To know more about the...

Master of Science in Behavior, Evolution and Conservation

Prof. Jérôme Goudet
Department of Ecology and Evolution
MSc Behavior, Evolution, Conservation (BEC)

Prof Tadeusz Kawecki tadeusz.kawecki@unil.ch
Prof Jerome Goudet jerome.goudet@unil.ch

https://www.unil.ch/eb-bec
MSc Behaviour, Evolution, Conservation (BEC)

- How does evolution work?
- How do organisms interact with their environment?
- What does this imply for conservation?

If you want to learn about these questions, the master BEC is for you.
A master program where personal research is central

- 2/3 of the program is pure research, embedded in one of the 20+ research groups of the Dept of Ecology and evolution, but also in other UNIL departments or outside UNIL.
- From field work to published scientific discovery
- You will learn to master all the skills necessary to convey your message: designing, collecting, processing analysing, writing, speaking.
Diverse Methods...

Evolutionary Theory, Fundamental concepts

Genetics (Evolutionary & Molecular)

Analytical Thinking, Experimental Design

Mathematical Modeling

Laboratory Experiments

Constructing Phylogenetic Trees

Selection Experiments, “Experimental Evolution”

Field Experiments & Measurements

Genomics; Sequencing; Genotyping Methods

Bioinformatics

Statistics, Hypothesis Testing
...and organisms

- Alpine Plant Communities
- Bats and their parasites
- Fruit flies
- Avian malaria
- White fish
- Ants
- Snakes
- Barn owls
- European wolf
- Green/Water Frogs
- Clown fish
- Mycorrhizal fungi
- Stick insects
- Freshwater snails
- Plants
- Lizards
- Alpine Salamanders
Observe, plan and design...

- Everything starts in the field.
- The master program offers several field courses (Spain, Tenerife, Brittany, Africa, and... The Alps)
- Planning and experimental design is essential.
Record...
Collect...
Experiment...
Analyse...
Write and publish!

Master of Science in Behaviour, Evolution and Conservation

You are here: UNIL > School of biology > Master of Science in Behaviour, Evolution and Conservation > Our students > Student contributions

Student contributions

- 2018

How to estimate kinship.
Geevat J., Kay T. & Wair B.S.

Prevalence and diversity of haemosporidian parasites in the yellow-rumped warbler hybrid zone.
Coppens O. S., Jenkins T., Teas D. R. L., Bradford A. & Christa P.

Do soil biota influence the outcome of novel interactions between plant competitors?
Cardenas A., Hart S.P. & Alexander J.M.

Learning from model errors: Can past use, adaptip and very high-resolution topo-climatic factors improve macroecological models of mountain grasslands?
Boudreau M.E.A., Parderow J.-N., Beauregard M., Bell A., Gossen A. & Vitzou P.

Rapid sex-chromosome turnover and non-random transitions in true frogs.
Canestrelli D., Crochet P.-A., Duhemmes C., Fuj J., Ma X.-W., Marin Sanz C., Ghal K., Nicole A. G., O’Donnell N. K., Rodriguez R., Romano A., Martinez Solano I., Sloaper M., Jupiter M.,
Where are our alumni working?
Three specialisations in MSc BEC

Specialisation: 30 ECTS credits of focused topics leading to a mention on the master’s diploma.

• Behavior, Economics, and Evolution (BEE)

• Computational Ecology and Evolution (CEE)

• Geosciences Ecology and Evolution (GEE)
Why does economics matter for an MSc BEC biologist?

Economics studies how individuals can make well-informed decisions when they have limited resources and interact with each other.

- Plants, animals, and humans are decision makers.
- Understanding how scarce resources are efficiently allocated is a common problem in biology.
(1) How does evolution shape behaviour?

- adaptation
- trade-offs
- human evolution

- strategy
- cooperation/conflict
(2) How to achieve resource conservation?

**Biology**
- how species evolve
- how resource dynamics occurs
- how interactions with the environmental evolved

**Economics**
- how to allocate resources
- how to solve conflicts
- how to incentives behavior to achieve certain goals

**Institutions for resource conservation**
Why does computational biology matter for an MSc BEC biologist?

Quantitative tradition in ecology and evolution:
- population & behavior & quantitative genetics.
- ecological models and management of resources.
- geographic information systems.
- phylogenetic modeling of biodiversity.

Genomics increasingly important:
- population genomics.
- sex determination systems, chromosome evolution.
- convergent evolution of genomes and phenotypes.
(1) Use statistics and computers for biology

**Genomics**
- Ant social chromosome
- Transposon evolution in asexuals
- Species definition
- Positive selection in human evolution

**Modeling**
- Climate change and trout biomass variation
- Predicting effectiveness of bird conservation
- Parameters for species distribution models
(2) Develop useful methods

Databases

Selectome

Software

QuantiNemo

R packages

MigClim
Why does geosciences matter for an MSc BEC biologist?

• Be able to solve complex ecological problems through quantitative and modelling approaches, using complementary knowledge acquired in geosciences and environmental sciences.
• Have an integrated view of natural systems and conduct interdisciplinary research projects in ecology / environment.
• Transfer scientific knowledge and skills
Climatology

Mountain studies in the Swiss Alp
http://rechalp.unil.ch

Geoinformatics, Remote Sensing & Spatial modelling

Drones
GPS
Lidar

Numerous lab equipment (spectroscopy, isotopic rates, particle size, ...)

Clean lab

Soil sciences and plant-soil interactions

Water & Geochemistry

Geomorphology & Cryology

Field work
Field stations

Useful additional skills for ecological studies
BEE, CEE & GEE: various type of integrative courses

• Disciplinary courses of MSc BEC

• Cross-disciplinary courses at HEC for BEE and at GSE for GEE

• Inter-disciplinary courses specific to the specialization, like environmental economics (BEE), bioinformatics algorithms (CEE) or mountain ecosystems (GEE).
BEE, CEE & GEE specialisations: summary

• Interdisciplinary and integrative.

• Bridges gaps among fields, thus makes you extra special.

• Details about program and motivation of the specializations available from MSc BEC website:

  https://www.unil.ch/eb-bec
For more information see:

MSc BEC website:
https://www.unil.ch/eb-bec

Department of Ecology & Evolution:
http://www.unil.ch/dee