

MSc and BSc projects or special courses:

Marine biology projects at the Technical University of Denmark ([DTU Aqua](#)) in 2019 - 2020

General information

Students are welcome to join ongoing research projects or start their own independent project. Students are expected to collect, analyse and interpret data and produce a manuscript draft that describes the study findings. All projects are designed to produce data for a peer reviewed publication that students will either first-author or co-author. Students are welcome to work in groups. Projects may be expanded, or combined, in case a single project (see below) provides insufficient work for a complete student project. In addition, most projects are flexible and may be modified (e.g. scope reduction) to meet student needs.

The work location is the [Technical University of Denmark campus](#), north of Copenhagen in Denmark. Field work, however, is carried out in a diversity of locations, including the estuary [Roskilde Fjord](#) and the bay [Sønderborg Bugt](#) (see picture below). Student guidance covers study planning, data collection/acquisition, statistical analyses, results presentation and writing of the thesis/manuscript. In addition to the student guidance, the university offers a study location (desk, PC, access to library, software etc.), laboratory space, transportation, research equipment (boats, underwater cameras etc.) and a friendly and international work environment. Depending on the project, direct financial support may be available. The university will ensure that students learn how to carry out a research project and report the findings.

Projects are available at: <https://projektbank.dtu.dk/en-us/Pages/default.aspx>.



Field work in Sønderborg Bugt in 2018. Students are from the Faroe Islands, the Netherlands, the UK and France.

PROJECT 5: Marine migration of anadromous brown trout (*Salmo trutta*) mapped using acoustic telemetry

Aim:

The aim of this study is to map the migration and temperature exposure of adult brown trout in the marine environment. Data will reveal if the brown trout is vulnerable to climate change in the marine environment.

Background:

In many rivers, brown trout exhibit an anadromous strategy where fish emigrate from the river to forage on abundant prey sources in the marine environment. While riverine migrations have been investigated by many previous studies, the marine migrations remain poorly understood. For example, habitat use and temperature exposure have rarely been described in the marine environment. Knowledge in this field is important to manage and protect populations of anadromous brown trout. This is particularly important in areas where brown trout populations are supported through the release of juvenile fish raised in captivity. Climate change could expose brown trout to suboptimal or lethal temperatures, but it has not been examined.

Content:

This study will use fish telemetry to investigate the migration of adult brown trout in a large estuary ([Roskilde Fjord](#)), 40 km west of Copenhagen in Denmark. Fish captured in the wild will be tagged with tiny acoustic transmitters and tracked using stationary hydrophones and manual tracking from a boat. A film showing brown trout tagging is available [here](#). Acoustic transmitters will not only reveal the position of the tagged fish in the estuary, the transmitters will also measure and transmit the temperature inside the fish. Temperature measurements can be used to estimate maximum growth rates and exposures to critical temperatures (e.g. during the summer). Stationary hydrophones will be positioned in narrow parts of the estuary and will be used to determine if the tagged brown trout emigrate from the estuary and enter the Kattegat Sea further north. The stationary hydrophones will also reveal if the tagged fish are utilizing a marine protected area situated in the southern parts of the Roskilde Fjord.



Tagging of brown trout and Nico examining hydrophones in the Roskilde Fjord in 2018.

Duration:

Data collection for this project is expected to run for 2-6 months, followed by data analyses lasting 1-3 months and 1-3 months for write up. The project is large enough to accommodate 2-3 students.

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