

Master thesis project:

‘Does light mediate bacteria-phytoplankton interactions?’

Master-thesis background

Phytoplankton, oceanic photosynthetic unicells, contribute approximately 50% of the world’s primary production and form the basis of all aquatic food webs. Oceanographic and microcosm studies have demonstrated that periodic phytoplankton ‘blooms’ causes bacterial concentrations to increase in parallel; likely due to localized nutrient release by photosynthesizing, or dying, phytoplankton cells. While light is essential to the survival of phytoplankton it can also act as a stressor, if experienced at intensities that surpasses the native abilities of cells to process incoming photons. Importantly, as the surface ocean is in near equilibrium with CO₂ in the atmosphere, the sinking of dead phytoplankton cells exerts a primary control on Earth’s climate via bacterial carbon-rem mineralization. By discovering mechanisms that influence phytoplankton survival and bacterial interactions, we thus gain knowledge on the global sequestration of CO₂. In this project, the student will investigate how light mediates phytoplankton health and whether the health status of individual cells does affect bacterial behavior. The data gained from this project will significantly advance our understanding of phytoplankton-bacteria interactions.

Master-thesis project description and aims

In this master thesis, you will use automated microscopy in combination with advanced cell tracking to measure the effects of light on phytoplankton-bacteria interactions.

Methods

In this project, you will learn the following methods:

- Basic microbiology
- High-throughput automated fluorescence microscopy
- Tracking single-cell movements in large image datasets

You should be a master-level student with some experience in e.g. image analysis, microscopy and/or phytoplankton and a keen interest for interdisciplinary science.

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

Have a look at what else we are up to: <https://behrendtlab.com/>

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