

Petra ZAHAJSKÁ

Early Postdoc in Paleolimnology

 https://www.researchgate.net/profile/Petra_Zahajska

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I'm an early-career researcher using non-destructive methods (hyperspectral imaging, biomarkers, isotopes) to reconstruct past environments from sediments. By unlocking these chemical signatures, I decipher how lakes responded to changing climates. My research bridges the gap between elemental cycles, plant communities, and sedimentary archives, ultimately aiming to understand ecosystem responses to environmental changes. I have a great interest linking natural sciences with approaches of data sciences.

EDUCATION

- 2016–2021 PhD in Geobiosphere Sciences, Lund University, Sweden
- 2014–2016 MSc in Geobiology, Charles University, Czechia
- 2014–2015 Erasmus+ exchange in Geology, University in Tromsø, Norway
- 2011–2014 BSc in Applied Geobiology, Charles University, Czechia

CURRENT AND PAST ACADEMIC POSITIONS

Now	Early Postdoc, INSTITUTE OF GEOGRAPHY & OESCHGER CENTRE FOR CLIMATE CHANGE RESEARCH, UNIVERSITY OF BERN, Switzerland
March 2022	SNF project : Biochemical responses of lakes to rapid climate transitions across space and time, Paleolimnology group Lake sediments Hyperspectral imaging Pigments Anoxia Fe & Mn extraction Tipping points HPLC
March 2022 April 2021	Postdoctoral researcher, DEPARTMENT OF GEOLOGY, LUND UNIVERSITY, Sweden Investigation of lacustrine Si cycling during the Holocene Silicon isotopes Biogenic silica Ge/Si ratios Mass balance Si balance
March 2021 October 2016	PhD student, DEPARTMENT OF GEOLOGY, LUND UNIVERSITY, Sweden Diatom-rich sediment formation in lakes Diatoms Si isotopes Diatomaceous sediment Yellowstone Lake Subarctic lakes Hydrothermal activity

RESPONSIBILITIES

- from 2023 Deputy of the Head of the Lab *University of Bern, Institute of Geology*
- from 2022 Responsibility for X-ray fluorescence scanning and data processing, *University of Bern, Institute of Geology*
- from 2022 Responsibility for Hyperspectral imaging and HPLC analyses of pigments, *University of Bern, Institute of Geography*
- 2016–2022 Equipping and maintaining set up for extraction of *n*-alkanes from fossil plants, *Charles University, Institute of Geology and Paleontology*
- 2018–2021 Maintenance of spectrophotometer SmartChem 200, AMS System, *Lund University, Department of Geology*

FUNDED PROJECTS

- THE KEY TO UNDERSTANDING PAST, RECENT, AND FUTURE IMPACT OF CLIMATE CHANGE ON LAKE ECOSYSTEMS : AN OPEN-SOURCE SOLUTION FOR HYPERSPECTRAL IMAGE DATA PROCESSING IN GEOSCIENCES** 2024
Collaborative Data Science Pilot Project Proposals Swiss Data Science Center and University of Bern
25000 CHF (~ 25 000 €)
- THE IMPORTANCE OF GROUNDWATER AS A SOURCE OF WATER, NUTRIENTS, AND GREENHOUSE GASSES EMISSION IN LAKES : COMMUNITY REVIEW AND PROTOCOL** 2023
Fund for the Promotion of Young Researchers, University of Bern
5000 CHF (~ 5 000 €)
- WATER AND SILICA MASS BALANCE OF LAKE YELLOWSTONE, US AND LAKE 850, SWEDEN** 2019–2020
The Royal Physiographic Society of Lund
90 000 SEK (~ 9 000 €)
- PHYSICAL LIMNOLOGY OF YELLOWSTONE LAKE AND ITS ROLE IN BIOGENIC SILICA FLUXES** 2019–2020
The Royal Physiographic Society of Lund, travel grant
15 840 SEK (~ 1 584 €)

INVESTIGATION OF DIATOM-RICH SEDIMENT FORMATION

The Royal Physiographic Society of Lund

2018–2019

150 000 SEK (~ 15 000 €)

