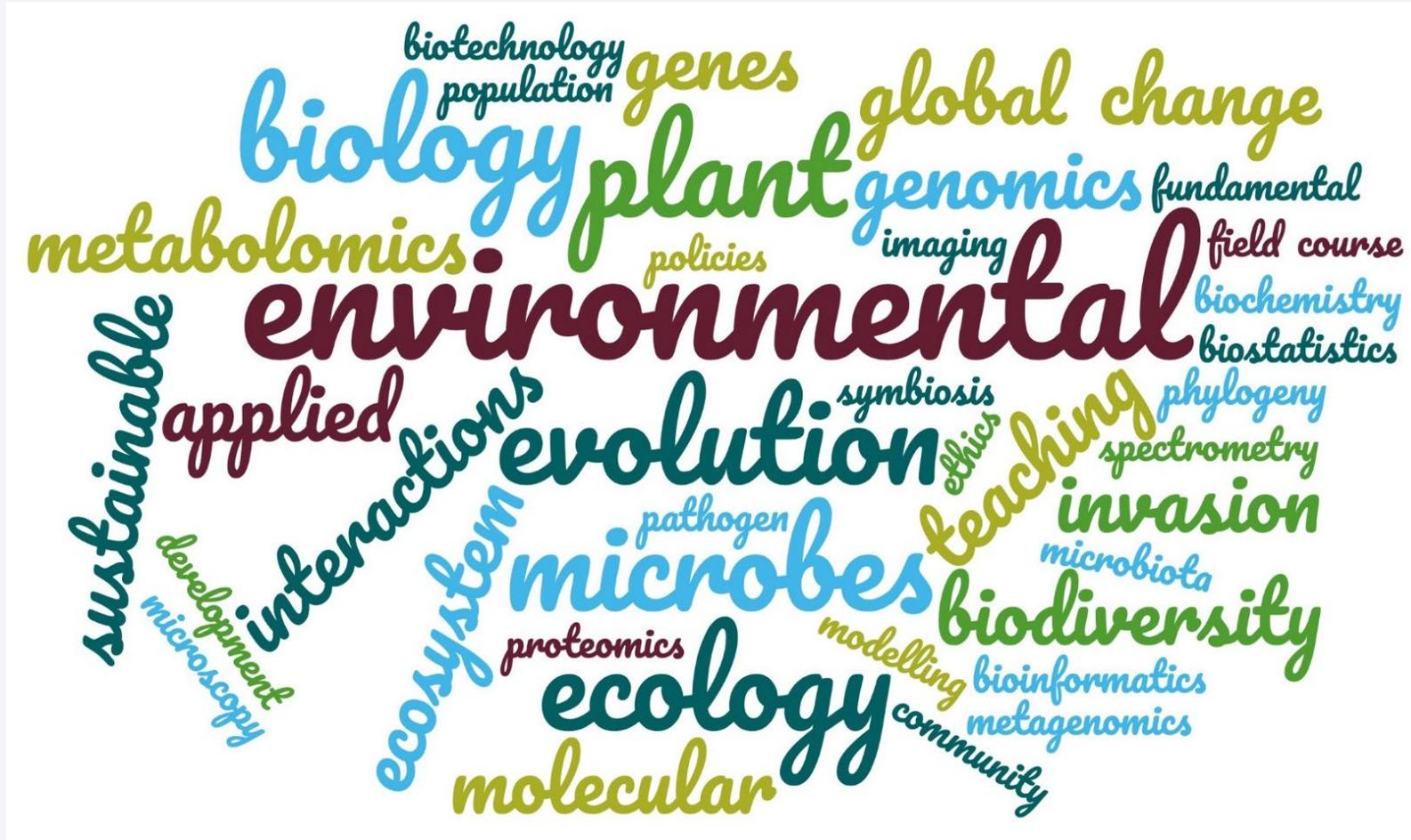
Laure Weisskopf

Rudolf Rohr

Thomas Flatt



” From genes to ecosystems “



We offer 4 options

Ecology & Evolution

120 ECTS

Master Thesis
60 ECTS

Courses
50 ECTS

Seminars
10 ECTS

Plant & Microbial Sciences

120 ECTS

Master Thesis
60 ECTS

Courses
50 ECTS

Seminars
10 ECTS

Applied Environmental Biology

120 ECTS

Master Thesis
60 ECTS

Courses
50 ECTS

Seminars
10 ECTS

Teaching

90 ECTS

Master Thesis
45 ECTS

Courses
37.5 ECTS

Seminars
7.5 ECTS

Ecology & Evolution

- Community ecology
- Population and evolutionary dynamics
- Evolutionary and ecological genomics
- Ecological field course
- Biostatistics
- Modelling
- Bioinformatics (in collaboration with the MSc in Bioinformatics & Computational Biology)



