List of laboratory projects available to students undertaking a research project during their exchange studies (5-month laboratory project) or completing a 60-day internship at the Faculty of Biology, University of Warsaw.

These opportunities are available exclusively to students receiving an Erasmus+ scholarship from their home institution.

To take part in the project, contact the Principal Investigator (PI) to verify whether the position is still available and whether your knowledge and skills qualify you to participate in the research. After obtaining the PI's approval, send it to the ERASMUS coordinator at the following address: erasmusbiol@uw.edu.pl and you will receive step-by-step instructions.

PI name : **Piotr Bębas** and **Rafał Stryjek** (IP PAS)	e-mail: piotrbe@uw.edu.pl and rstryjek@psych.pan.pl
Length of the project: 2-3 months or one semester * **2 months**	
Preferable time for realization of the project: winter semester, summer semester, summer, vacation* **End of summer semester/vacation**	
Level of study: BSc, MSc * Both: **BSc, MSc**	
We invite students to participate in a field-based research project focused on the behavior of free-living rodents at the Kumak Field Station in Urwitałt (the northeastern region of the Masurian Lake District in Poland, deep in the wilderness of a protected landscape park) – https://www.facebook.com/biolstacja/?locale=pl_PL. The project will make use of a remote data collection system for behavioral monitoring and analysis. Your responsibilities will include maintaining recording stations – such as regularly providing attractive food to lure animals – analyzing footage captured by remote cameras, and validating the collected data. A key component of the study involves observing animals caught in live traps and monitoring their behavior in semi-natural enclosures specifically designed for this kind of research. The study site is exceptionally rich in rodent species, which offers a unique opportunity to discover previously undocumented behaviors – particularly interspecific interactions that naturally occur in wild rodent communities. For more insight into our research methods, we recommend reviewing our published work: • https://doi.org/10.1098/rsos.231692 • https://doi.org/10.1016/j.jneumeth.2021.109303 • https://doi.org/10.3389/fevo.2022.1054568 This project will culminate in a BSc or MSc thesis and at least one scientific publication.	
Laboratory: Institute of Evolutionary Biology – Mycology Group	
PI name : **Julia Pawlowska**	e-mail: julia.z.pawlowska@uw.edu.pl
Length of the project: 2-3 months or one semester	
Preferable time for the realization of the project: summer semester	

Level of study: MSc or PhD

1) FunDive - Monitoring and mapping fungal diversity for nature conservation (https://fun-dive.eu/). The project includes high-throughput nanopore barcoding of fungal specimens, collected by citizen scientists. It will include lab work, focused on nanopore library preparation and sequencing, as well as resulting data analysis and phylogenetic interpretation for selected genus.

2) PestSpace – Improving resilience to the spread of plant diseases via a regional Pest Common Data Space (https://interreg-baltic.eu/project/pestspace/). The project covers field sampling for plant diseases on winter wheat and faba beans, recording symptoms and handling data in PlutoF data management system, high-throughput nanopore sequencing of plant material with visible diseases symptoms. It will also cover data analysis for selected subset of samples.