INVESTIGATION OF DIATOMITE FORMATION

The Royal Physiographic Society of Lund

2017–2018

140 000 SEK (~ 14 000 €)

CALIBRATION OF THE STABLE CARBON ISOTOPE ANALYSIS AND APPLICATION TO PALEORECONSTRUCTION OF MESOZOIC ECOSYSTEMS

Grant Agency of Charles University

2017–2019

186 000 CZK (~ 7 400 €) in 2017 254 000 CZK (~ 10 000 €) in 2018 234 000 CZK (~ 9 300 €) in 2019

SUPERVISION AND CO-SUPERVISION OF STUDENTS

PhD students	Co-supervision of Stan J. Schouten and Noé Schmidhauser, University of Bern, 2022-ongoing
MSc students	Co-supervision of Sara L. Ogi, University of Bern, 2022-2023
BSc students	Co-supervision of Kathrin Rüetschli, University of Bern, 2022-2023

TEACHING EXPERIENCE

from 2023	Advanced Laboratory Methods in Physical Geography II
from 2023	Advanced Laboratory Methods in Physical Geography I
from 2023	Seminar in Paleolimnology
from 2022	Field course in Paleolimnology
2017–2021	Teaching exercises in Sedimentology (GEOB22 & GEOB23)
2016–2020	Development of landscape from last glaciation until now and Swedish regional geology
2017	Seminar in Marine geology

EXTRACURRICULAR ACTIVITY

from 2010	Pikomaf MFF UK, Faculty of Mathematics and Physics, Charles University – Organizer of mathematical correspondence competition. Working with talented kids, teaching, managing programs, trips, summer camps.
2017–2021	JOLK committee member, Lund University – Gender equality board for Geology and Geography (INES). Organizing seminars, workshops and surveys in gender equality topics
2018–2019	Lunds Doktorandkår (LDK) – Communication officer of Lund's Doctoral Student Union. Webmaster, updating social media, graphics for promotion, promotional activities, organizing workshops for PhD students.
summer 2016	Tarfala research station, Stockholm University – Chef and helping out to field assistants – Cooking and helping to take care of the station, helping on the regular measuring of mass balance of the Storglaciären, water sampling for stable isotope analysis, fluorescent dye tracing etc.
2014–2015	Universitet i Tromsø, Department of Geology – Laboratory staff – Processing samples from marine gravity cores. Sectioning cores, freeze drying, sieving, picking planktic Foraminifera.

MAJOR SCIENTIFIC ACHIEVEMENTS

During my PhD, I focused on diatom-rich sediments and their formation in lacustrine sediments as part of a project funded by the Swedish Research Council (VR) and led by Prof. Daniel Conley. We studied the silicon mass balance of two lakes - subarctic Lake 850 in Northern Sweden and hydrothermally influenced Yellowstone Lake in the USA - to determine whether and under what conditions these lakes act as silicon sources or sinks over the last 12,000 years. Additionally, I demonstrated the importance of groundwater contribution to the water and silicon balance of these lakes. Our findings were published and included in my PhD thesis, which was awarded the Oscar II Foundation Award for the best PhD thesis in Natural Sciences at Lund University in 2022.

Recently, I secured funding for an independent project on groundwaters in lakes. This project involves a systematic review of existing literature and a methodological report to help the community better constrain groundwater fluxes and their effects on lake ecosystems. We are currently working on the meta-analysis of already reviewed publications and preparing the standard operational protocol for limnologist on how to constrain groundwater inflow into lakes.

Last year, in collaboration with Dr. Guillaume Witz from the Data Science Lab, we secured financial support for modernizing current workflow of hyperspectral data processing. We aim to replace slow, proprietary software currently used, by developing an alternative Python-based software leveraging open-source libraries (dask, scikit-learn, spectral etc.) and data formats (zarr). The entire workflow is implemented as a set of interactive plugins for the fast multi-dimensional visualisation software napari. In an effort to promote open-science and foster data exchange, the software is being made available on the data science platform Renku in collaboration with the Swiss Data Science Center.