

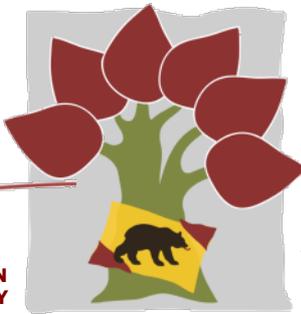


The Division of Conservation Biology at the Institute of Ecology and Evolution, University of Bern, offers:

## **BSc positions for 2022**

In the following research programmes:

- Grassland restoration, research on invertebrates (1 post)
- Small structures for mustelids in farmland (1 post)
- A test of the mesopredator release theory (1 post)
- Flight behaviour of large soaring raptors from a windfarm planning perspective (1 post)
- Amphibian reintroductions (1 post)
- Modelling the potential breeding range of a rare breeding bird in the Alps, the bluethroat (1 post)
- Will the wallcreeper winter abundance and distribution increase under temperature warming? (1 post)
- Post-fledgling survival in juvenile Hoopoes (1 post)



## Grassland restoration (1 post)

Farmland biodiversity has been dramatically impacted by the post war agricultural intensification. Most European countries have thus implemented agri-environment schemes (AES) that support farmers financially for modifying their farming practice so as to provide environmental benefits. However, despite the massive financial incentives, the benefits of AES for biodiversity have remained limited until now.

### Active restoration of lowland grasslands (1 post)

In this lowland module we actively restored 47 species-poor extensively managed AES meadows with four different pro-active reseeding methods. Two of these methods relied on hay transfer from biodiversity-rich hay meadows which is known to efficiently restore the plant community. However, virtually nothing is known about the following cascading effects like how invertebrates (re-)colonized the restored grasslands. The main goal of the present BSc project is to assess the responses of hoverflies to the different restoration methods. Because hoverfly and wild bee sampling is time and labor intensive, the project will be conducted with the help and in close collaboration with Alina Kurmann, a MSc student. Field and lab work will be carried out jointly, while analyses will be conducted independently, investigating different aspects (Alina will focus on the wild bees, while the BSc student on the hoverflies). Field work will be sometime from May to August 2014, with a main effort in June.

### Rotational vs permanent uncut grass refuge for invertebrates (1 alternative post)

In a former research project, we demonstrated that many invertebrate groups benefit from uncut grass refuges left when mowing. Nevertheless, it is still unclear if the uncut refuge should change location from cut to cut (i.e. twice a year) or remain at the same place all year round but change from one year to the next. The objective of the BSc work is to assess how many, and which invertebrate species, take direct advantage of these refuges. In 2021, we collected different invertebrate groups within rotational and permanent uncut grass refuges. Some samples are already sorted, while some will need to be sorted and identified by the BSc student. Although there is no field work planned, the student will have several opportunities to join colleagues on the fields to help and learn about plants and field invertebrates sampling methodology. Timing is very flexible and the BSc student can start and organize the work at his/her convenience.

For further information please contact  
[jean-yves.humbert@iee.unibe.ch](mailto:jean-yves.humbert@iee.unibe.ch)





## Small structures for mustelids (1 post)

Small structures, such as piles of branches or stones, are more and more popular and recommended by many experts to promote vertebrates, in particular stoats (*Mustela erminea*) and least weasels (*Mustela nivalis*). Though, scientific evidence behind these recommendations is still missing.



### Study objectives

In 2022, we will launch two distinct but complementary real-scale research projects: one will be carried out in the lowland farmlands of the Swiss Plateau and one in fruit tree plantations in Valais. The goal of the proposed projects is to determine quantitatively the functional role of the small structures for the promotion and conservation of mustelids. To sample the stoat and weasel populations we will use faecal (scat) detection dogs. Sampled faeces will be collected for genotyping, which will allow to identify individuals across space and time and run population dynamic models.

### Envisioned bachelor projects

1-2 bachelor students can be accommodated within the framework of these projects. Though, because the field work will be carried out in April-May for the lowland project, and July-August for the Valais project, it is foreseen that the BSc student(s) will focus on the Valais project as it shall better fit the study curriculum constraints of the student(s). BSc student(s) will work in close collaboration with Laurent Schenker, a MSc student.

