



EBERHARD KARLS
UNIVERSITÄT
TÜBINGEN



CSC-Tübingen PhD Scholarship Program

2025/2026 application round: prospective PhD positions at the University of Tübingen

Faculty: Faculty of **Science** (Eberhard Karls University Tübingen)

Institute / Section / Subject: Centre for Integrative Neuroscience / Institute of **Neurobiology**

Supervising Professor(s): Prof. Dr. Aristides Arrenberg (Systems Neurobiology laboratory)

About the Supervisor(s): Our research group investigates **vision** and oculomotor circuits in **zebrafish**. We study how the diencephalon and the midbrain process optic flow to support behavioral responses. We use calcium imaging (two-photon microscopy) to measure brain activity in head-restrained transgenic larval zebrafish. Behavioral and neurophysiological data are analyzed via custom programming algorithms (e.g. Python). Dr. Arrenberg has a background in neuroscience and biochemistry from his studies at the University of California San Francisco and the University of Hamburg. Dr. Arrenberg has pioneered optogenetic approaches to manipulate brain activity in zebrafish. Also see: <https://tinyurl.com/3kd9tprz>

Specification: Optogenetic dissection of color vision circuits in the zebrafish pretectum and tectum

Topic Description: In this project, we will investigate how color information (four cone photoreceptors exist in the zebrafish retina) is used by the brain. We already do understand, which color opponencies are represented in the retina, but how they are combined with spatiotemporal information in the different functional neuron types of the midbrain is unknown. Neurons supporting hunting behavior, escape responses, and gaze stabilization rely on different color channels and our visual virtual reality environment for zebrafish enables precise investigation of spatiotemporal color processing. The lab recently set up a microscope for holographic photostimulation of the brain, which we will use to activate or deactivate target neuron groups and thereby reveal circuit mechanisms as well as demonstrate causal roles of neurons for the generation of behavior in this vertebrate.

Intended Degree: Dr. rer. nat. in Biology (Faculty of Science) or Neuroscience (via our international Graduate Training Centre, GTC)

Type of the PhD Study: Full-time (complete doctoral studies at the University of Tübingen)

Required Degrees and Qualifications: Master of Science in Neurobiology or related discipline (e.g. Biology, Biomedical Engineering), Programming skills (e.g. Python)

Language Requirements: Fluent English, verbally and in writing (TOEFL iBT 95 / IELTS 6.5); German is a benefit, but not required

Notes: See our papers at <https://pubmed.ncbi.nlm.nih.gov/?term=Aristides+Arrenberg&sort=pubdate>