

## MSc-project for students in Biomedical Engineering, DTU/KU

### Title:

Prototyping a new fluorescence microscope for long-term imaging of living specimens

### Description:

This project aims to provide a *'proof-of-concept'* for a new type of fluorescence microscope tailored to capture dynamics in living bacterial biofilms. More specifically, we will build and test a microscope, which relies on a new pattern-based illumination/scanning scheme. Hence, the project focuses primarily on hardware/software development.

Ideally, two M.Sc.-students will work on the project in parallel, starting January/February 2019 (Lyngby Campus). One student will implement instrument control using LabVIEW. The other student will work with hardware assembly using SOLIDWORKS and off-the-shelf optics. The two students will collaborate on data-simulation (MATLAB) and data-acquisition from a test-sample.

While the project requires a high level of collaboration/coordination between the two students, each student *must* submit an individual report (full thesis). If a single M.Sc.-student feels ready to tackle the whole project alone, then I am happy to discuss this option.

The project is generously supported by a grant from *'Direktør, Dr. Techn. A.N. Neergaard og Hustrus Fond'*.

### Required qualifications:

- Required: Mathematical simulation (image analysis) in MATLAB
- Recommended: Programming (instrument control) in LabVIEW
- Recommended: 3D-CAD in SOLIDWORKS
- Recommended: Basic optics
- Recommended: Basic electronics
- Recommended: A conceptual understanding of Fourier theory

### Responsible institution:

DTU Dept. of Electrical Engineering, Biomedical Engineering Group  
(starting January 2019: DTU Dept. of Health Technology)

### Contact information:

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**Allowed no of students per report:** 1 (each student *must* submit an individual report)

**DTU supervisor:**

Emil B. Kromann