Laboratory: Institute of Evolutionary Biology	
PI name : **Anna Karnkowska**	a.karnkowska@uw.edu.pl
Length of the project: 2-3 months or one semester	
Preferable time for realization of the project: winter semester, summer semester,summer/vacation	
Level of study: MSc or PhD	
Brief description of the project available for ERASMUS student: The projects will aim to understand the diversity, ecology and evolution of microbial eukaryotes. The project could be focused (1) on environmental studies, including sampling, and short and long reads sequencing and analyses of data, (2) on the single-cell identification, sequencing, and analysis, (3) on the genome or transcriptome sequencing, reconstruction of metabolism and phylogenomics. The details of the project will depend on the timeframe and the background of the candidate.	
Laboratory: Department of Parasitology, Institute of Functional Biology and Ecology	
PI name : **Katarzyna Goździk ,** e-mail: kj.gozdzik@uw.edu.pl	
Length of the project: one semester *	
Preferable time for realization of the project: winter semester, summer semester, ~~summer/vacation~~*	
Level of study: BSc, MSc, PhD*	
Brief description of the project available for ERASMUS student: Genetic characterization of Neospora caninum using microsatellites as genetic markers. Neospora caninum is a protozoan parasite that has been recognized as a cause of neuromuscular disease and reproductive disorders in infected animals worldwide. N. caninum is a parasite with a complex life cycle and wide range of intermediate and definitive hosts. In Poland the presence of the parasite was confirmed in cattle, bison, red deer, fallow deer as well as dogs, foxes, badgers and raccoon dogs. Despite of much data about the biology and epidemiology of the parasite, analysis of the genetic diversity as well as differences in pathogenicity between N. caninum isolates are limited. In this project molecular studies are planned, which aim to genotype Neospora caninum isolates maintained in vitro culture, using selected nucleotide sequences and comparing the results of sequencing with data deposited in GenBank as well as demonstrate phylogenetic differences between Neospora caninum Polish isolate and isolates from other countries.	
Laboratory: Plant Metal Homeostasis	
PI name: **Oskar Siemianowski**	PI e-mail: o.siemianowski@uw.edu.pl
Length of the project: it could be both/either 2-3 months or one semester *	
Preferable time for realization of the project: winter semester, summer semester	
Level of study: any BSc, MSc *	
Brief description of the project available for ERASMUS student:	

Zinc is a vital element for all living organisms, essential for their growth and development. Plants serve as the primary source of this nutrient in human diets. Therefore, enhancing zinc levels in the edible parts of plants is of great importance. Understanding how plants manage zinc is pivotal for improving the nutritional quality of crops, especially in regions with zinc-deficient soils. Our research focuses on the model plant tobacco (*Nicotiana tabacum L.*). Although tobacco is not edible, its metal transport is well studied and noteworthy, as it shows a relatively high proportion of zinc transported to the shoot compared with other plants (i.e., increased root-to-shoot transport). We investigate how plants absorb zinc and distribute it between roots and shoots, primarily using hydroponic systems that uniformly supply zinc to the entire root system. Recently, we explored a growth medium that allows both controlled composition and uneven nutrient distribution within a pot. This medium, known as transparent soil, consists of gel beads that supply nutrients and water to plants, simulating natural soil conditions. In one experiment, transparent soil containing zinc was layered on top of a zinc-free layer. Surprisingly, tobacco plants grown in this setup did not show typical signs of zinc deficiency in roots located in low-zinc areas. Instead, these roots appeared to receive sufficient zinc from other parts of the plant. This suggests that the flow of zinc toward the shoot (where edible tissues are found in many crops) may be partially redirected to roots lacking zinc at a given time. The mechanism behind this phenomenon remains unknown. Our objective is to uncover how plants allocate zinc among different root parts and organs. We are looking for an enthusiastic student who feels comfortable growing plants in a laboratory setting and is eager to learn new techniques to join us in this research.

Laboratory: University of Warsaw Herbarium

PI name : **Kamil E. Frankiewicz, PhD** | e-mail: k.frankiewicz@uw.edu.pl

Length of the project:
either 2-3 months or a whole semester (depending on arrangements with a student)

Preferable time for realization of the project:
winter semester, summer semester, summer, vacation

Level of study: **BSc, MSc** (suitable for both)

Botanical Time-Travel in Light: Ageing Plant Specimens to Decode Reflectance Signatures

The reflectance spectrum of plants is essentially their optical "signature": it describes what fraction of incoming radiation at different wavelengths is absorbed and what fraction is reflected. It depends on the content of pigments (such as chlorophyll), water status, tissue structure and the degree of tissue degradation, and therefore carries information about plant condition, environmental stress and ageing processes. On this basis we interpret satellite and drone imagery used in ecology and precision agriculture. In this context, traditional herbaria represent an almost inexhaustible archive: they hold millions of dried specimens collected across regions and decades, potentially ideal for long-term analyses of vegetation change. However, they are still rarely used in spectroscopic studies, because we lack robust knowledge of how long-term storage and ageing of plant material affect the shape of the reflectance spectrum.

