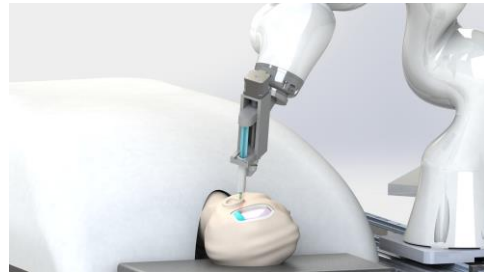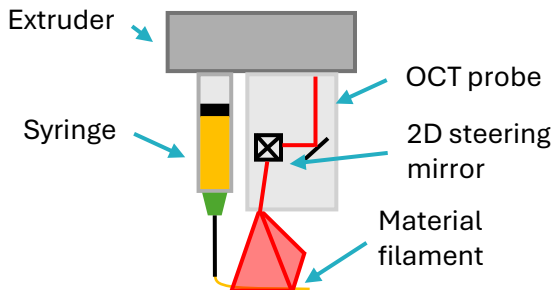# Master Thesis Project – Optical-based flow scanning and calibration for *in situ* printing

BIROMED-Lab and CIO
Department of Biomedical Engineering

Join us for an exciting project towards the next level in intraoperative robotic adaptability!

Project Background

In recent years, the concept of *in situ* (bio)printing, comprising the fabrication of the implant directly on the patient, has been proposed. This approach promises improved implant integration, wound healing, and intraoperative adaptation. To collect intraoperative information and react to it, precise sensors and scanners need to be integrated into the printing platform. Optical coherence tomography (OCT) is an imaging technology based on interferometry with short-coherence-length light, allowing to image inside tissues with micrometer resolution. These characteristics make OCT a promising option to provide real-time feedback to the *in situ* printing process.

Task Description

This master thesis project focuses on the integration of an OCT scanner to obtain information about the status of the printing process. The objective is to measure the height and uniformity of the deposited filament to calibrate the material dispensing. Your tasks will include:

*   Integrate the information from the OCT scanner into the robotic system
*   Based on the optical data, extract and reconstruct the filament and print shape
*   Feed the data back into the extruder and printer to achieve a uniform print

Start date: January 2025 or upon agreement. You will work at the DBE located in the 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 biomedical engineering, physics, mechanical engineering, or a related discipline
*   Basics knowledge of optics and robot control
*   Experience with C++ or Python for hardware control
*   You are curious, motivated and self-driven
*   You want to work in and contribute to an interdisciplinary and applied research environment
*   Experience with Matlab & Simulink is advantageous

Apply to this project by e-mail (ruben.martinrodriguez@unibas.ch) with 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.

BIROMED-Lab

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