

Project Proposals at Chalmers University of Technology.

Division of Industrial Biotechnology – Department of Biology and Biological Engineering

MSc Project

Microbial Robustness quantification through phenomics and fermentations

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 – Cecilia Trivellin** (cectri@chalmers.se).

Background: Bioprocesses are receiving increasing interest, especially for their fundamental role in the shift from a fossil-fuel economy to a green economy. However, the success of a bioprocess relies on efficient cell-factories and a high degree of process control. Often, perturbations occurring in industries are not predictable and this makes the process yield and quality lower than non-bio-based chemical processes. Consequently, it becomes paramount to use and design robust microbes that can maintain their performance regardless of process fluctuations and perturbations.

Project overview: Microbial robustness is a key aspect in strain design; however, its quantification is often undervalued and wrongly measured with tolerance assays.

In this project, the student will develop and validate a methodology to measure microbial robustness of *Saccharomyces cerevisiae* with phenomics data collection and large-scale fermentations. The synergistic effects that multiple perturbations have on bioethanol fermentation will be evaluated.

The work will include microbiology, analytical chemistry and fermentation technology. In specific the following methods will be used: high throughput screenings, cultivation in shake flasks, batch fermentations, high performance liquid chromatography, enzymatic essays and multivariate data analysis.

Pre-Requisites. Applicants should have a background in biotechnology / microbiology / chemical engineering, or related fields. Previous lab working experience is not mandatory. Basic knowledge of R is considered a merit.

We look for someone with a curious mindset, willing to learn and work independently.

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