

# Bachelor's/ Master's/ Semester Thesis

## Product Development for a Rapid Point-of-Care Detection System

Keywords: Pathogen Detection, Medical Product Development, Membrane Filtration

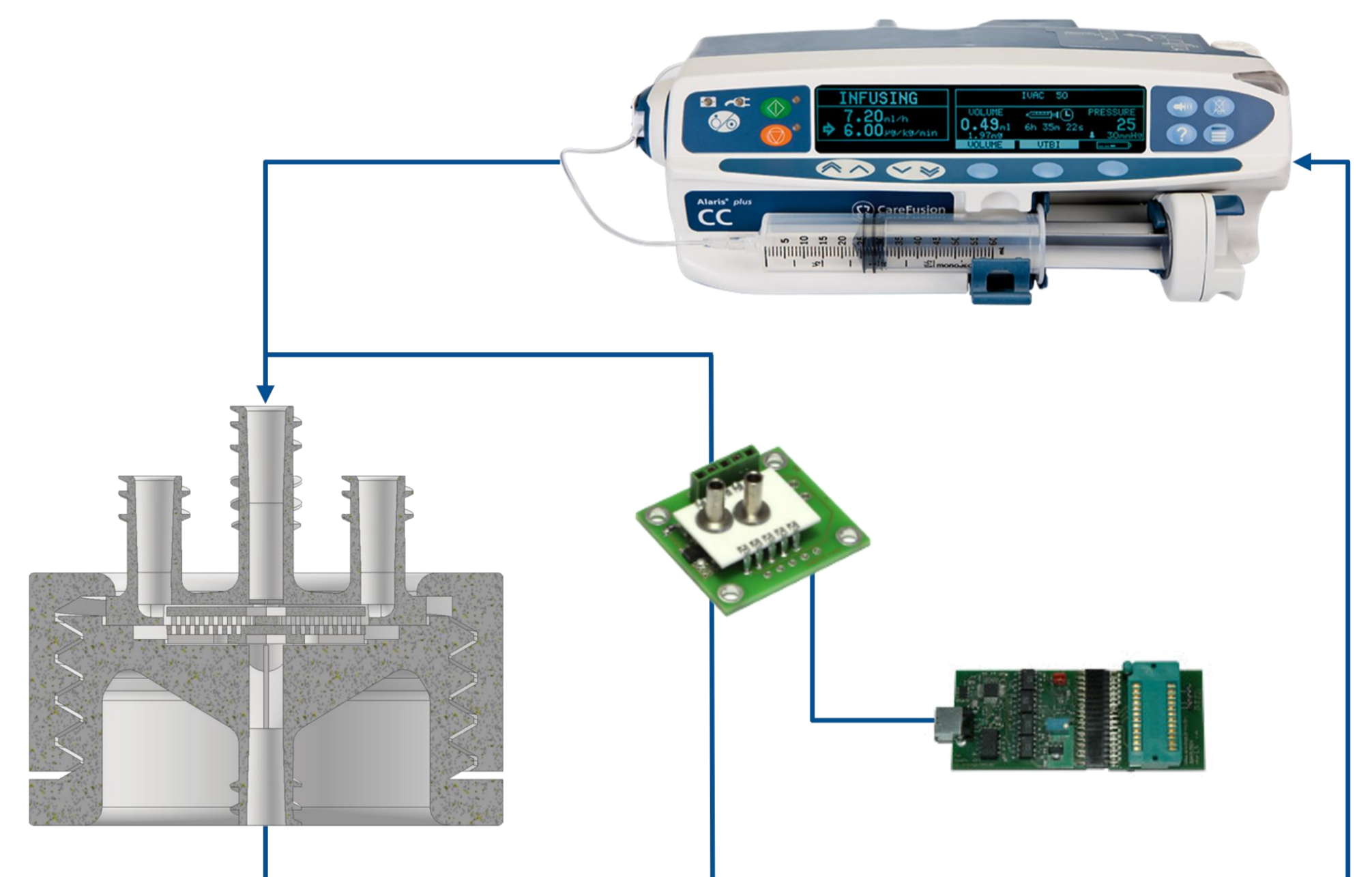
### Project Description

In 2020 around 26% of the global population still did not have access to safely managed drinking water, with over 770 million people not having basic access to drinking water. This results in over 1.2 million deaths per year.

Early and accessible detection of pathogens is crucial to prevent the spread of infectious diseases. We are developing a novel Point-of-Care detection system that promises to deliver results about the level of contamination in minutes, compared to days or weeks of competing concepts. Therefore, it needs a far higher-than-natural pathogen concentration.

One common way to enrich bacteria cheaply is membrane filtration — this work centres around the design of a membrane filtration setup, which maximizes the enrichment performance.

