



At LMU Munich, Faculty of Biology, for the Chair of Quantitative Organismal Networks, we are looking for a

Postdoctoral Researcher (m/f/d) in Computational Cell Biology in Cnidaria

We are looking for a highly motivated genomics and computational cell biologist who is interested in coral symbiosis and circadian biology of animals. You will work on a DFG-funded project entitled **“Shedding light on corals: How DNA damage repair, cryptochromes and the circadian clock shape the response of Anthozoa to sunlight”**. The project is funded for 3 years and a collaboration between the Guse lab (Prof. Annika Guse) and the chronobiology lab of Prof. Nicholas Foulkes at the Karlsruher Institut für Technologie (KIT). For this project, we are using a new experimental model organism, the marine sea anemone *Aiptasia*. For more information on our research, visit: www.guselab.de.

Project background: Coral reefs are the most biodiverse marine ecosystems on this planet. They thrive in relatively harsh habitats, which are characterized by low levels of nutrients and high levels of sunlight. To overcome these challenges, reef-building corals (class Anthozoa, phylum Cnidaria) exploit sunlight and form a stable symbiosis with photosynthetic, single-celled dinoflagellate algae of the genus *Symbiodiniaceae*. These algae transfer essential nutrients to their coral host. However, corals are sessile animals and are therefore exposed to sustained high levels of ultraviolet (UV) radiation, the primary cause of DNA damage. To date it is unclear how corals balance the essential harvest of sunlight to promote symbiont photosynthesis while avoiding excessive DNA damage and thus genomic instability. To address this, we will use the symbiotic sea anemone *Aiptasia* as a model, in combination with comparative fieldwork to better understand how corals adapt to the various effects of sunlight in their environments. What are the molecular adaptations to withstand high levels of UV radiation? How are they interconnected with DNA damage repair mechanisms and the circadian clock? To what extent are these adaptations shaped by the coral-dinoflagellate symbiosis? Overall, we seek to generate a functional understanding of the DNA damage response in Cnidaria and specifically corals, aiming to reveal links between photobiology, cellular function, circadian clocks and behavior.

Project Aims: In this project, you will use bioinformatics and phylogenetics to generate an inventory of the molecular toolbox for DNA damage repair in Anthozoa and associated regulatory systems (e.g. the circadian clock). To complement this *in silico* approaches, you will develop reliable CRISPR/Cas9 method based on our previous protocol for microinjection method to deliver protein, mRNA, and DNA into zygotes of *Aiptasia* (Jones et al. *Sci Rep* 6, 2018) and our preliminary CRISPR/cas9 reagents. The ultimate goal is to knock-out and/or perturb genes in the sea anemone *Aiptasia* that have been implicated in sensing and repairing UV-induced DNA damage such as the newly discovered AnthoCRY cryptochromes (Gornik et al. *Mol Biol Evol* 38, 2021) to assess their molecular function. In parallel, you will experimentally test the extent and dynamics of DNA damage using qPCR quantitation and RNA-seq analysis with the ultimate goal to systematically document the DNA damaging effects of different light stressors. and to identify the degree of circadian clock and light-driven regulation of DNA damage repair responses associated with sunlight exposure (with and without genetic perturbation). Guided by the obtained results, you will test whether observations in the model *Aiptasia* are also relevant for reef building corals in an experimental mesocosm (in collaboration with the Jörg Wiedemann lab in Southampton (UK)). By combining diverse *in silico* and experimental approaches,

this project will provide fundamentally new insight into the mechanisms with which corals adapt to high levels of UV exposure, a prerequisite to create the most productive marine ecosystems on our planet.

Your Background: The position is available for early-career scientists holding a PhD-degree. The successful candidate has a strong background in genetics, molecular biology or cell biology with a proven track record using CRISPR/Cas9 or equivalent molecular tools. You should also have experience in generation and analysis of RNA-Seq data. Moreover, phylogenomics experience and working with command line tools such as IQ-TREE, DESeq2 and various R packages (e.g. pcaExplorer) are an advantage, as is familiarity with handling marine cnidarians (e.g. Aiptasia, Nematostella, etc.). Our working language is English. We expect good communication skills, the ability to work independently as well enjoying contributing to a diverse research team.

What we offer: This position offers the opportunity to work in a diverse, international and motivated team, dedicated to advancing our understanding of coral symbiosis. Our research is highly topical and we seek to actively contribute to a sustainable world. Accordingly, we offer to complement your basic research activities with opportunities for further training and with participation in transfer and outreach activities including *jvamos, symbiosis* (<https://vamossymbiosis.org/>). The laboratory is well-funded and researchers are supported by an excellent laboratory infrastructure at the HighTechCampus Planegg-Martinsried, which is part of the largest German university. We value good communication, a pleasant working atmosphere and personal responsibility. We are also dedicated to contribute to open and reproducible science. If applicable, you will participate in coral reef field work in Okinawa (Japan) and interact with international collaboration partners.

This is a full-time position and remuneration is up to TV-L E13, depending on qualifications. LMU has signed the "Diversity Charter" and is committed to the diversity of its employees. We therefore actively promote gender equality. Severely disabled applicants will be given preference if their qualifications are otherwise essentially the same.

We look forward to receiving your application via email (one PDF, max. 5 MB) by 01/31/2023 to:

Prof. Dr. Annika Guse, **Email:** annika.guse@biologie.uni-muenchen.de

In the course of your application for an open position at Ludwig-Maximilians-Universität (LMU) München, you will be required to submit personal information. Please be sure to refer to our [LMU Privacy Policy](#). By submitting your application, you confirm that you have read and understood our data protection guidelines and privacy policy and that you agree to your data being processed in accordance with the selection process.