MASTER'S PROJECT INVITATION

SURGICAL ROBOTICS LABORATORY

www.surgicalroboticslab.nl

SUPERVISORS: S. MOHANTY[1] & PROF. S. MISRA[2]

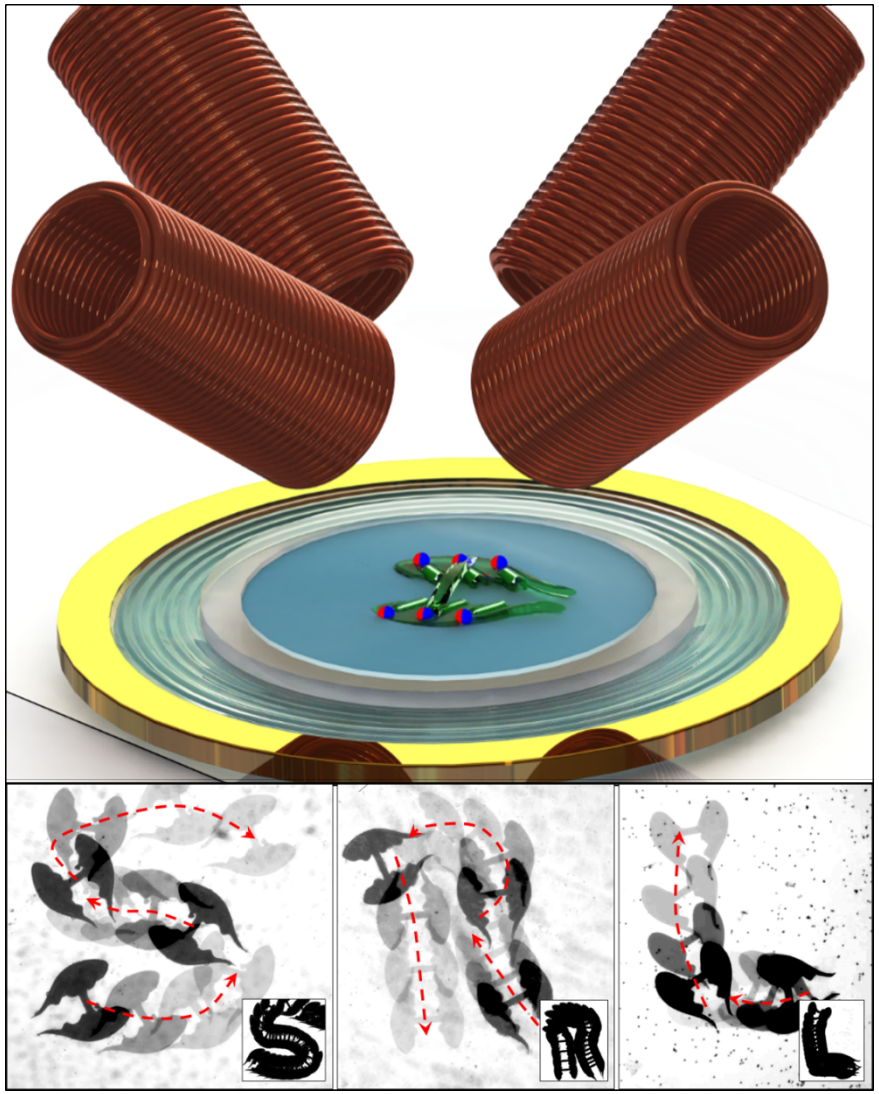
Project title: Design, actuation and control of bio-inspired microrobots

Background: Mimicking sea creatures like squid, cuttlefish and octopus, robots can be intelligently designed to swim through fluids using tiny actuators of up to a micrometer scale. These miniaturized robots called microrobots, have the ability to harness energy from magnetic, acoustic and optical fields to be actuated remotely. In this project, we investigate new designs of microrobots and mechanisms that allow them to swim alike organisms found in nature.
More information? Go to Google and type "CeFlowBot"

Tasks:

- Literature survey on application of mechanisms based on magnetism, sound and light as means of contactless actuation.
- Design and CAD based modeling of different bio-inspired microrobots.
- Fabrication of microrobots using nanoscale 3-D printing.
- Instrumentation and setup design of the contactless actuation system.
- Experimental investigation of bio-inspired motion of microrobots in artificial and biological workspaces.

Suited for: *BME, ME, 4TU S&C, EE, NT, APH*



Squid-inspired microrobot that navigates fluids using magnetic and acoustic fields

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SUPERVISORS: S. MOHANTY[1] & PROF. S. MISRA[2]

Project title: Robot-assisted manipulation of particles using acoustically-powered end-effector

Background: Focused ultrasound-based therapy allows for remote means to perform clinical operations such as tissue ablation, perfusion of drugs and expulsion of kidney stones in the human body. Inspired from this clinical technology, acoustically-powered array is designed to manipulate millimeter-size particles immersed in biological fluids. In this project, we aim to employ a portable array of acoustically-powered transducers to trap and manipulate particles across large distances using a robotic arm.

Tasks:

- Survey of acoustically-powered transducer arrays used in clinical therapy.
- Simulation study of trapping forces exerted by transducers on different particles in millimeter-range.
- Design and assembly of transducer arrays for acoustic trapping of particles.
- Experimental evaluation of the overall system – robotic arm and array, for underwater manipulation of particles.

A robot arm carries acoustically-powered device which can trap and maneuver particles underwater

Suited for: *BME, ME, 4TU S&C, EE, TM*

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