LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN
DEPARTMENT FOR EARTH AND ENVIRONMENTAL SCIENCES

PhD Position in Evolutionary Genomics / Bioinformatics:

Gene Expression Evolution of Fireflies

I invite applications for one doctoral position in my research group at the Ludwig-Maximilians-Universität (LMU), München. The position is part of the DFG SPP "Genomic Basis of Evolutionary Innovations (GEvol) – Phase II" (https://g-evol.com) which means that you will be part of a large network of doctoral students (https://g-evol.uni-muenster.de/members/). The topic of our project is gene expression evolution in fireflies (https://g-evol.uni-muenster.de/projectpage/#AnkerFireflies). You will be jointly supervised by Sebastian Höhna (https://hoehnalab.github.io) and Ana Catalán (https://www.anacatalan-evolution.com/). This is a research-only PhD position funded for 3 years by the DFG (no classes and teaching required but possible). The starting date is flexible, ideally between 1st March 2026 and 1st October 2026. This project focuses on whole genome evolution and gene expression data analysis. Therefore, we strongly encourage evolutionary biologists with a keen interest in bioinformatics/statistics or bioinformaticians/statisticians/computer scientists with a keen interest in evolutionary biology to apply.

A major part of the wide phenotypic diversity that we observe today can be explained by changes in gene expression. Changes in gene expression have been successfully linked to the variation of different trait types. One of the most extreme differences within species are sexually dimorphic traits, many of which can be linked to sex-biased gene expression. In fireflies, extreme sexual dimorphism has evolved several times independently, which makes fireflies an excellent study system for repeated evolution. Published results from the first phase are https://doi.org/10.1038/s42003-024-06550-6, https://doi.org/10.1093/molbev/msaf123, and https://doi.org/10.1101/2025.08.19.671050.

In Phase II we want to explore: (i) the interaction of gene loss and gene expression evolution, (ii) the impact of gene duplication on gene expression evolution, and (iii) the correlation between TEs and cis-regulatory elements and gene expression evolution. We will try to address this question using RNA-seq of >18 firefly species from ~6 genera (3 with extreme sexual dimorphism) and performing specific hypothesis tests within a statistical phylogenetic framework. These phylogenetic models will be newly developed in the Höhna-lab (you can contribute if interested).

Your tasks will include:

- Performing analyses to assemble gene orthology datasets
- Performing analyses of gene family evolution (gene duplication and losses)
- Performing analysis of gene expression evolution across a phylogeny
- Various statistical analysis in phylogenomics and population genomics (e.g., estimating rates of evolution and selection, identification of TEs, reconstructing the evolution history of TEs)
- Testing hypotheses of correlation of gene expression evolution and genomics features (e.g., shifts in expression due to presence/absence of TE)
- Writing research articles & presenting your work at international conferences

Your required skills:

- A Master's degree or equivalent in Evolutionary Biology, Bioinformatics or a similar field finished by the starting date
- Good communication skills in English
- Good written and oral skills in English
- Highly motivated and independent working
- Basic knowledge in statistical analysis (e.g., a first course in statistical analyses using R)
- Basic knowledge in evolutionary genomics

What we offer:

- Being part of a large network of genome evolution in insects (https://g-evol.com)
- Training in genomics and statistical analysis
- Opportunities to participate at international workshops and conferences
- Working at the LMU Munich, one of Germany's and Europe's top Universities
- Standard LMU salary scheme for doctoral students
- Benefits such as health care, 30 days of vacation per year, pension, unemployment insurance, child support (if applicable) and parental leave.

LMU Munich is an equal opportunity employer. The University continues to be very successful in increasing the number of female faculty members and strongly encourages applications from female candidates. LMU Munich intends to enhance the diversity of its faculty members. Furthermore, disabled candidates with essentially equal qualifications will be given preference.

Any questions should be directed to Sebastian Höhna (hoehna@lmu.de) or Ana Catalán (catalan@bio.lmu.de). Applications, consisting of (a) a motivation letter (1 page) which states your motivation and interest for the specific position as well your relevant experience and skills for this project, (b) a current CV and (c) names and contact details of two referees should be sent to Sebastian Höhna by the deadline of 30 November 2025.