LAROCARE Open Bachelor Thesis

User Interface Design for Surgeons

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 cartilage 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

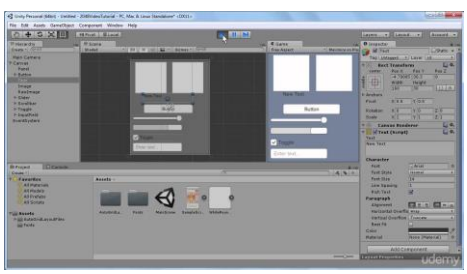
This master thesis focuses on the design of an intuitive user interface for surgeons to control the robotic arthroscope. The main challenge will be to find intuitive visual feedback s.t. the complex 3D pose of the laser tip and the hand-held tool with respect to the cartilage surface can be interpreted:

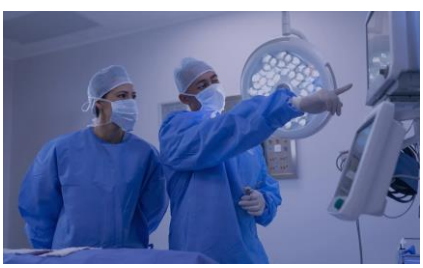
- Design intuitive visuals for the hand-held laser arthroscope in close collaboration with experienced surgoens.
- Implement your real-time visual simulation in an appropriate tool (e.g., in Unity)
- Analyze its usability in a small study with surgeons and other people

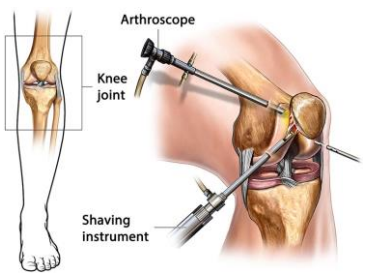
Start date: November 2024 or upon agreement. You will work at the DBE located in the new SIP Basel Area campus in Allschwil, an exciting and modern working environment with various research groups.

Your profile:

- You are pursuing a master’s degree in mechanical engineering or a related discipline
- You have solid skills in kinematics and geometry
- You like to work with simulation
- 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 Matlab, Unity, or a similar real-time 3D visualization tool is advantageous







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

- CV
- Diplomas and Course Transcripts

Want to know more about us? check out www.dbe.biromed.unibas.ch or plan a lab visit.

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University of Basel Department of Biomedical Engineering