

Master thesis project: 'The biophotonic behavior of coral symbionts'

Master-thesis background

Corals are among the most biodiverse and productive aquatic ecosystem on the planet and obtain most of their energy demands from unicellular microalgae (dinoflagellates, genus *Symbiodinium*) that live within coral tissues, absorb light and photosynthesize. Within corals, the concentration of microalgae varies among different tissues is known to vary, which consequently must cause the distance between each cell to vary. This so-called cell 'packing-fraction' is important for tissue-specific light absorption: i.e. in a tightly packed tissue, the amount of light that is available for photosynthesis to a single cell will be lower (due to cell-cell shading) than in a loosely packed tissue. The relationship between packing fraction, light absorption and photosynthesis is currently unknown and will be investigated in this master thesis. The data gained from this project will significantly advance our understanding on the effects of cellular densities on photosynthesis and make an important contribution to the emerging field of coral-reef biophotonics.

Master-thesis project description and aims

In this master thesis, you will to make use of available microfluidic devices to create different packing fractions of single coral symbiont cells. You will subsequently test their biophotonic properties by use of chlorophyll fluorometry and fiber optic illumination setups and analyze the resulting data.

Methods

In this project, you will use the following methods:

- Basic microbiology
- Microfluidics
- Advanced chlorophyll fluorometry imaging
- Data analysis

You should be a master-level student with some experience in e.g. optics, photosynthesis and/or physics and a keen interest for interdisciplinary science.

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Students from all walks of life and backgrounds are welcome to apply!

Interested? Please contact Lars Behrendt, lars.behrendt@scilifelab.uu.se. The scope of the project is a 30-45 hp master thesis