Plant & Microbial Sciences

- Plant biotechnology
- Symbiosis: how plants and microbes communicate
- Methods in plant pathogen interactions
- Structure and functions of host-associated microbiota
- Microbial metabolism and genetics

- Proteomics, metabolomics, microscopy
(in collaboration with the MSc in Molecular Life & Health Sciences)



Applied Environmental Biology

- Global change
- Invasion biology
- Ecological field course
- Biostatistics

- Principal of environmental ethics & Issues of sustainable development (in collaboration with the MSc Environmental Sciences & Humanities)



Teaching

- Core courses from the 3 research options
- Appropriate for students who are interested in **becoming teachers** at the secondary level II
- The students taking this option will need to complement the 90 ECTS with 30 ECTS from other programs





Pierre-Marie Allard



Thomas Flatt

We are 11 research groups



Sven Bacher



Markus Geisler



Christian Parisod



Didier Reinhardt



Louis-Félix Bersier



Gregor Kozlowski



Stefanie Ranf



Rudolf Rohr



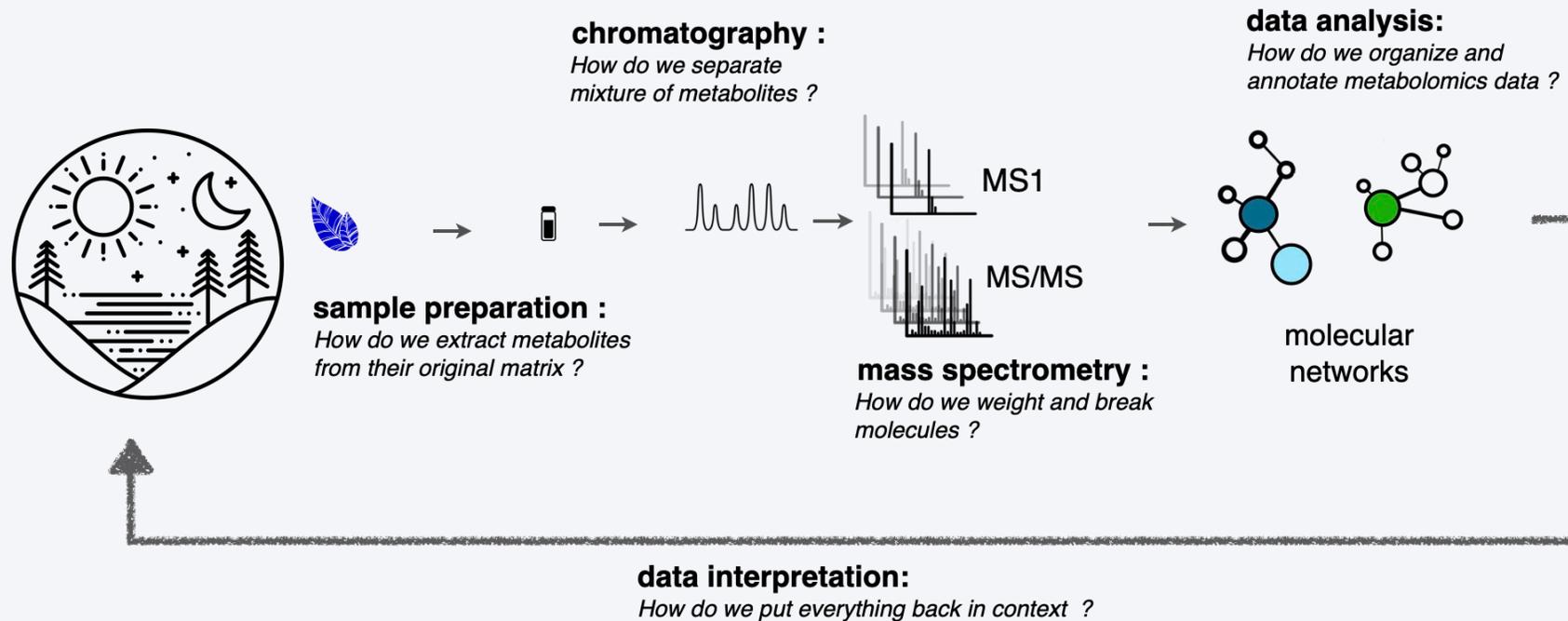
Laure Weisskopf

How do we characterize metabolomes ?

