



# LAROCARE Open Master Thesis

## Mechanical Design of a Robotic Arthroscope

BIROMED-Lab

Department of Biomedical Engineering

Join us for the project «Laser-Assisted Robot-guided Cartilage Regeneration (LAROCARE)»

### Project Background

LAROCARE is a joint project between three labs at the Department of Biomedical Engineering and aims to improve the outcome of chondral and osteochondral defects regeneration in the knee by combining two approaches. First, by precise, controlled, and standardized shaping of the chondral and osteochondral defects using a laser. We call this robotic device “minimally-invasive smart robotic laser arthroscope” because we are aiming at an arthroscopic-assisted or a mini-arthrotomy procedure. Second, we combine this precise bed preparation with novel regenerative cell-based methods and biopolymer-based hydrogel.

### Job Description

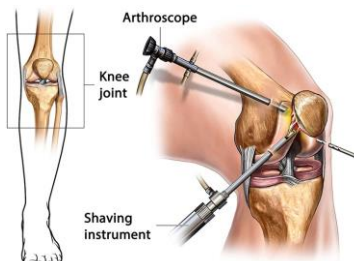
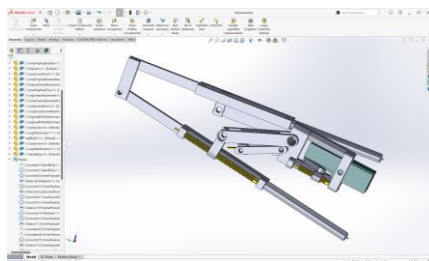
This master thesis focuses on the mechanical design of a 4-DoF hand-held robotic arthroscope based on already given medical requirements. The main challenge will be to find a solution that respects the small size, the required accuracy, and the necessary degrees of freedom for the laser tip. Your tasks include:

- Analyzing the technical requirements for the arthroscope
- Conduct research to identify feasible mechanisms and actuation principles
- Select the most promising principles and design a prototype of the arthroscope
- Evaluate the performance of the developed prototype according to the specified requirements

Start date: November 2024 or upon agreement. You will work at the DBE located in the new SIP Basel Area campus in Allschwil, an exciting and modern working environment with various research groups.

### Your profile:

- You are pursuing a master’s degree in mechanical engineering or a closely related discipline
- You have solid basics in mechanics
- You are a hands-on person who likes to work with hardware
- You are curious, motivated and self-driven
- You are a team player and eager to work with other students
- You want to work in and contribute to an interdisciplinary and applied research environment
- Experience with Solidworks and Matlab is advantageous



Apply to this project by email. Send us ([michael.sommerhalder@unibas.ch](mailto:michael.sommerhalder@unibas.ch)) the following materials:

- CV
- Diplomas and Course Transcripts

 **Want to know more about us?** check out [www.dbe.biomed.unibas.ch](http://www.dbe.biomed.unibas.ch) or [plan a lab visit](#).