For any questions, please contact [jean-yves.humbert@iee.unibe.ch](mailto:jean-yves.humbert@iee.unibe.ch)

Supervisors: Dr Jean-Yves Humbert and Dr Alain Jacot ([alain.jacot@vogelwarte.ch](mailto:alain.jacot@vogelwarte.ch))





## Testing the mesopredator release theory based on camera trap data (1 post)



### Project outline

The return of large carnivores to Central European regions where they have previously been extirpated, creates not only conflicts with human land use, but may also affect trophic cascades. The mesopredator release theory states that the return of apex-predators may “regulate” the density of mesopredators, especially the red fox, which has undergone a substantial population increase in the past decades. This trend however, is not primarily attributed to the absence of apex predators, but mainly to landscape fragmentation, agricultural intensification with an overall increase in nutrients and to the successful vaccination against rabies. In an ongoing long-term project on predator-prey relationships, we have been collecting information about the presence of both, large carnivores (lynx, wolf) and various mesopredator species based on trail cameras deployed in winter at 102 sites across the canton of Valais and visual picture classification.

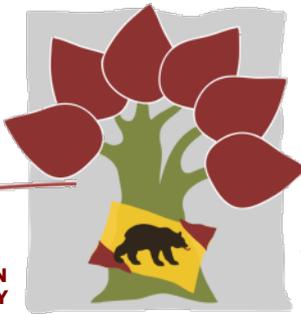
In this BSc study we will evaluate the camera-trap data of the last winter seasons so as to assess proxies for relative mesopredator densities and their trends. By relating these data to the presence of apex-predators at the camera sites as well as to the prevailing landscape conditions, we will test for potential effects of predator presence in relation to other landscape-related effects and identify the key drivers for local mesopredator densities in an Alpine environment.

### Study area

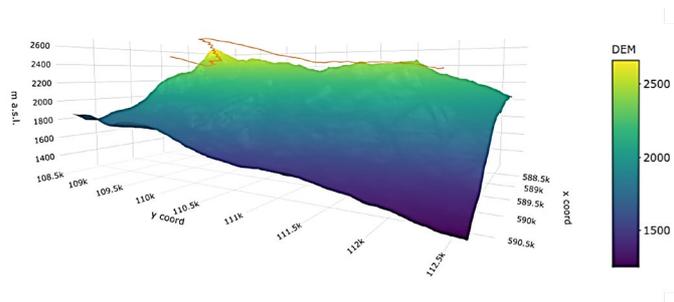
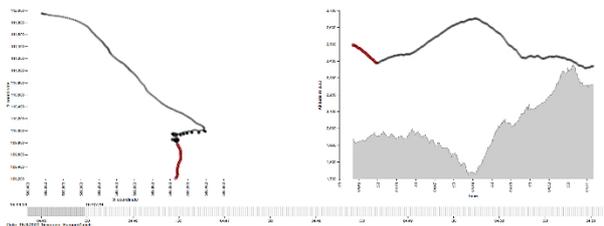
Please note: This project focuses on picture evaluation and statistical analyses. Since the camera trap data are already collected, no fieldwork will be involved.

### Information and requirements

For further information please contact [veronika.braunisch@iee.unibe.ch](mailto:veronika.braunisch@iee.unibe.ch)



## Flight behaviour of large soaring raptors (1 post)



### Project outline

Wind energy is one of the main alternatives to fossil fuels for energy production and its development is increasing rapidly worldwide. Although it is considered a clean and environmentally friendly source of energy, its development has several negative effects on wildlife, especially on flying vertebrates. In 2014, the Division of Conservation Biology of the University of Bern launched the applied research project *Large Birds and Wind Turbines in the Swiss Alps* with the aim of developing spatially explicit models to predict areas of potential conflicts between large resident raptors and wind turbine development. Within the framework of this project, we offer 1 BSc study to analyse a large dataset of GPS locations collected by logged golden eagles (*Aquila chrysaetos*) and bearded vultures (*Gypaetus barbatus*). Students will have to classify GPS fixes into different flight modes (e.g. thermal soaring, orographic soaring and gliding) by visually screening flight trajectories. The classified trajectories will then be analysed in relation to terrain characteristics and weather conditions to identify the main drivers of the different flight modes. The results of this research will serve as a basis for further analyses to be conducted in the context of wind energy development.

### Study area and requirements

This study focuses on data collected within the Swiss Alpine range and does not require field work. A basic knowledge of GIS software is required.

Please contact [sergio.vignali@iee.unibe.ch](mailto:sergio.vignali@iee.unibe.ch) for further information.

**Supervisors:** Dr. Sergio Vignali and Prof. Raphaël Arlettaz, University of Bern.



## Assessing and planning amphibian reintroductions (1 post)



### Project outline

We are managing and planning amphibian reintroductions along the Rhône in Valais. Within these projects, there are multiple options for BSc projects. (1) Developing a simple conceptual model to reflect and predict demography of treefrogs *Hyla arborea* reintroduced populations, by reviewing available databases and literature sources; (2) determining implementation costs, likelihood of success and cost-effectiveness for different reintroduction methods for *H. arborea* and yellow bellied toads *Bombina variegata*, and assess their cost-effectiveness using some simple approaches. Both projects would ideally develop into a longer and more comprehensive study like an MSc, including substantial practical components as reintroduction plans progress.