- What is a metabolite ? What is a metabolome ? What is metabolomics ?
- Practically, how do we acquire, process and interpret metabolomics data ?



Pierre-Marie Allard

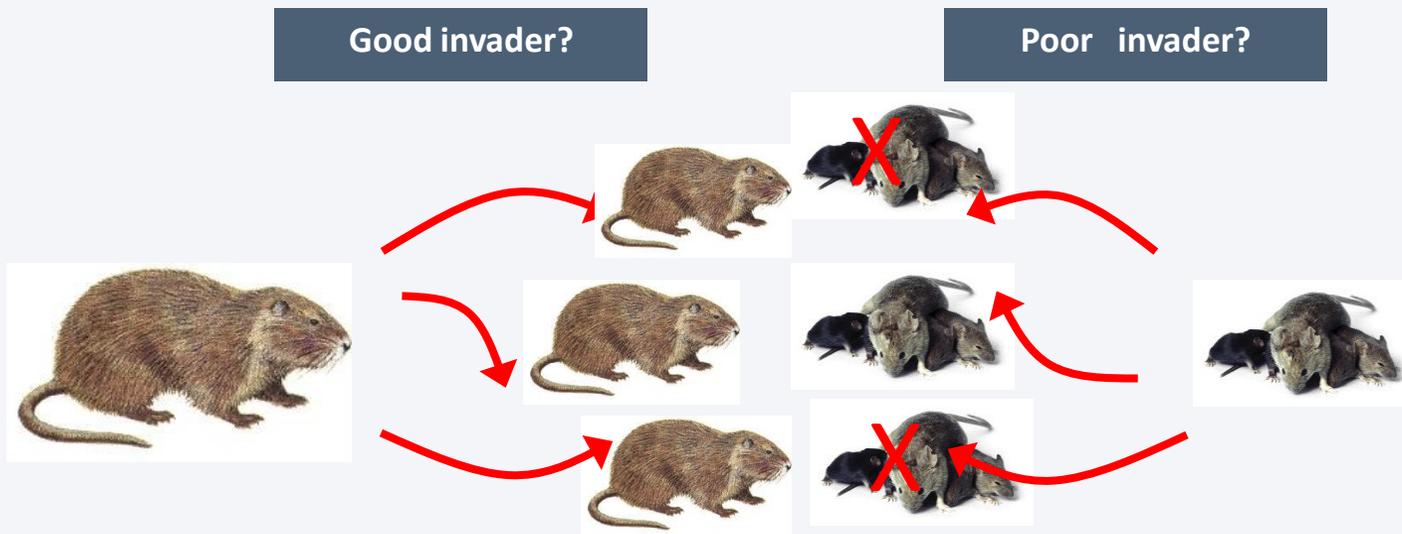


Fundamental questions about biodiversity

- How many species are there?
- Which species are becoming extinct?
- Which species become invasive?
- Which species become pests?



Sven Bacher



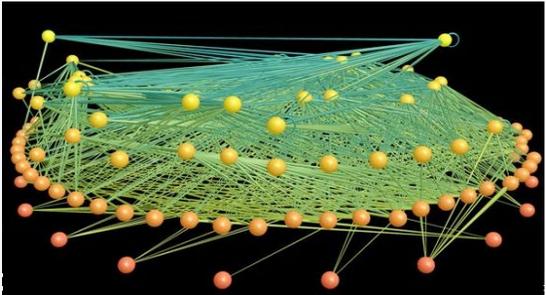
How do ecological networks work?



