



Bachelor's / Master's / Semester thesis:

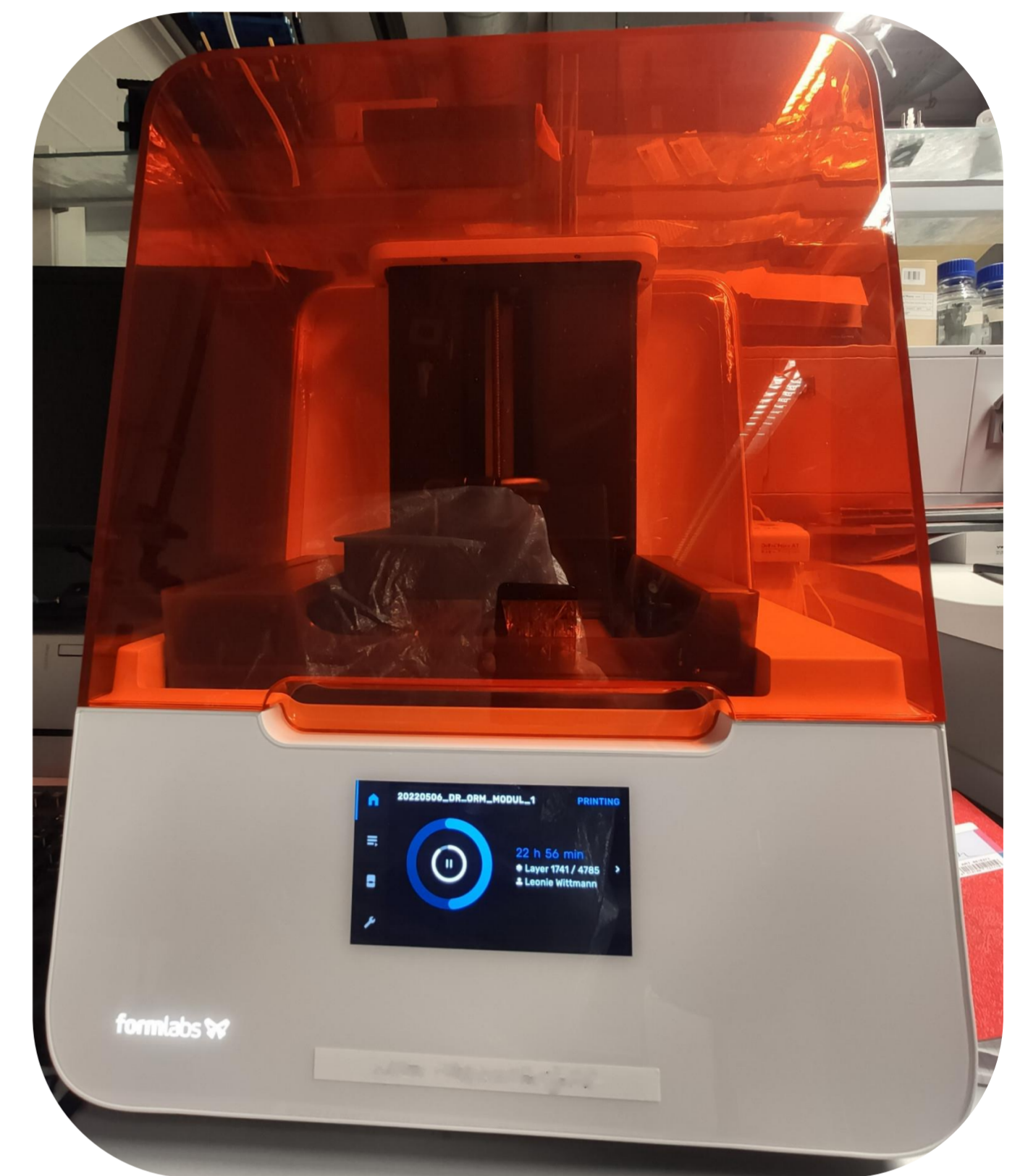
Modelling - Simulation – Construction: Sustainable separation processes

Keywords: sustainable processes, setup-design, simulation, 3D printing, membrane devices, constructive & simulative work, chromatography

Project description

Due to their ease of handling and high throughput, membrane processes are of essential importance for the biochemical industry. However, most membrane processes are still characterized by poor flow properties, large dead volumes, low resolution and high waste streams. Through the combination of electrical and chemical processing membrane devices for more efficient and sustainable industrial applications can be manufactured.

