UNIVERSITÉ DE FRIBOURG
UNIVERSITÄT FREIBURG

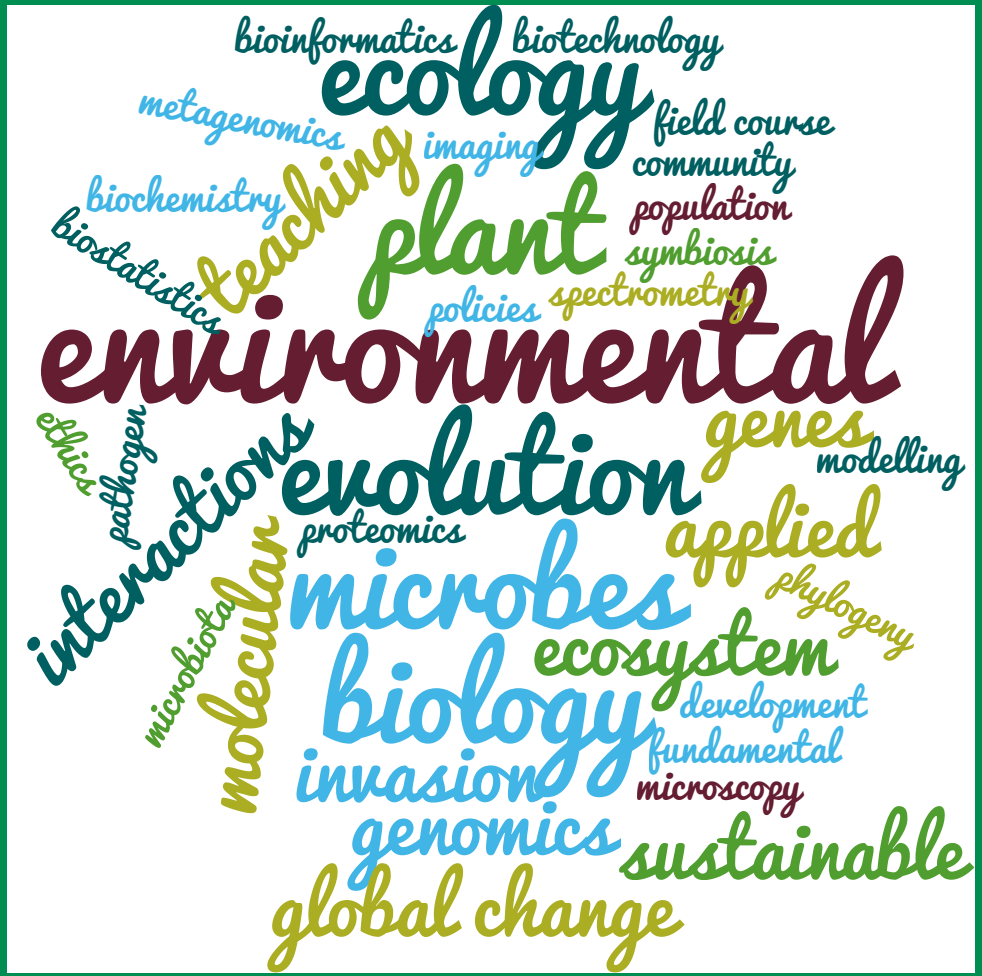
Master in Environmental Biology

Department of Biology

FACULTY OF SCIENCE AND MEDICINE
DEPARTMENT OF BIOLOGY
CH. DU MUSÉE 10, CH-1700 FRIBOURG

“From genes to ecosystems”

Major environmental problems, in particular **global change** and its consequences for **biodiversity** and **ecosystem functioning**, are intimately interconnected and pose a threat to our future. Solving these problems requires an **integrative** and **synergistic** approach in terms of both **fundamental** and **applied research**. The Department of Biology of the Faculty of Science and Medicine offers a multidisciplinary **Master in Environmental Biology**. The program ranges from fundamental concepts in **ecology & evolution**, to molecular aspects of **plant & microbial sciences,** and **applied solutions for environmental policies and sustainable development**. It provides students with state-of-the-art training and background in conceptual, technical, and applied aspects of environmental biology.



In a nutshell : 4 options

Ecology & Evolution

120 ECTS
4 semesters

Master Thesis
60 ECTS
Courses
50 ECTS
Seminars
10 ECTS

Plant & Microbial Sciences

120 ECTS
4 semesters

Master Thesis
60 ECTS
Courses
50 ECTS
Seminars
10 ECTS

Applied Environmental Biology

120 ECTS
4 semesters

Master Thesis
60 ECTS
Courses
50 ECTS
Seminars
10 ECTS

Teaching

90 ECTS
3 semesters

Master Thesis
45 ECTS
Courses
37.5 ECTS
Seminars
7.5 ECTS

Ecology & Evolution

Core courses

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

Research questions

- How do ecological networks work?
- How does coevolution influence biodiversity, and vice versa?
- Why are some organismal groups more species-rich than others?
- How can genes regulate social behaviour?
- What molecular changes happen during evolution?
- What is the genetic basis of evolutionary change?
- How do socially exchanged fluids manipulate receivers?

