

## Master thesis (M.Sc.)

### Development of passively adaptive wing structures for an underwater glider utilizing the passive flapping-foil glide concept

Underwater gliders are autonomous underwater vehicles that generate propulsion through small volume adjustments and the conversion of the resulting vertical motion into horizontal motion. To achieve this, wings are employed. As part of a research project at the University of Rostock, a glider is currently being developed whose body remains on an even keel while its wings passively flap into a position suitable for propulsion generation.

To further optimize the flight efficiency of this system, the present work will investigate advanced concepts for passively adaptive wings. Specifically, the study will explore how wings can be designed to passively adjust their camber to the direction of motion—either through flexible elements or through joint mechanisms—thereby achieving higher efficiency.

The following points are to be addressed in detail:

- In-depth study of the hydrostatics and hydrodynamics of underwater gliders
- In-depth study of the hydrodynamics of lifting surfaces
- Development of multiple solution concepts and selection of the most promising design idea
- Implementation of the selected concept into a detailed construction
- Fabrication of a functional demonstrator and experimental validation
- Documentation of the investigations as well as presentation and discussion of the results

The written report must be submitted before the end of the allotted working period. The results of the work are expected to be presented in a colloquium in a 20-minute talk and subsequently defended in a discussion.

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