This thesis aims to optimize a novel potential-controlled membrane module for the use in a preparative chromatography process. The fluid flow and electric potential distribution of the system play a decisive role and will be investigated simulatively. Simulations will then be validated on a preparative chromatography plant. In a further step, optimized prototypes will be constructed using SLA printing. In this project, you can bring in your creative ideas to design, develop and construct membrane devices for a sustainable biochemical industry.

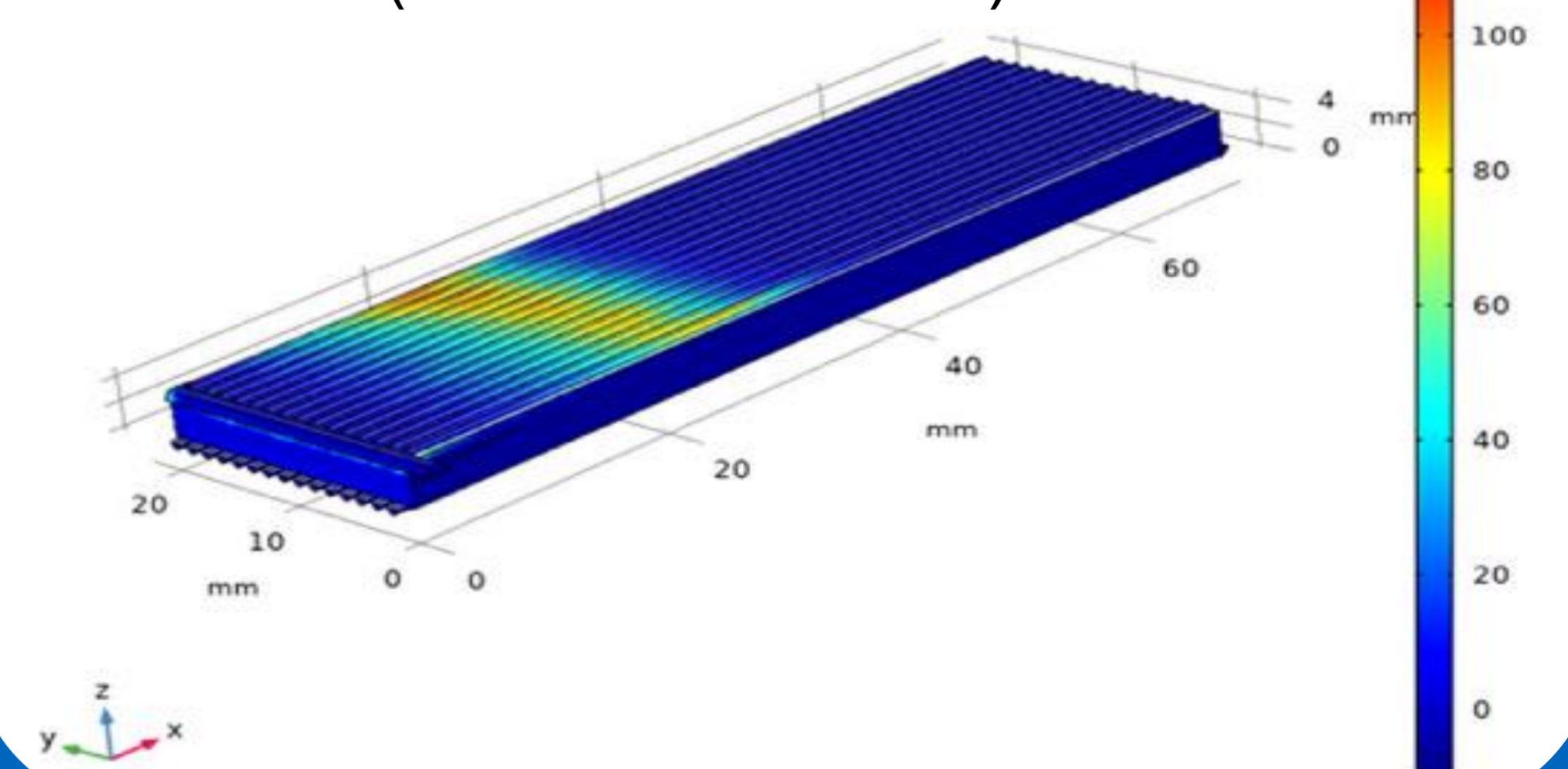


Formlabs 3B+ (SLA Printer)

