



Open Master Thesis Project

Development of a miniature milling feed mechanism for a miniature intraoral robot

BIROMED-Lab

Department of Biomedical Engineering

The Bio-Inspired ROBots for MEDicine-Laboratory (BIROMED-Lab) at the Department of Biomedical Engineering (DBE) at the University of Basel offers an exciting, multidisciplinary, and applied learning- and research environment. Our research is interdisciplinary and organized in close collaboration with clinicians and industrial partners.

Project background:

You will join the BIROMED-Lab performing medical robotics and mechatronics research under the lead of Prof. Dr. Georg Rauter. You will be part of the team for the project **Miniature Intraoral Robot (MIR) Performing Minimal-invasive, Personalized and Precision Dentistry**. In this project we aim to develop a robotic device for tooth preparation enabling a fully digital treatment workflow based on an innovative technology previously developed at the BIROMED-Lab.

Project description:

You develop a **miniature milling feed mechanism** that allows the milling instrument to move in vertical direction. The main challenges will be to design this mechanism in such a way that it requires as little space as possible, can withstand the milling force, and still achieves a very high positioning accuracy ($\leq 50 \mu\text{m}$). To ensure that the mechanism you develop fits into the overall robotic device being developed, you will collaborate closely with the other project members and be part of a bigger team working on this robotic device. Your tasks will include:

- Analyzing the requirements for this feed mechanism
- Conduct research about which mechanisms and actuation principles are feasible for realization
- Select the most promising principles and design a prototype of the feed mechanism
- Production and commissioning of the prototype
- Evaluate the performance of the developed prototype according to the specified requirements

Start date: June 2023 or upon agreement. You will work at the DBE located in the new SIP Basel Area main campus, an exciting and modern working environment in which various research groups of the DBE are located.

Your profile:

- You are pursuing a master's degree in mechanical engineering or a closely related discipline
- You have solid basics in mechanics
- You have experience in mechatronics
- You are a hands-on person who likes to work with hardware
- You are curious, motivated and self-driven
- You want to work in and contribute to an interdisciplinary and applied research environment

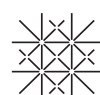
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Biomedical Engineering