Plant-pollinator interactions



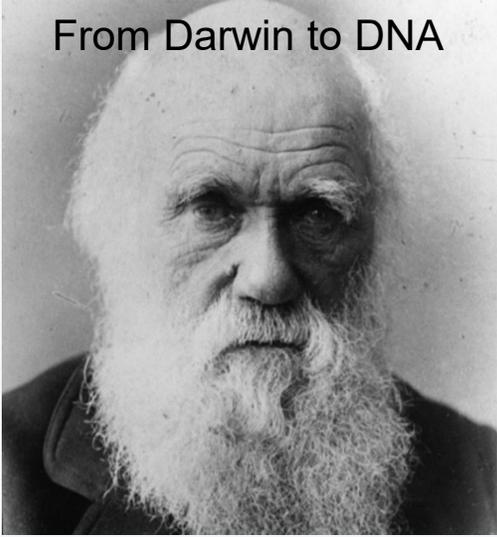
Predator-prey interactions



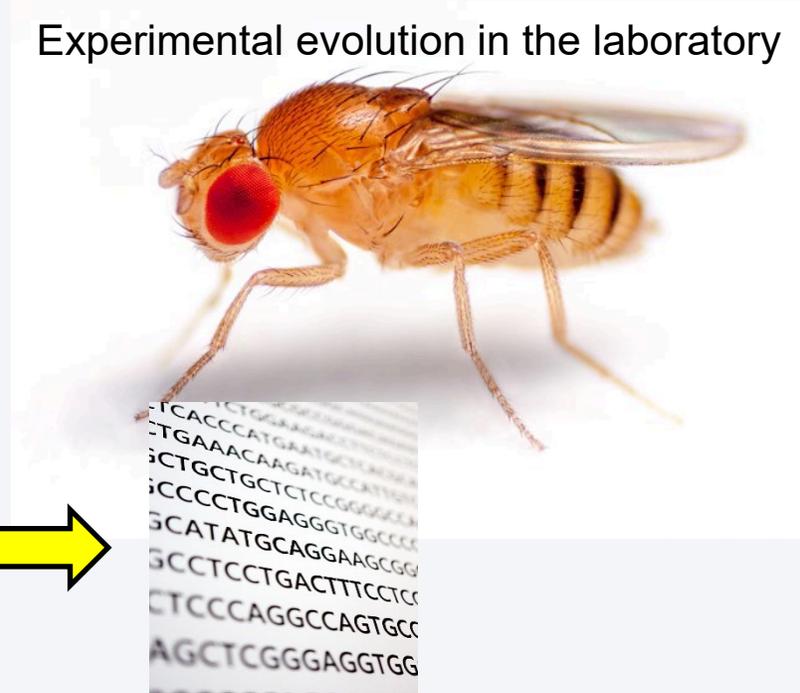
Louis-Félix Bersier

How do species adapt to their environment?

From Darwin to DNA



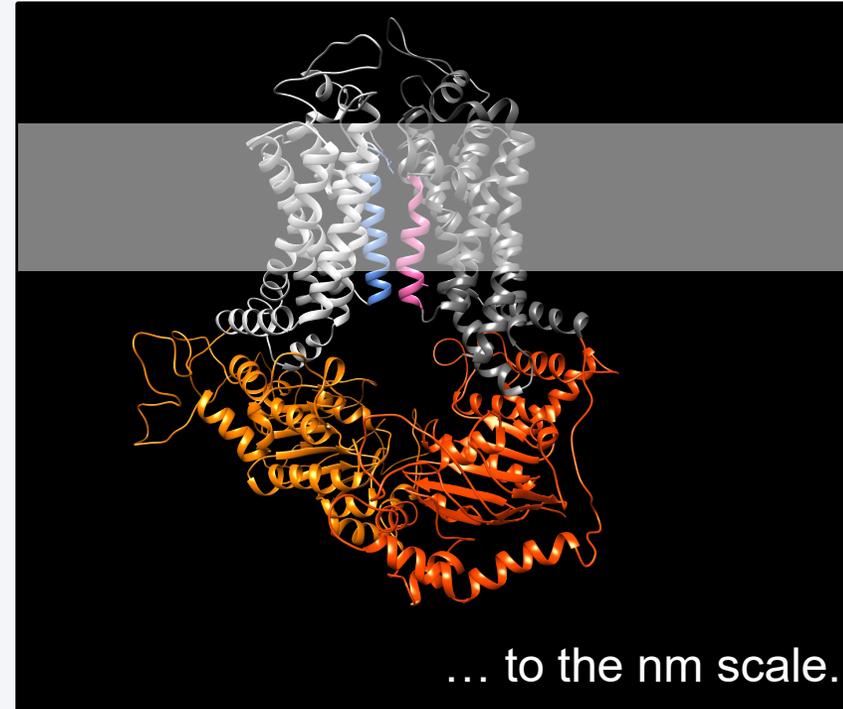
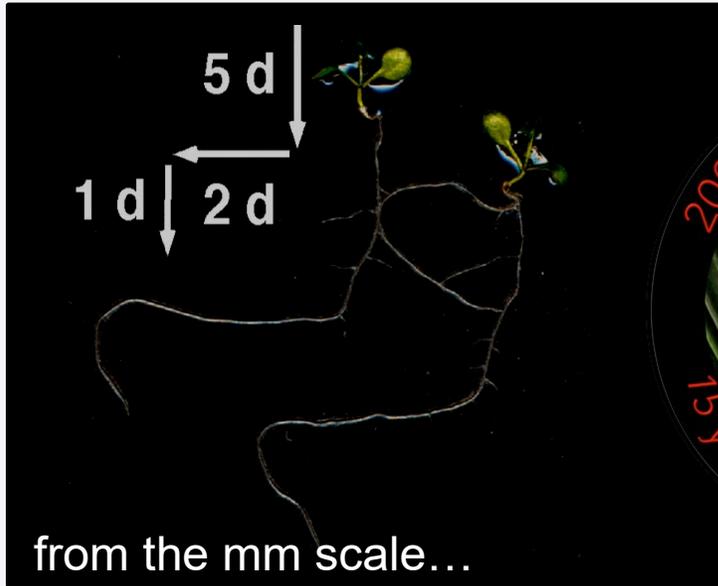
Experimental evolution in the laboratory



