TUM School of Engineering and Design
Technical University of Munich

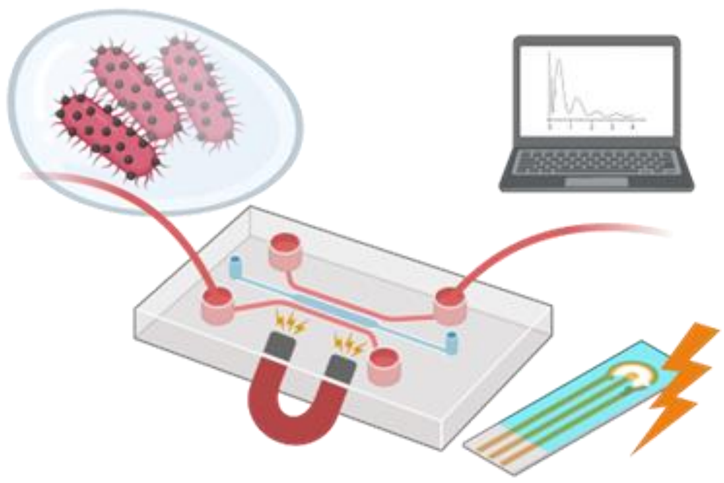
Master's/ Semester Thesis

Simulative Design and Experimental Validation of a Millifluidic Separation Chamber

Keywords: MedTech, 3D Printing, Prototyping, Fluid Simulation, Experimental Simulation Verification, Immunomagnetic Separation

Project Description

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. To facilitate a faster detection, a high pathogen concentration is needed, which can be achieved in a two-step concentration process.



Concept Drawing of the envisioned magnetophoretic separation chamber

By binding magnetic nanoparticles to the specific pathogens, they are easily attractable to a sensing surface inside a millifluidic chamber. Aim of this thesis is to design the chamber based on simulated parameters, printing it and experimentally verifying the simulated parameters.

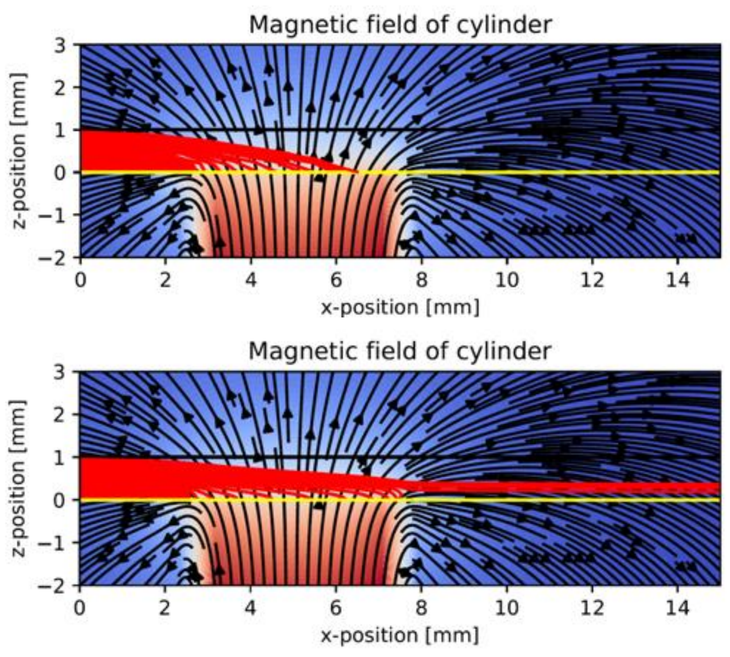
Profile

- Interested in hands-on prototyping and experimenting
- Mechanical Engineering, Chemical Engineering, or similar

Ideal, but not required:

- Lab experience

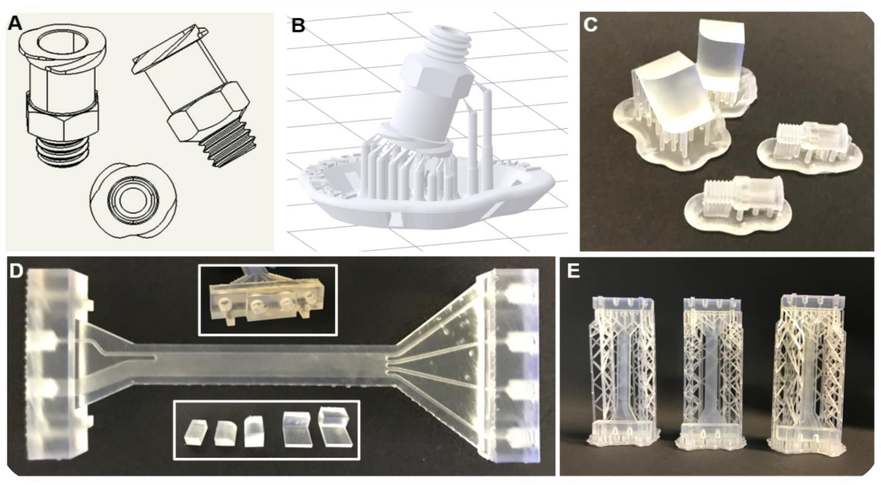
A joint thesis with task distribution is possible



Part of our simulative results

Tasks

1. Literature Review into existing solutions
2. Generate models of millifluidic chambers based on previously derived design parameters
3. Print, finish, and test millifluidic chambers
4. Verify simulated results experimentally



Example of a millifluidic separation chamber with supporting parts

Interested? Contact us:
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