

## **MSc Project**

### **Development of Fluorescent Promoter-Based Biosensors for Yeast**

**Duration:** 5-10 months (30 to 60 hp).

**Preferred starting time:** September – December 2021.

**Contact people:**

- **Supervisor – Prof. Lisbeth Olsson** (lisbeth.olsson@chalmers.se).
- **PhD Student – Luca Torello Pianale** (lucacat@chalmers.se).

**Background.** The transition from a fossil-based economy towards a bio-based one has been a worldwide goal in the last years. Biomass can be one of the raw materials for the biochemical conversion in the desired chemicals, thanks to the use of microorganisms such as bacteria and yeasts. Industries constantly strive for more robust cell factories, thus cells able to optimally perform under challenging conditions prevailing in industrial processes.

**Project overview.** Over the last years, investigation of bio-based industrial processes at the single-cell level is a new field in constant exploration. In this view, fluorescent biosensors are useful tools, allowing for fast and precise screening of multiple conditions in the intracellular environment.

In this project, the student will develop *de-novo* promoter-based fluorescent biosensors able to detect specific intracellular conditions related to metabolisms and intracellular stresses. The biosensors will be then introduced in yeast *Saccharomyces cerevisiae*, tested and used to further investigate yeast physiology. The work will include fluorescence-related techniques (microscopy, flow-cytometry and cell sorting), microbiology techniques (flask cell cultivation and high-throughput machines, such as the BioLector®) and molecular biology (PCR, DNA purification, cloning, strain engineering using CRISPR-Cas9 technology).

**Pre-Requisites.** Applicants should have a background in biotechnology / microbiology / molecular biology / synthetic biology or related fields. Previous lab working experience is not mandatory. Theoretical knowledge on fluorescence microscopy and image analysis is appreciated. We look for someone with a curious mindset, willing to learn and work independently.

If you are interested or have any questions, contact us!