Experimental, constructive, or CFD works are possible.



Schematics of current test setup. It allows for cross-flow and dead-end filtration. A differential pressure sensor gives inferences to the trans membrane pressure

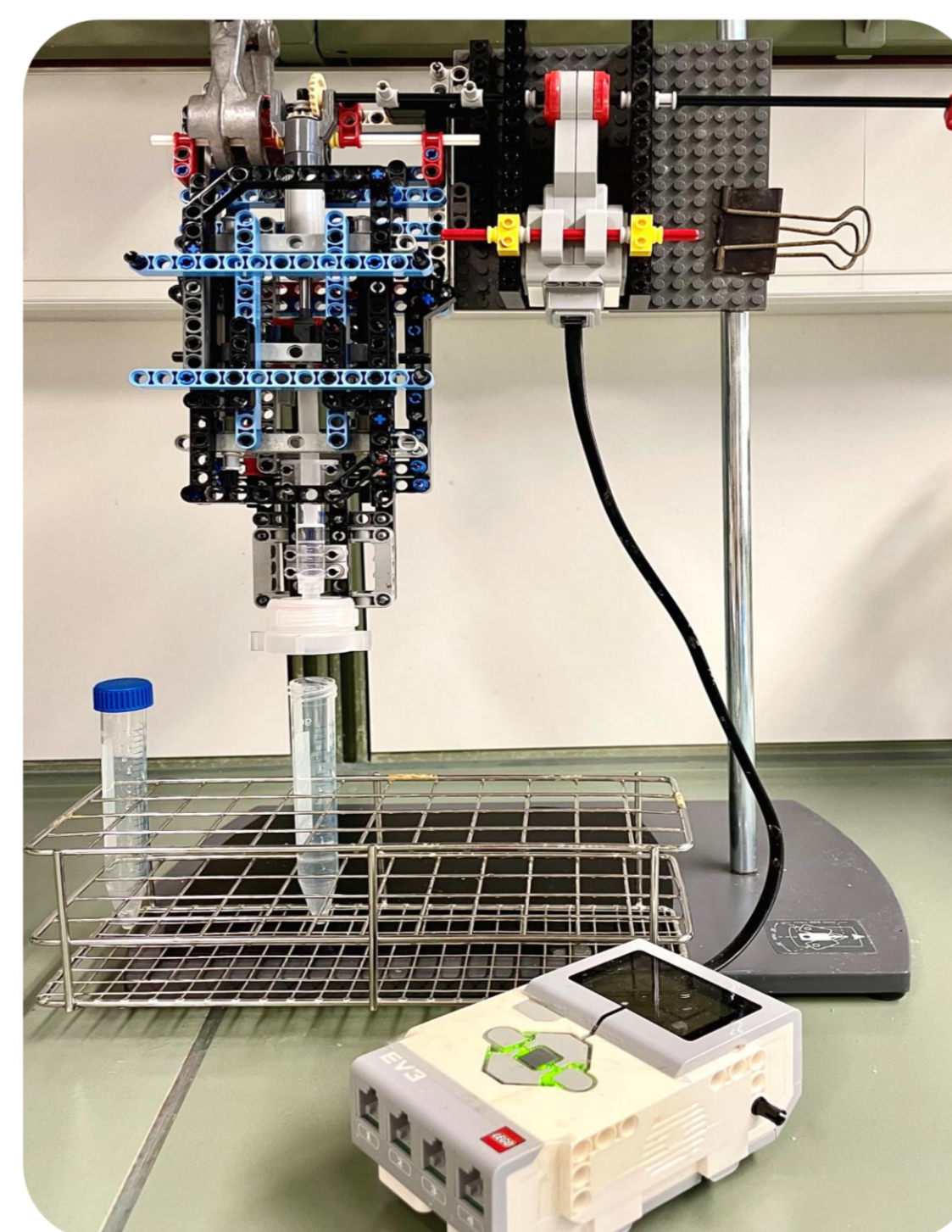
### Profile

- Structured and independent work
- Maker spirit
- Medical-, mechanical-, bioprocess-, chemical-engineering, or similar

*Ideal, but not required:*

- Lab experience

A joint thesis is possible (e.g. mech. engineer focussing on CFD; chemical engineer on materials)



Earlier test setup  
Currently undergoing rework to address several issues, that made it unsuitable for long-term use.

### Tasks

1. Literature Review into existing solutions
2. Identification of improvement potentials
3. Design or simulation and, if necessary, experimental validation of results
4. Design and model optimization & feedback



3D printed Membrane holder  
Current iteration of the membrane holder. Printed on a FormLabs 3B SLA printer.