

PhD position or part-time post-doctoral position in plant evolutionary biology, University of Zurich.

University of Zurich, Dept. of systematic and Evolutionary Botany

RESEARCH PROJECT:

Whether evolutionary trajectories leading to a particular function/morphology are predictable is a fundamental question of evolutionary biology. Yet, there is little consensus on this issue and experimental evidence is contentious. The phenomenon of convergent evolution, the repeated evolution of traits in independent lineages, provides an ideal framework to test for constraints on the trajectory of the evolutionary processes. Our project investigates the genetic bases of parallel morphological evolution in a closely related group of moss species, the family Funariaceae. In mosses, the dominant haploid gametophyte phase (the leafy shoot) alternates with a diploid sporophyte (spore producing) phase. Fitting the classical example of parallel evolution, the reduced sporophyte phenotype has evolved multiple times independently in the Funariid mosses. The availability of information on the developmental biology of complex and reduced sporophyte phases, the simple structure of the sporophyte phase and the family's amenability for reverse genetic work makes it an ideal system to investigate the genetics basis of parallel evolution.

This project heavily relies on the vast amount of preliminary data produced during the last three years using comparative transcriptomic and genomic analyses on two species (*Physcomitrium* (*Physcomitrella*) *patens* and *Funaria hygrometrica*) representing the end points of sporophyte complexity in the Funariaceae family. The preliminary data encompassing chromosome-scale genome assemblies, comparative transcriptomics and established methods for reverse genetic manipulation already enabled us to identify candidate genes and jump start this project. We envision that the proposed research will contribute to the general understanding of the molecular processes underlying parallel evolution of morphological traits, a fundamental issue of evolutionary biology.

This project is funded by a Swiss National Science Foundation (SNSF) grant to Peter Szovenyi (<http://peterszovenyi.weebly.com/publications.html>) and will be carried out in collaboration with Bernard Goffinet (UConn) and Joan Coudert (University of Lyon).

The Dept. of Systematic and Evolutionary Botany hosts research groups working on the evolutionary and ecological drivers of biodiversity, on the macroevolution of plants, on plant-insect interactions/pollination, on the evolution of mating systems, hybridization and speciation. The Dept. of Plant and Microbial Biology hosts many groups working on plant molecular and developmental biology, epigenetics, community genomics and plant adaptation. Both institutes are housed in the beautiful Botanical Gardens and host a diverse community of researchers in plant biology.

Ideal candidates will have an MSc in biology with a specialization in evolution, developmental genetics and/or bioinformatics. This position involves expert level bioinformatic work including genome assembly (long-reads, Hi-C) and genome annotation. Furthermore, the project uses comparative transcriptomics (spatial transcriptomics) including gene regulatory network analyses in a phylogenetic context, and high-throughput reverse genetic work. Therefore, this position requires advanced skills in handling, analyzing and interpreting high-throughput next-generation sequencing and RNA-seq data. Good skills in assembling vectors, carrying out genetic transformations and microscopy are also required. In case not all these skills are covered, the willingness to quickly acquire them is necessary. The student will closely work together with the postdoctoral fellow on this grant. Students should be willing to work both in the wet lab and in the office doing computational work. The position (if PhD) for four years. Selected candidates will be enrolled in one of the two affiliated PHD schools in evolution or plant sciences.

CLOSING DATE: The position is opened until filled, but all application material including CV, a summary of research experience, a letter of motivation, copies of relevant publications (published or submitted) and names and contact information of three reference persons should be received by 6th April 2023 to ensure full consideration. The position will start at the earliest possible date but it is negotiable (at the latest in June-July 2023). Candidates should indicate in a cover letter when they could take up the position and whether they are applying for a phd or postdoc position.

Please send all application material with the following subject line “PhD_sporophyte_evol” to: Peter Szovenyi, peter.szoevenyi@uzh.ch, as a single pdf document. For enquiries please contact Peter Szovenyi (peter.szoevenyi@uzh.ch).