Thomas Flatt

- What molecular changes happen during evolution?
- How do characteristics of organisms change when they adapt?

How is plant development regulated on a molecular level ?



Markus Geisler

- How do plant hormone transporters work?
- How are they regulated?
- Are they different to mammalian ones?

Fundamental questions of conservation biology

- How to stop or slow down the extinction crisis?
- What is the value and importance of biodiversity?
- What are species responses to manmade global changes?
- How to determine conservation priorities?



Gregor Kozlowski



Arctic and alpine plants and global warming



Mediterranean ecosystems and overbrowsing



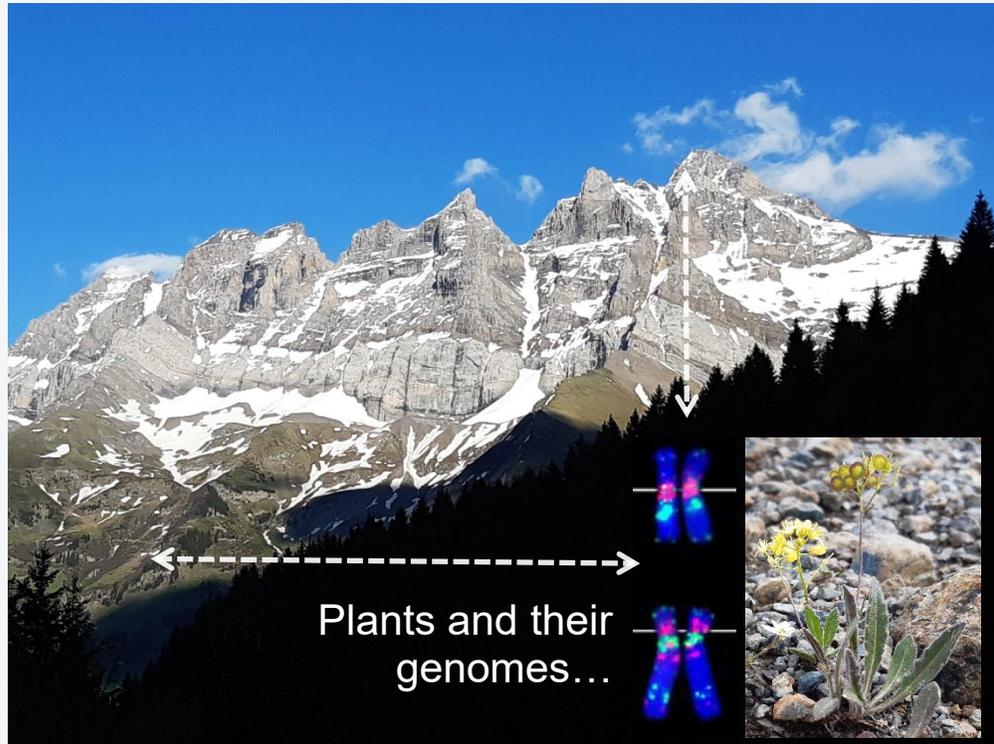
Relict trees and conservation priorities

How do new plant species evolve ?

