# MASTER'S PROJECT INVITATION

### SUPERVISORS: V. KALPATHY VENKITESWARAN<sup>1</sup> & PROF. S. MISRA<sup>2</sup>

**Project title**: Design and development of a magnetically-actuated surgical tool

**Background**: Magnetic actuation shows good promise in driving the development of next era of surgical instruments. We will aim to harness the advantages of magnetism and create a new tool for specific surgical interventions. Example applications may include gripping, drug delivery, ablation, removal of calcified tissue and suturing. Remote actuation using magnetic means is expected to make the device more compact and applicable for minimally invasive surgery (MIS).

#### <u>Tasks:</u>

- Survey current methods in literature to identify specific interventional goal
- Develop a new design that overcomes limitations of state of the art
- Determine most suitable method of magnetic actuation
- Investigate procedures for fabrication of components, including integration of sensors
- Create an accurate system model to help achieve precise motion
- Demonstrate feasibility of design through experiments or simulation

Suited for: BME, ME, 4TU Systems and Control







Example of magnetic tool/end-effector

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# MASTER'S PROJECT INVITATION

## SUPERVISORS: V. KALPATHY VENKITESWARAN<sup>1</sup> & PROF. S. MISRA<sup>2</sup>

**Project title**: Tracking and control of milli-scale magnetic soft robots

**Background**: Magnetic actuation has the advantages of requiring no on-board power source, untethered control and easy "programmability". Our aim to harness the advantages of magnetism and develop small-scale soft robots for potential applications in minimally invasive surgery (MIS). In this project, the focus is on developing methods for tracking existing specimens and controlling their motion to follow specific trajectories.

#### <u>Tasks:</u>

- Survey current methods in literature to identify suitable tracking method
  - Clinical relevance
  - Soft robotics
- Cultivate background in magnetic actuation
- Understanding control options through investigation of motion
- Calculations and/or simulations to back up control strategy
- Experiments with soft robots and magnetic actuation systems

Suited for: BME, ME, 4TU Systems and Control

### SURGICAL ROBOTICS LABORATORY www.surgicalroboticslab.nl





Pick-and-place tasks using soft robots

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