

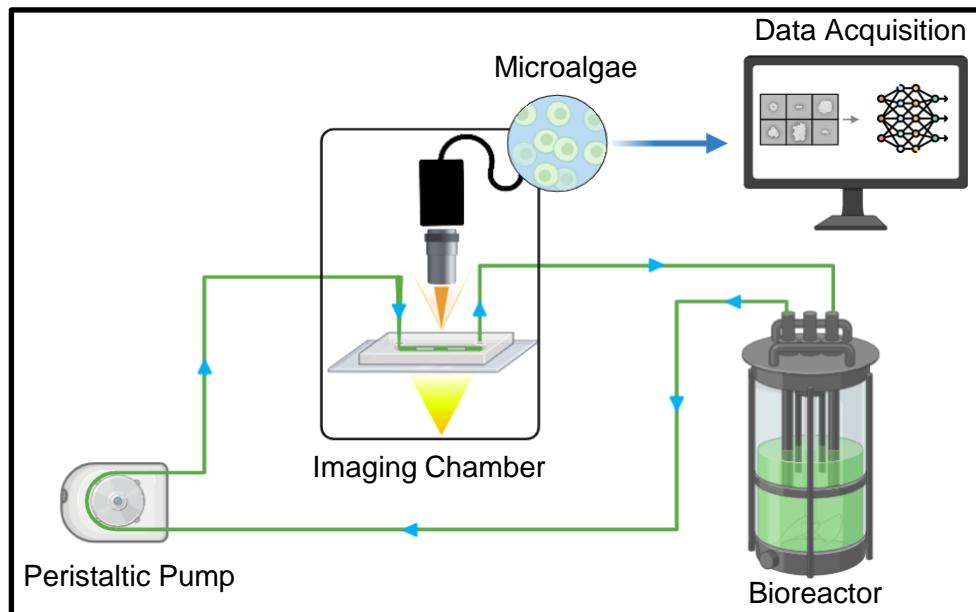
Master Thesis

Development of a Low-Cost Imaging Sensor for Online Microalgae Process Monitoring

Microalgae are photosynthetic microorganisms with increasing commercial interest. While manual microscopy is the established standard for microalgae cell population monitoring, its labor-intensive nature and reliance on specialized expertise limit scalability and reproducibility.

This project aims to design and build a low-cost imaging sensor integrating a microfluidic chip and an RGB camera for on-line imaging of microalgae cells ($\geq 2\mu\text{m}$). The focus is on mechanical design, with a particular attention given to optical alignment, and reliable fluid handling.

The expected outcome is a working prototype reliably capturing images of microalgae cells flowing through the microfluidic channel suitable for continuous laboratory operation, which will facilitate further important research in microalgae bioprocess monitoring and control with a real scientific impact.



Task description

- Literature research on existing imaging sensing platforms
- Research and choice of components (camera, microfluidic chip, pipes etc.)
- Conceptualization of the mechanical design and its fabrication (3D printing)
- Assembly, testing and calibration

Requirements: Background in Mechanical Engineering, Mechatronics or hands-on experience

Start: as soon as possible

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What to expect: During your research you can expect close guidance, while also maintaining freedom in how you approach the tasks. Through intermediate presentations you can prepare for your final defense and gather feedback from multiple team members throughout your project. The thesis can be written and supervised both in English or German, if your study regulations allow.