Title

Controllable dry adhesion system for micromanipulation applications

Context

MEMS have been increasingly interested by the miniaturization of components to satisfy the need for high-performance micro-sized devices. Among the microfabrication process phases, the manipulation and assembly of microcomponants with different shape and material is still challenging. A remarkable challenge of robotic micromanipulation at this scale is represented by the significant action of the surface forces. This phenomenon is predominant during manipulation operations, because it affects the grip, the handling and the release phases. The need for a reliable and repeatable micromanipulation operation therefore requires the study of suitable solutions able to address this issue.

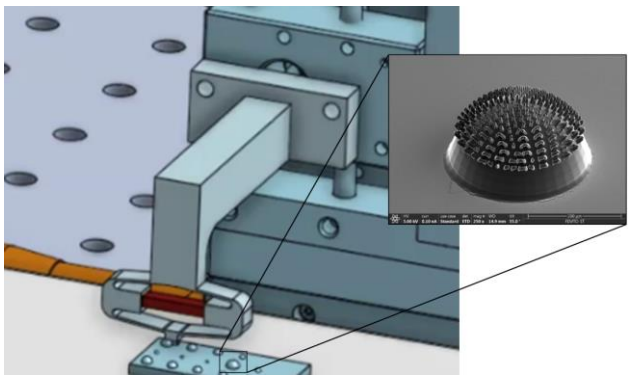

Figure 1 – Schematics of the experimental setup for the adhesion strength regulation tests

Aim of the internship

The aim of this internship is to advance in the design and control of a dynamically tunable dry adhesion system for robotic micromanipulation. The trainee will develop an experimental platform for the control and characterization of the adhesion forces. A commercially available vibration setup will be used to vary the adhesion forces (amplify and reduce) by controlling the frequency and the amplitude parameters. The trainee will work on the following tasks:

- formalization of the adhesion forces,
- design of the experimental platform and control of different equipment (actuators and sensors),
- design, fabrication and characterization of micro-fibrillar structures.

The work will take place at the FEMTO-ST institute in Besancon, within the AS2M department (Automation and Micro-Mechatronic Systems). The framework will benefit from the technological platforms of the S.mart platform and the knowledge of the team in design fabrication and control of microsystems. The gratification is at the legal rate (~550 €/month), for a period of 6 months.

Keywords: Adhesion forces, design, control, additive manufacturing.

Requirements

The candidate must have an interest in design, control and programming and have elements of competence in these fields. The concerned scientific domains are computer science and engineering sciences.

Supervisors

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How to apply

Please send your resume, cover letter and transcripts of the **current and previous year** to Wissem Haouas at: wissem.haouas@femto-st.fr.