- What is the impact of genome changes on adaptation and speciation ?
- How do sessile plants respond to environmental changes ?



Christian Parisod



...in natural and experimental populations

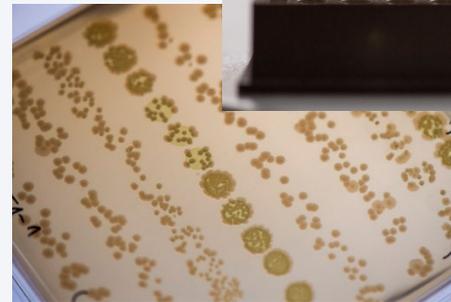
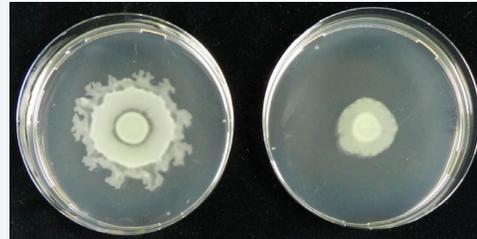


Molecular plant-microbe interactions

- How does the plant immune system control microbial colonisation?
- How do microbes deal with plant immune responses?
- How can we exploit plant immunity for sustainable plant protection?

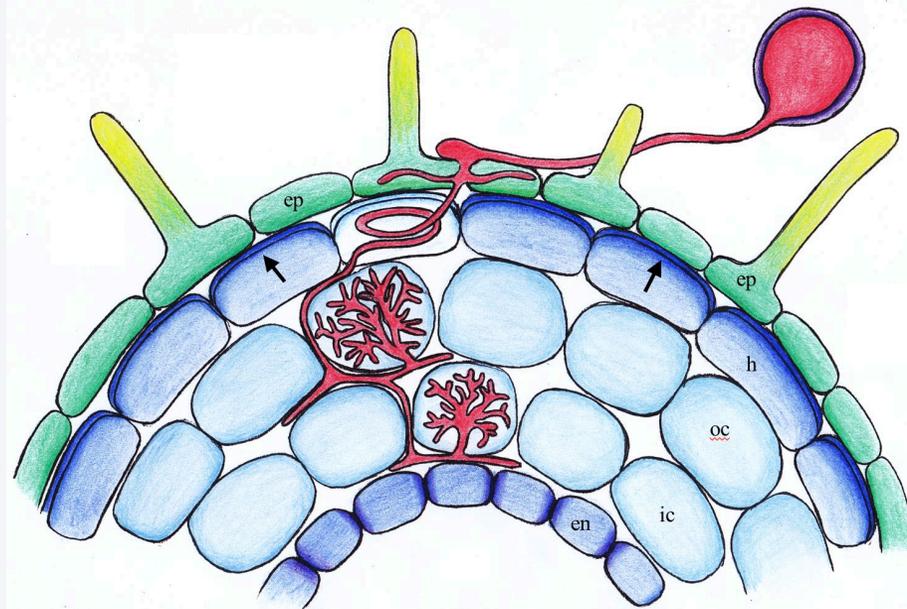
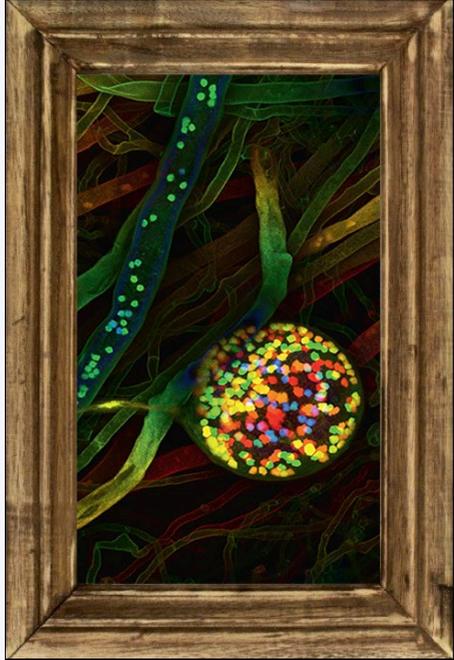


Stefanie Ranf



How do plants and their microbial symbionts get along with each other?

The fungus



The symbiosis

The host plant



Didier Reinhardt

- How do bacterial and fungal symbionts enter and colonize the roots?
- How is symbiosis established without triggering an immune reaction in the plant?

