Research Internship in Medical Robotics

- **Duration:** 3 to 6 months
- **Start Date:** Flexible

Postdoc, Project Lead
Dr. Michael Sommerhalder

PhD Student
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📍 **Innovation Park, Allschwil (CH)**

Joint injuries and cartilage degeneration affect millions worldwide, causing pain and reduced mobility. Current treatments are invasive and imprecise, leading to inconsistent results. The **Laser-Assisted RObot-guided Cartilage Regeneration (LAROCARE) project** tackles these challenges with a minimally invasive solution that combines robotics and laser technology for precise cartilage repair.

Your Tasks

Join us in our robotics lab and contribute to **building a robust software framework** for our **6-DOF serial robot arm (MECA500)**. This robot will **guide a high-precision Er:YAG laser** to cut and shape cartilage tissue. To **fully automate the process**, we integrate:

- **Optical Coherence Tomography (OCT)** for real-time tissue analysis
- **A RealSense D405 stereo camera** for a global view of the surgical target
- **A closed-loop control system** for safe and precise laser guidance
- **A human-machine interface** for surgeon commands and trajectory planning
- **Collision detection and safety protocols** using a force-torque sensor

Development & Technologies
- **Robotic Operating System 2 (ROS2)** for software development
- **MoveIT** for motion planning and control
- **Gazebo** for simulation-based testing
- **PLC (Programmable Logic Controllers)** for real-time critical tasks

Our lab features **3D printers** and an extensive workshop to develop experimental setups.

Your Profile

Education: Enrolled in a degree program in **Robotics, Mechatronics, Electrical Engineering**, or a related field.

Experience & Knowledge:
- Basic understanding of **robotics and motion control**
- Strong programming skills in **Python and C++**
- Experience with **version control (GitLab/GitHub)**
- Advantageous: Familiarity with **ROS2, MoveIT, and Gazebo**
- Bonus: Experience with **Matlab, TwinCAT3**

Skills & Mindset:
- Hands-on, motivated, and pragmatic approach
- Curious, self-driven, and eager to learn
- Team player with strong collaboration skills
- Interest in **interdisciplinary and applied research**
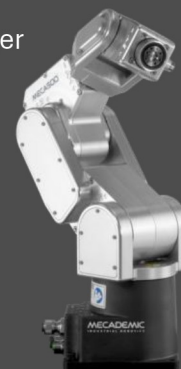
Apply to this project by email. Send us (jan.schimmelpfennig@unibas.ch) the following materials:
- CV
- Diplomas and Course Transcripts

BIROMED-Lab

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