### Study area

Most projects focus on reviewing and summarizing literature, with data and code already available, so fieldwork is not strictly necessary and the timing of projects is quite flexible. Depending on long-term interest, projects can include field trips to current and candidate reintroduction areas and existing *H. arborea* and *B. variegata* populations.

### Information and requirements

For further information please contact [stefano.canessa@iee.unibe.ch](mailto:stefano.canessa@iee.unibe.ch)



## Modelling the potential breeding habitat of the bluethroat in the Alps (1 post)

### Project Outline

The bluethroat *Luscinia svecica* is a passerine bird, cousin of the nightingales, which occurs with two morphs (orange-spotted breast, in Northern Eurasia; white-spotted breast, southern and central Europe). If some rare pairs of the boreal morph breed in the Alps, very little is known about the actual distribution and population size of the species in the Swiss Alps. Given the elusive and secretive behaviour of the bluethroat, reproduction in the European Alps might be more regular than expected. Moreover, the species, as a typical inhabitant of boreal biomes, may, on the one hand, suffer for global warming although climate change, on the other hand, creates new valuable alluvial habitats at high elevations following glacier melt and retreat.



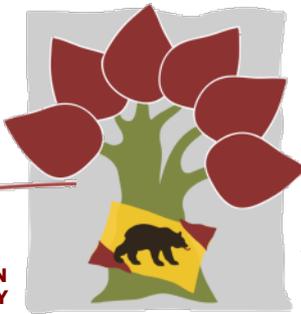
### Objectives and conservation value

The goal of this project is to prepare a simple habitat suitability model for the bluethroat in the Swiss Alps based on data collected by the Swiss Ornithological Institute via its network of observers. Based on the predictions of that model, targeted exploration of potentially suitable habitat will ensue, which might enable us to better figure out the status of that species in Switzerland. If the hypothesis that the sectors recently freed by the melting glaciers represent suitable breeding habitat, valuable arguments would be available to protect these novel zones against any risk of industrial development at high elevation, notably via the hydropower exploitation of Alpine streams. All in all the results of this research may pave the way towards a better understanding of the response of high-elevation biodiversity to habitat changes.

### Information and requirements

The student will take part to some visits to known sites and exploratory surveys of apparently suitable sites that will be carried out in May-June 2022. Then s/he will analyse the dataset provided by the Swiss Ornithological Institute and run a simple initial habitat suitability model. A continuation with a MSc study is foreseen, depending on the results. A driving license would be an asset while readiness to camp outside in sometimes harsh alpine conditions would be a requisite.

**Supervision** This study will be co-supervised by Dr Ian Ausprey [ian.ausprey@iee.unibe.ch](mailto:ian.ausprey@iee.unibe.ch), Dr Sergio Vignali [sergio.vignali@iee.unibe.ch](mailto:sergio.vignali@iee.unibe.ch), PD Dr Veronika Braunisch [veronika.braunisch@iee.unibe.ch](mailto:veronika.braunisch@iee.unibe.ch) and Prof. Dr Raphaël Arlettaz whom you may contact for further information.



## Efficiency of peregrine falcon monitoring

### Project Outline

The peregrine falcon *Falco peregrinus* is an extremely efficient aerial predator that hunts mostly flying birds. As such it is the fastest animal on Earth, with speed in diving flight reaching more than 300 km/h. Not surprisingly, this fascinating bird of prey has been praised by the Egyptians (Horus) and falconers since the Antique. The widespread use of organochlorinated pesticides such as DDT, Dieldrine or Lindane after World War II, notably in agriculture, has decimated most populations in the Western World. However, the peregrine underwent a dramatic come-back after this family of pesticides was banned in the early 1970s. At this title the species is nowadays considered as a key environmental sentinel.



While European populations reached again high densities in the 1990s and 2000s, new concerning signs of decline were detected since the mid 2010s. Switzerland is no exception to that general demographic trend pattern. Yet, the causes of this decline have still to be elucidated. The expansion of the eagle owl, which regularly preys on the peregrine, might play a role, but there might be other cryptic issues in the environment that have remained until now undetected (neonicotinoids, decrease in prey supply, etc.). There are currently considerable efforts carried out in Switzerland to monitor peregrine falcon populations. The population of the Upper Rhone Valley (Valais and Vaud), which has also slightly declined in recent years, is tightly monitored since 2013. Before more in-depth scientific investigations about the causes of decline can be envisioned we want to assess the reliability of the currently implemented monitoring scheme.