How do species co-evolve?

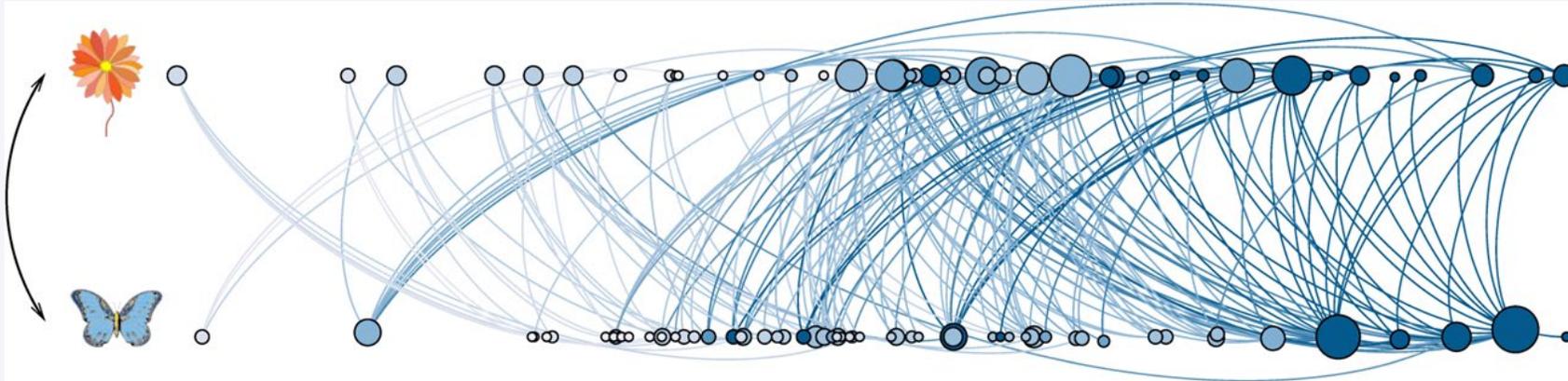
- How do interactions between species influence ecological networks?
- How does coevolution influence biodiversity?



Co-evolution between pollinators and plants



Rudolf Rohr

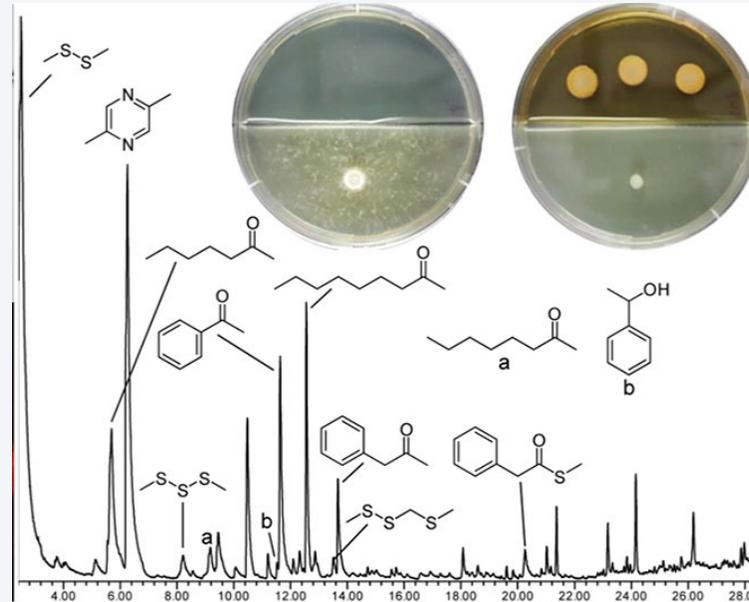


What are plant-associated microbes doing?

- How do microbes communicate ?
- How do beneficial bacteria protect plant health ?
- Can we use these beneficial microbes as alternative to pesticides ?



Laure Weisskopf



What can you do with this master degree?

- go into **academic research** in life and environmental sciences (PhD studies)
- become a **teacher** with broad knowledge and skills
- work in **industry** (agronomy, microbiology, biotechnology, ...)
- work for **nature preservation** offices, NGOs or private foundations
- work at **federal research institutes** and offices (Agroscope, FiBL, WSL, HAFL, HEPIA, BAFU, BLW, etc...)
- start your own **business**
- ...

Questions ?



Visit our webpage:

<https://www.unifr.ch/bio/en/studies/master/>

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