Requirements

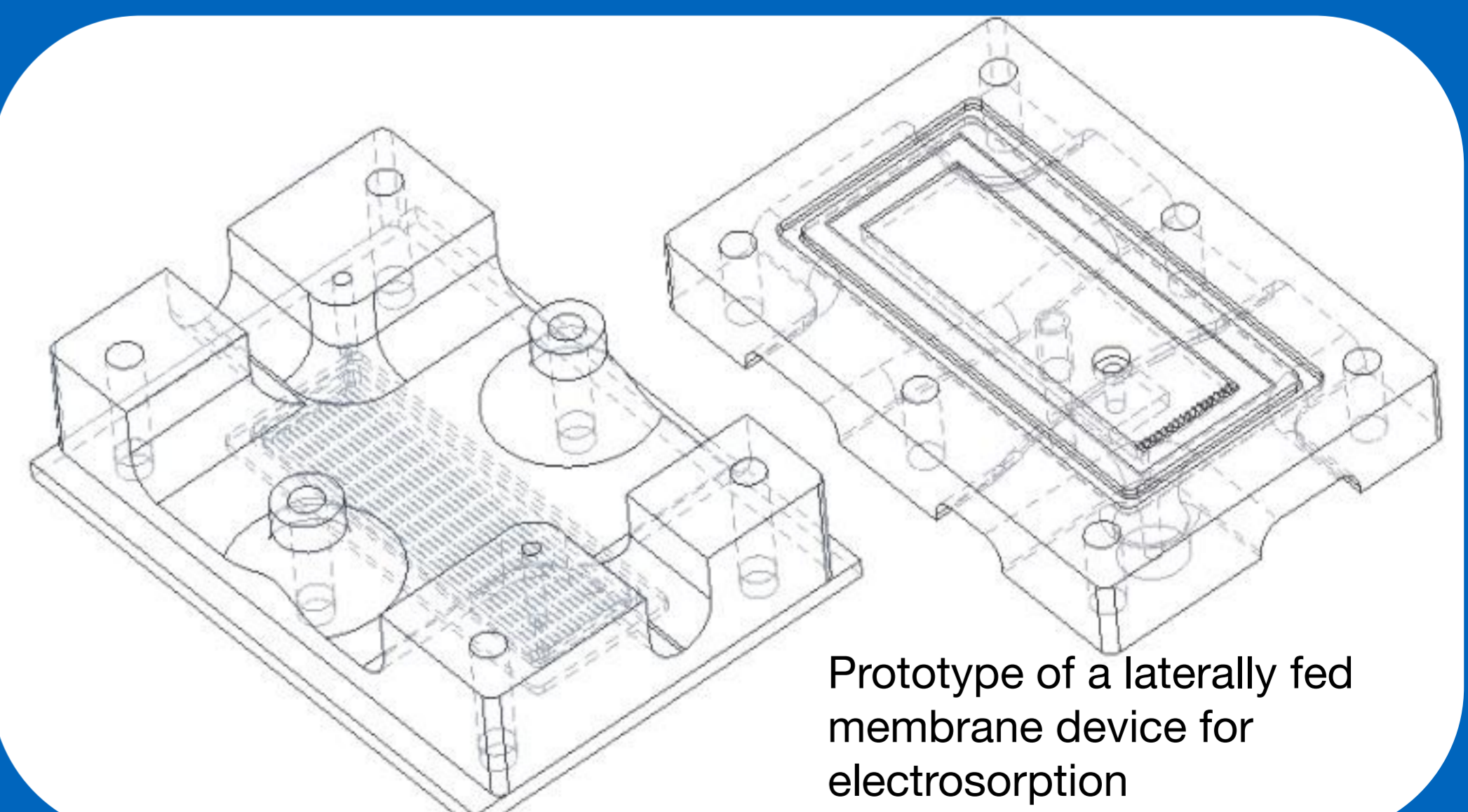
- Creativity and structured work
- Advantageous but not necessary: Experience with CAD and COMSOL
- Interest in applied sciences, simulation and construction
- To start from august 2022

Tracer partitioning in a membrane device (Ghosh et al. 2020)



Tasks

- Construction and optimization of prototypes
- Simulation of streaming properties and potential distributions in novel prototypes
- Validation of simulative results on a preparative chromatography plant



Prototype of a laterally fed membrane device for electrosorption