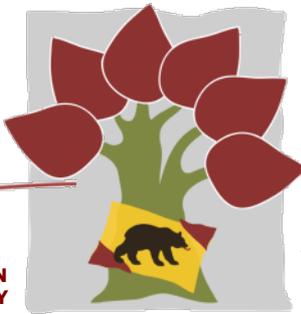
### Objectives and conservation value

Assess the reliability of the monitoring scheme implemented in Valais. There observers have to spend at least 6 h per historical breeding site – in at least two sessions of 3 hours but up to 12 sessions of 30 min or combination thereof – during the period preceding egg laying. On that base, population size and structure is estimated over the years. The student will work on datasets collected earlier on (2013-2022) to assess to which extent this effort is sufficient to assess population demographic status. The student can take part to surveys on breeding productivity carried out in May-June if interested.

### Information and requirements

The student will analyse data extirpated from the platform Ornitho.ch with simple statistics. A continuation with a MSc study is foreseen, but depending on the results. A driving license would be an asset.

**Supervision** This study will be co-supervised by Dr Ian Ausprey [ian.ausprey@iee.unibe.ch](mailto:ian.ausprey@iee.unibe.ch) and Prof. Dr Raphaël Arlettaz whom you may contact for further information.



## Post-fledging survival and habitat use of juvenile Hoopoes (1 post)

### Project Outline

The Eurasian Hoopoe is a charismatic migratory species that breeds throughout central Eurasia and winters in Africa and southern Asia. In Switzerland the species breeds in low elevation river valleys and is considered “vulnerable” due to small population sizes. Due to severe population declines in the 1990s, Prof. Arlettaz and colleagues at the Swiss Ornithological Institute initiated an intensive species rehabilitation campaign in Valais by placing hundreds of nest boxes on barns and other farm structures. This intervention proved successful, and the local population rapidly increased. The Hoopoe has since become a central model species for research at the Division of Conservation Biology and monitoring of the nest boxes and the Hoopoe population in Valais continues to this day.



### Project Objectives & Location

The available project is the first step of a larger research program that will potentially focus on quantifying a critical, yet unstudied, portion of Hoopoe demography: post-fledging survival. Studies throughout the world have demonstrated that high mortality rates occur immediately after fledglings leave the nest, mainly due to predation. Identifying strategies to reduce fledgling mortality should be an efficient strategy for mitigating demographic declines.

This project will occur during the summer of 2022 in Valais and focus on assessing efficacy of research methods for studying fledgling survival. Because radiotracking is essential for quantifying post-fledgling survival, we will assess the costs and benefits of attaching small radio tags, equipped with activity/mortality sensors, to fledgling Hoopoes. Successful results will lead to a larger project in 2023 for a potentially continuing MSc student.

### Field Methods

The student will work in close collaboration with the supervisors to attach radio tags at nest box sites and subsequently track individuals using radiotracking to determine survival and habitat use.

### Supervisors

The student will be co-supervised by Prof. Dr Raphaël Arlettaz and Dr Ian Ausprey [ian.ausprey@iee.unibe.ch](mailto:ian.ausprey@iee.unibe.ch), whom you may contact for further information.



# Will wallcreeper winter abundance and distribution increase under temperature warming? (1 post)

## Project Outline

The Wallcreeper remains one of the most enigmatic and poorly understood birds in Europe due to its inaccessibility and cryptic behaviour. During the summer it nests and forages on high elevation cliffs throughout the mountains of Europe and Asia. It then moves to the valley floor or to the Mediterranean in order to avoid the harsh alpine winter, representing a spectacular example of altitudinal migration. In Switzerland birdwatchers have found Wallcreepers wintering throughout river valleys, the Jura Mountains, and the northern plateau. Interestingly, wintering Wallcreepers appear to select environmental features that mimic their breeding habitats, including human-made structures such as stone walls, quarries, and even cathedrals! Despite the importance of maintaining suitable wintering habitat in a human-dominated landscape, projections on the impact of future climate change have not yet been made for the species.



## Project Objectives and Location

The objectives for this project are to use existing distributional data on the wintering range of Wallcreepers in Switzerland to project the impact of climate change on species abundance and distribution. The student will retrieve citizen science data from the Swiss Ornithological Institute and model current and future distributions in concordance with various environmental and climatological variables. The research will be largely office-based at the Division of Conservation Biology and requires a student willing to learn sophisticated, state of the art species distribution modelling approaches with direction by the project supervisors.

## Project Supervisors

The student will be co-supervised by Prof. Dr Raphaël Arlettaz, PD Dr Veronika Braunisch [veronika.braunisch@iee.unibe.ch](mailto:veronika.braunisch@iee.unibe.ch), and Dr Ian Ausprey [ian.ausprey@iee.unibe.ch](mailto:ian.ausprey@iee.unibe.ch), whom you may contact for further information.