CSC-Tübingen PhD Scholarship Program

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

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Faculty: Faculty of Science

Institute / Section / Subject: Evolution and Ecology / Evolutionary Biology of Invertebrates

Supervising Professor(s): Prof. Dr. Oliver Betz

About the Supervisor(s): The research of Oliver Betz focuses on the functional and ecological morphology of insects, taking into account the integration of morphology and ecology to improve the understanding of the function of morphological structures in their ecological (environment) and evolutionary (history) context. Through his participation in interdisciplinary research projects (e.g., the collaborative research council "Biological design and integrative structures - analysis, simulation and implementation in architecture" (https://www.trr141.de/)), his team has also been involved in biomimetic projects on insect attachment systems and joint-free movement principles. Methodologically, his group uses light and (scanning and transmission) electron mircoscopy, synchrotron microtomography and synchrotron-based X-ray cineradiography, 3D reconstruction, force measurements with force transducers and nanotribometers, high-speed videography in the context of kinematic analyses, behavioral observations, phylogenetic systematics, and ecological field and laboratory experiments.
Link: https://uni-tuebingen.de/de/147741

Specification: Comparative morphology, ultrastructure and function of the postabdomen of beetle larvae (Coleoptera)

Topic Description: The abdominal apex (postabdomen) of beetle larvae comprises the last three segments. They differ from the more anterior segments, because they are involved in locomotion, sensing, cocoon spinning, defense and / or respiration. Major developments of the postabdomen involve the transformation of segment 10 into a pygopod (a special attachment organ) and the development of terminal urogomphi (pseudocerci) (often used as movable “pseudoantennae”). Moreover, the postabdomen often comprises gland structures that release a secretion for defense or cocoon building. This project involves the comparative investigation of the ultrastructure of the postabdomen across beetle taxa using transmission and scanning electron microscopy, 3D reconstructions based on histological section series and functional observational studies using videography.

Degree: Dr. rer. nat.; will be embedded in our structured doctoral program EVEREST: Evolution and Ecology Research School Tübingen: https://uni-tuebingen.de/de/39407

Required Degrees: Master of Science, Areas of expertise: zoology, entomology

Language Requirements: *TOEFL iBT 95*

Notes: Willingness to work in an electron microscopic lab and learn about entomological techniques. The PhD will require much effort in (ultra-)microtomic serial sectioning including fixation of fresh samples, staining, cutting and working with SEM and TEM (microscopes). Adult beetles will have to be collected in the field and reared in the lab to attain the larvae needed for further investigations