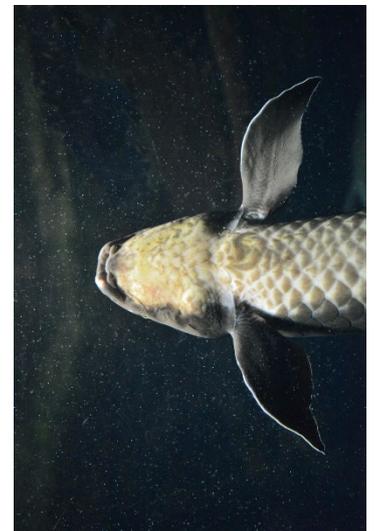


## Evolution of pre- and postzygotic reproductive isolation in cichlid fishes

### Project description:

In Nicaragua a rare “natural experiment” resulted in repeated parallel adaptive radiations of cichlid fishes. 13+ species arose in a few thousand years after colonization of 7 crater lakes from an older ancestral lake population. In two crater lakes small repeated adaptive radiations, but, in other crater lakes species only mate strongly assortatively (for coloration or lip size polymorphisms) but did not speciate. The color-polymorphism (a cue in mate choice) and hypertrophied lips (possibly a magic trait) are caused by single major-effect loci, permitting to apply functional assays (CRISPR-Cas9) to ascertain the geno-phenotype relationships. Although the sympatric species are genome-wide differentiated they are not reproductively isolated and can be hybridized in the laboratory producing fertile offspring. This permits to address some fundamental questions in evolutionary biology on the genetic basis of adaptations, reproductive isolation and on the role of reinforcement in speciation. We are asking how speciation unfolds from weak to complete reproductive isolation along the speciation continuum. This large project spans several biological levels: from comparative genomics, population genomics, QTL and GWAS analyses, to characterizing genomic signals of natural selection, mapping adaptive traits, mating cues, and mate preferences. Mate choice experiments will study the degree of pre- and postzygotic isolation as well as the role of reinforcement in species from sym- and allopatric geographic settings. Hybrid crosses as well as laboratory and field experiments will test for pre- and postzygotic isolation and fitness differences in hybrids.



We are looking for a talented Ph.D. student to work with us on this large project since it will require more than one Ph.D. student to work on the different aspects of this fundamental problem in evolutionary biology. One potential student should focus on the **molecular/genomics aspects of adaptations and species differences**. Another could work on **behavioral questions relating to pre- and postmating isolating mechanisms and cues to mate choice or incomplete barriers to gene flow and hybridization**. We would welcome applications by motivated applicants if you are interested in any of these aspect of speciation and hybridization from the behavioral to the genomic level. A particular thesis topic could fit into this long-term project that could also involve field work in Nicaragua. Based on background and interest the Ph.D. student the thesis project would be a well-defined subproject of this long-term effort.

### Keywords:

Evolutionary Biology, Genomics, Speciation, Population Genomics, Mate choice, Hybridization

# Evolution of pre- and postzygotic reproductive isolation in cichlid fishes

**Entry requirements:**

**MS or MA Degree in Biology, Bioinformatics, Molecular Biology or similar**

**Location:** University of Konstanz, Chair in Zoology and Evolutionary Biology

**Starting date:** September 2021

**Funding:** limited to 3 years

**How to apply:**

Apply until **March 31<sup>st</sup>, 2021** via the [HFA application portal](#).

The Hector Fellows will arrange interviews (via skype or if feasible in-person) with the most promising applicants. The final candidates will be invited for a personal presentation on July 8, 2021 in Bremen (Germany). The final decisions will be announced by August 2021.

For questions related to making your application, please contact Hector Fellow Academy Office: [application@hector-fellow-academy.de](mailto:application@hector-fellow-academy.de) or [www.hector-fellow-academy.de](http://www.hector-fellow-academy.de)