BACHELOR'S PROJECT INVITATION

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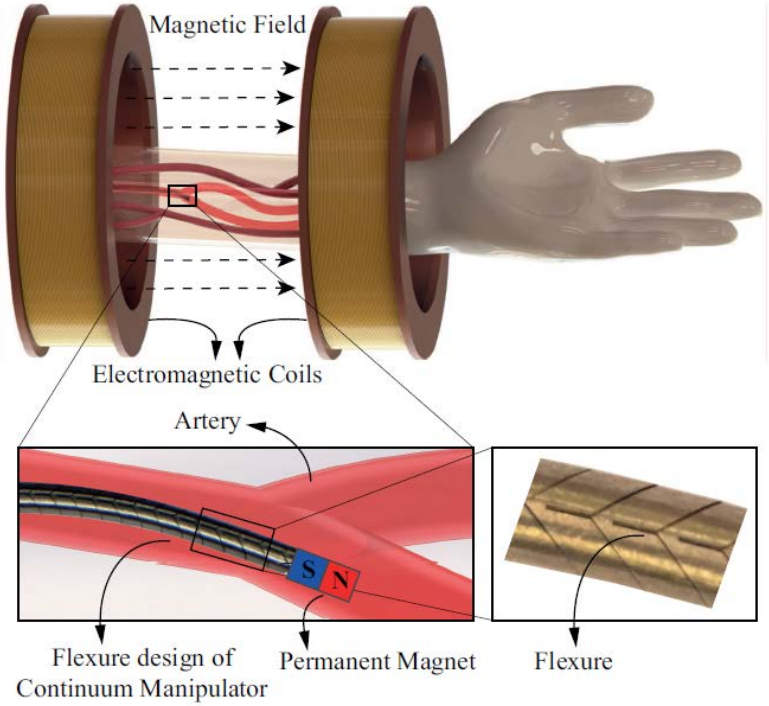
SURGICAL ROBOTICS LABORATORY

www.surgicalroboticslab.nl

Project title: Design of a variable stiffness surgical manipulator using smart materials

Background: For a safe and successful minimally invasive surgery, current state-of-the-art surgical catheters rely on the clinician's skill of instrument manipulation in complex vessel networks without causing any vessel puncture. Smart materials like shape memory alloys (SMAs) and shape memory polymers (SMPs) are expeditiously prevailing as actuators of surgical instruments. Smart materials triggered by external stimulus such as temperature, magnetic fields have great potential for accurate catheter steering and reducing tissue trauma. This project aims to design a flexible surgical manipulator having variable stiffness to achieve different bending curvatures. Feasible designs explored will be considered for applications in endoscopy and ablation.



An illustration of a flexible surgical manipulator

Tasks:

- Literature review on flexible surgical manipulators
- Investigate suitable materials and fabrication methods of variable stiffness designs
- Understanding mechanical properties of smart materials (shape memory effect)
- Calculations and simulations of feasible designs.

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