



Open PhD position

BIROMED-Lab & CIO

Department of Biomedical Engineering, University of Basel



The **BIROMED-Lab** develops bio-inspired robotic and mechatronic systems for medical applications. The main research focus of the BIROMED-Lab is minimal invasive semi-autonomous robotic surgery for laser ablation of hard tissue (bone). This research is done within the MIRACLE II Project. Our portfolio includes knowledge in mechatronics, mechanical design, micro machining, robotics, control, and real-time data processing.

The Center for Intelligent Optics (**CIO**) focuses on developing intelligent optical technologies that can be used in treatment, diagnosis, and imaging. Our goals are to design advanced laser technologies for real-time monitoring of disease progression and treatment response, as well as develop new laser-based therapies for targeted tissue ablation.

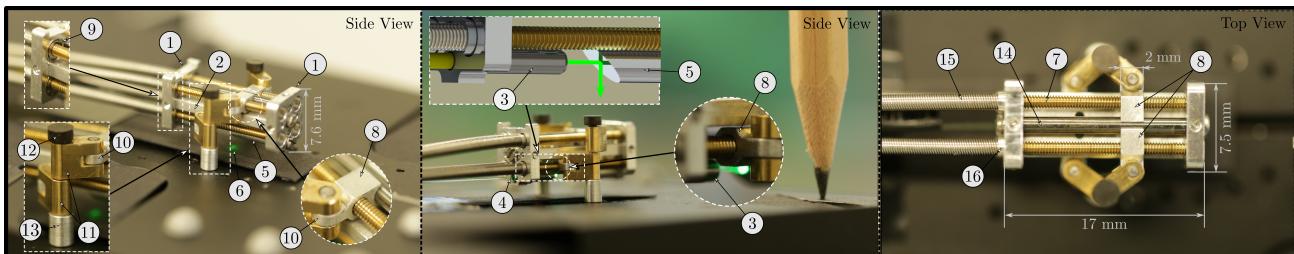
The **BIROMED-Lab** and the **CIO** are both **located door by door** within the Department of Biomedical Engineering (**DBE**) within the Medical Faculty of the **University of Basel**.

Project background:

The principal aim of the interdisciplinary project called **Minimally Invasive Robot-Assisted Computer-guided Laserosteotome (MIRACLE)** is the development of a minimally invasive robotic endoscope for cutting bone with laser light. The goal is to develop a laser osteotome in collaboration between the natural sciences and medicine that will enable new surgical procedures instead of simple scalpels, bone saws, and drills. Our disruptive technologies required to achieve this goal lie in laser physics, medical robotics, virtual planning, and intraoperative navigation. The successful PhD candidate will be part of an interdisciplinary team of biomedical, and mechatronics engineers, computer scientists, physicists, and medical doctors.

Job description:

Your task will be to design an optical setup capable of delivering high-energy lasers and a robotic endoscope to host and control the laser beam. The optical design will be miniaturized and tested for bone ablation. Then, the optical design will be positioned in a robotic endoscope to perform minimally invasive automated bone surgery.



Your profile:

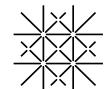
- Experience in Optics and background in Mechanical Engineering or vice versa,
- Experience with high-energy lasers is a plus,
- Programming skills (e.g. Zemax, Matlab/Simulink, Python, CAD-design),
- High motivation to work in an interdisciplinary team, to develop an endoscopic surgery tool.

Ready to revolutionize surgery? We are.

Apply for this project by email sending us the following materials:

- CV
- diplomas and course transcripts

 **Want to know more about us?** check out www.biromed.dbe.unibas.ch and www.cio.dbe.unibas.ch and contact us for a lab visit.



**University
of Basel**

Department of
Biomedical Engineering