

PhD student position: "Genome size variation and adaptation in rotifer populations"

The **Stelzer Lab** (<https://www.uibk.ac.at/limno/personnel/stelzer/forschungsdetails.html> and <https://www.uibk.ac.at/limno/personnel/stelzer/>) at the **Institute for Limnology in Mondsee**, Austria, has an opening for a PhD student interested in studying fundamental questions about the role of genome size variation in phenotypic adaptation, funded by the Austrian Science Funds.

Background

Eukaryotic genomes are replete with repetitive sequences and copious amounts of non-coding DNA, which are believed to offer little to no informational value. Moreover, eukaryotic genomes exhibit a remarkable range in size, spanning over five orders of magnitude. Over the past two decades, genome sequencing projects have unveiled the presence of extensive repetitive DNA elements, including transposable elements, satellite DNA, and pseudogenes. Despite ongoing efforts to sequence more genomes, crucial questions about the evolutionary mechanisms governing the abundance of repetitive DNA remain unanswered. We aim to understand why this repetitive proportion is so substantial, how it influences other genomic regions, and ultimately, how it impacts the phenotype of individuals bearing these genomes. Our research is driven by a deep fascination with these questions and focuses on exploring them from the angle of intraspecific genome size variation. Our main model organism is the rotifer *Brachionus asplanchnoidis*, known for its within-population GS variation that is mediated by satellite-DNA rich genomic elements.

The project

Our overarching goal is to unravel the intricate relationship between genetic and structural elements within the genome of *B. asplanchnoidis* and their impact on the organism's phenotype. By employing techniques like flow cytometry, whole-genome sequencing, and automated phenotyping, we aim to dissect the causes and consequences of genomic variation in this population. Through rigorous laboratory experiments, including long-term experimental evolution studies, we investigate how these genomic variations affect critical aspects such as body size, development, growth, and metabolic efficiency at both individual and population levels. Leveraging automated image analysis, we track phenotypic changes, particularly body size, throughout the evolution of these populations. Our research addresses key hypotheses concerning genome size changes, encompassing selection-based, mutational, and drift-based perspectives.

The PhD position

This PhD position is funded within an Austrian Science Funds (FWF) research project (P35916) titled "Genome Size Variation and Adaptation in Rotifers." The salary for this position will be in accordance with the FWF's guidelines, as outlined here: <https://www.fwf.ac.at/en/research-funding/personnel-costs/>. The selected candidate will be required to enroll at the University of Innsbruck. The funding for this position is secured for a minimum duration of three years. There will be no teaching responsibilities expected from the PhD candidate.

The Work Environment

The main work will be conducted at the Research Institute for Limnology in Mondsee (<https://www.uibk.ac.at/limno/>), which is a part of the University of Innsbruck, Austria. Courses of the PhD curriculum are either in Innsbruck or in Mondsee. Our lab and the institute provide a friendly and stimulating work environment with state-of-the-art infrastructure, expertise, and opportunities for collaboration. The Institute is situated in the charming town of Mondsee, nestled in the Salzkammergut lake district. It is located approximately 30 km east of the historic city of Salzburg and 200 km east of Innsbruck. The Salzkammergut area is renowned for its natural beauty and offers a high quality of life with exceptional opportunities for various outdoor activities. The institute boasts a dedicated team of approximately 30 staff members, including 8 research scientists, who are actively engaged in diverse research areas, particularly focusing on the evolutionary ecology of aquatic organisms.

Your Profile

We are seeking a highly motivated candidate with a strong background in evolutionary biology. An interest in combining experimental and computational work is essential. Prior experience in programming (any language), bioinformatics, and/or experimental work is a plus. We value candidates who are driven by scientific curiosity, possess a strong work ethic, can work independently, and have excellent communication and interpersonal skills. The ability to integrate and work effectively within a team is highly desirable.

Application

To apply, please send via email a letter of motivation, a CV with publication list, and contact information for two reviewers to Dr. Claus-Peter Stelzer (claus-peter.stelzer@uibk.ac.at).

We welcome and encourage informal inquiries before you initiate the application process.

For full consideration, please send your application by November 20, 2023.

Planned start is in Spring 2024.

References

Stelzer C.P., Pichler M., Stadler P. (2023) Genome streamlining and clonal erosion in nutrient-limited environments: a test using genome-size variable populations, *Evolution*, qpad144, <https://doi.org/10.1093/evolut/qpad144>

Stelzer C.P., Blommaert J., Waldvogel A.M., Pichler M., Hecox-Lea B., Mark Welch D.B. (2021). Comparative analysis reveals within-population genome size variation in a rotifer is driven by large genomic elements with highly abundant satellite DNA repeat elements. *BMC Biology* 19:206, <https://doi.org/10.1186/s12915-021-01134-w>

Stelzer C.P., Pichler M., Hatheuer, A. (2021). Linking genome size variation to population phenotypic variation within the rotifer *Brachionus asplanchnoidis*. *Communications Biology* 4:596, <https://doi.org/10.1038/s42003-021-02131-z>