The aim of this project is to investigate how controlled ageing of botanical specimens alters their reflectance spectra. The student will carry out an experiment using an ageing chamber, subjecting selected plant samples to accelerated ageing under strictly controlled conditions. Subsequently, they will perform a series of reflectance measurements (e.g. in the visible and near-infrared range), process the data using basic statistical and visualisation methods, and finally relate the observed changes to the possibilities and limitations of using herbarium material for the interpretation of remote-sensing data and for monitoring plant condition.

Laboratory: The Bird Song Lab, Department of Ecology and Environmental Conservation	
PI name : **Jan Jedlikowski**	PI e-mail: janjedlikowski@uw.edu.pl
Length of the project: 3 months	
Preferable time for realization of the project: summer semester	
Level of study: BSc or MSc	
Brief description of the project available for ERASMUS student: Most vocal interactions in animals involve a single signaller, yet in some species two or more individuals produce collective displays. It is not unusual to hear several individuals singing side by side at the same time. Competing males, for example, often engage in countersinging interactions, attempting to avoid being drowned out by their rivals. However, when collective signals arise from cooperation rather than competition, they are expected to differ in both form and meaning from two solo signals produced independently. Using two bird species with simple and innate vocal repertoires (the water rail Rallus aquaticus and the little crake Zapornia parva) as a model, we aim to test several hypotheses to determine: (1) whether coordinated signals have a stereotyped structure that occurs repeatedly and predictably over time; (2) whether the degree of signal coordination encodes information; and (3) what types of information may be transmitted in these signals. I am looking for a student to participate in bioacoustic data collection. The project will run from early April to the end of June. The fieldwork will be intensive, so candidates with experience in field research and strong motivation for hard work will be preferred.	
Laboratory: Department of Molecylar Virology	
PI name : **Piotr Golec**	PI e-mail: piotr.golec@uw.edu.pl
Length of the project: 2-3 months or one semester * at least 3 months	
Preferable time for realization of the project: ~~,~~ summer semester, ~~summer, vacation~~*	
Level of study: BSc, MSc *	
Brief description of the project available for ERASMUS student: Work with bacteriophages, including their isolation and characterization, as well as evaluation of their antibacterial properties. Analysis of their potential to prevent and eradicate bacterial biofilms.	
Laboratory: Mammalian Evolution Lab, Institute of Evolutionary Biology	
PI name : **Sergi López-Torres**	PI e-mail: s.lopez-torres@uw.edu.pl
Length of the project: one semester or 3 months	
Preferable time for realization of the project: winter semester, summer semester, or summer/vacation (3 months)	
Level of study: MSc or PhD	
The candidate would be able to choose from a variety of different projects, mainly with a focus on Euarchontoglires (the group that includes primates, treeshrews, colugos, rodents, lagomorphs, and related fossil forms) and other fossil mammals. Such topics include: - Resolving the phylogenetic position of primitive mammalian lineages, like early primates, early rodents, or stem members of Euarchontoglires. - Ancestral state reconstruction analyses for primitive stages of primate evolution.	

- Morphological description of various fossil mammalian lineages, including early primates, early members of Euarchontoglires, cetartiodactyls, perissodactyls, and eulipotyphlans.
- Sensory evolution in primates.
- Dietary reconstruction in fossil rodents, and early members of Euarchontoglires.
- Dental topographic analysis of modern gummivorous primates.

Many of these projects involved computer work on micro-CT data and specimen measurements.

Laboratory: **Institute of Functional Biology and Ecology, Department of Hydrobiology**

PI name: **Piotr Maszczyk**

p.maszczyk@uw.edu.pl

Length of the project*: one semester.

Preferable time for realization of the project*: winter semester or summer semester or/and summer/vacation

Level of study: MSc or PhD

Brief description of the project available for ERASMUS student:

Body size strongly determines how ectothermic organisms function, grow, and reproduce. Under higher temperatures, many species grow faster but reach smaller adult size, a pattern known as the temperature–size rule (TSR). However, it is still unclear whether this pattern results from physiological limitations or from adaptive life-history responses that maximize fitness.In this project, the student will use laboratory experiments with Daphnia to test how increased temperature affects growth, body size, and reproduction. The project will compare responses across generations and between populations with different histories of predation pressure. This will allow us to assess whether temperature-induced responses resemble those caused by physiological stress (e.g. oxygen limitation) or by predator-related adaptive strategies.