A trophic interaction between the European Bee-eater (*Merops apiaster*) and a Carpenter Bee (*Xylocopa sp.*)
Photo credit: Olivier Seydoux

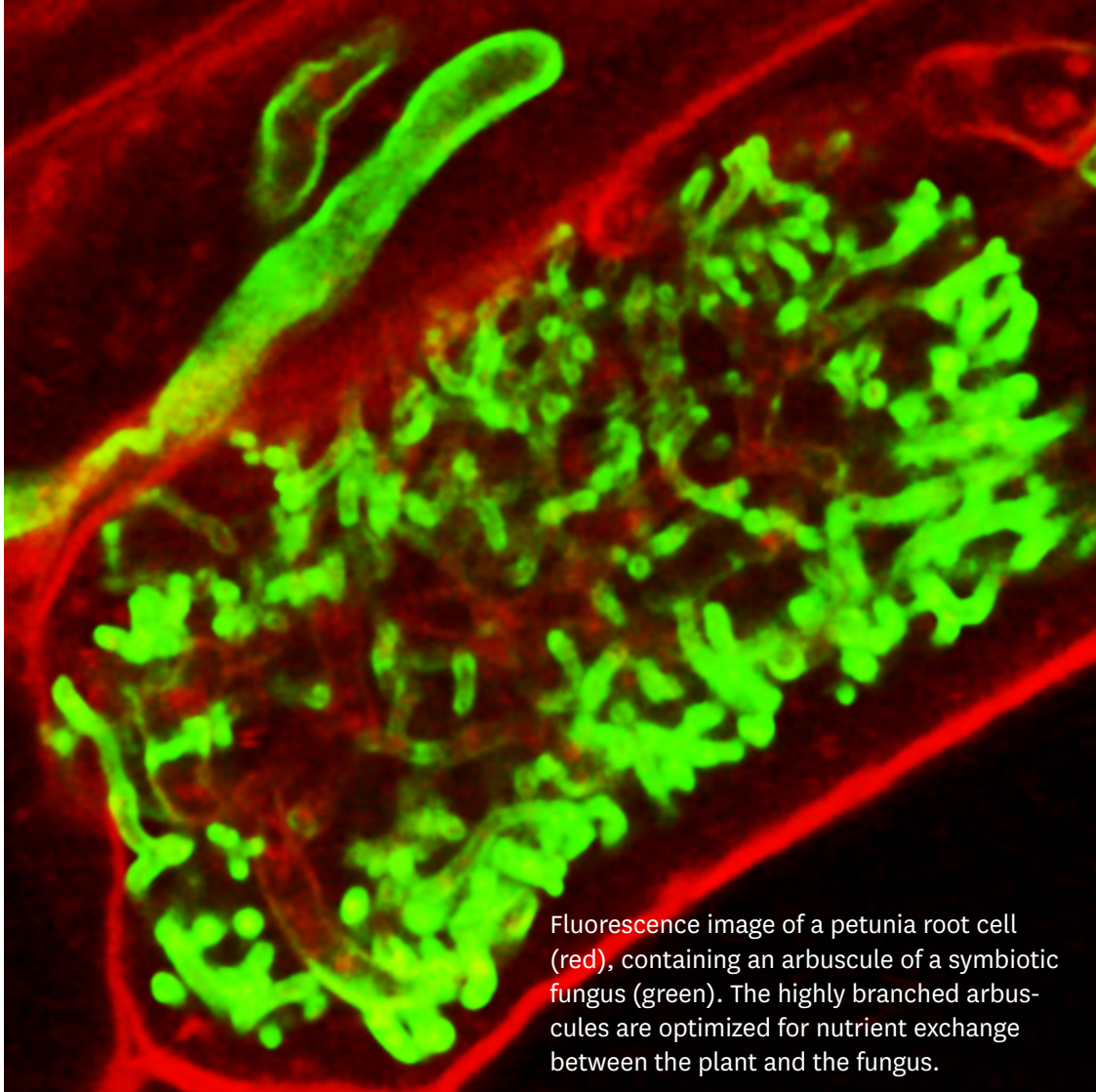
Plant & Microbial Sciences

Core courses

- Plant biotechnology
- Symbiosis
- Plant pathogen interactions
- Plant development
- Structure and functions of host-associated microbiota
- Microbial metabolism and genetics
- Proteomics, metabolomics, microscopy (with the MSc in Molecular Life & Health Sciences)

Research questions

- How do microbes communicate?
- How do microbes deal with plant immune responses?
- How do plant hormone transporters work?
- How do bacterial & fungal symbionts enter the roots?
- How do signaling peptides shape a plant?
- How do we characterize metabolomes?



Fluorescence image of a petunia root cell (red), containing an arbuscule of a symbiotic fungus (green). The highly branched arbuscules are optimized for nutrient exchange between the plant and the fungus.

Applied Environmental Biology

Core courses

- Global change
- Invasion biology
- Ecological field course
- Biostatistics
- Principles of environmental ethics & Issues of sustainable development (with the MSc in Environmental Sciences & Humanities)

Research questions

- What is the value and importance of biodiversity?
- How to determine conservation priorities?
- How to stop or slow down the extinction crisis?
- Which species are becoming extinct?
- Which species become invasive?
- How do sessile plants respond to environmental changes ?
- Can we use beneficial microbes as an alternative to pesticides?

Japanese Beetle Damage

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

What can you do with this master degree?

- Continue with **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 conservation** offices, NGOs or private foundations
- Work at **federal research institutes** and offices (Agroscope, FiBL, WSL, HAFL, HEPIA, BAFU, BLW, etc…)
- Start your own **business**

Visit our webpage:

- https://www.unifr.ch/bio/en
- https://www.unifr.ch/bio/en/studies/master/

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