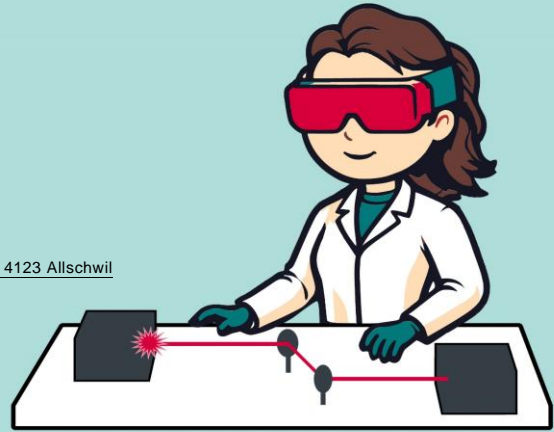




**University
of Basel**

Department of
Biomedical Engineering

University of Basel, Department of Biomedical Engineering, Hegenheimermattweg 167C, 4123 Allschwil



Semester Project – Biomedical Engineering Thesis Proposal

Development of Laser Ablation Process System:

In Orthopedic surgery, lasers are increasingly being used due to their improved precision and faster patient recovery compared to traditional instruments. Laser ablation in this context, requires the integration of various subsystems with real-time feedback and the introduction of an acoustic emission monitoring to identify different types of tissue, and increase the precision of the process.

This project aims to develop a robust and user-friendly monitoring software platform that can control the hardware and provide real-time feedback, thereby increasing the reliability of laser ablation experiments while providing valuable experience in precision control systems and ablation process improvement.

The following steps outline the thesis:

- Conducting a literature review of existing laser ablation control technologies and systems.
- Analyzing existing ablation system to identify strengths, weaknesses, and areas for improvement.
- Designing and developing a system prototype, including:
 - User Interface (UI): A platform for parameters adjustment and monitoring ablation process
 - System Integration: Integration of devices (Motorized stage, thermal camera, etc.) for laser ablation.
 - Testing and Validation: Documenting the design, development, and optimization of the system.

Nature of the Thesis

Experimental: 35%

Programming: 50%

Documentation: 15%

Specific Requirements

Background in Physics, Optics, or related fields.

Experience in working with MATLAB or Python.

Familiarity with mechanical systems and instrumentation.

Supervisor

MSc. Mingyi Liu

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<https://dbe.unibas.ch/en/research/center-for-intelligent-optics/>

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