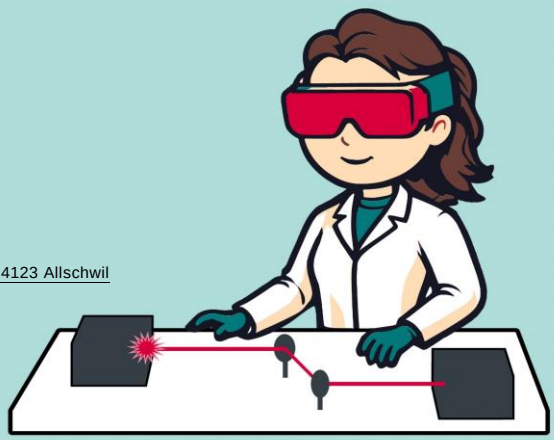
University of Basel

Department of Biomedical Engineering

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



Master of Science – Biomedical Engineering
Thesis Proposal

Investigating the application of spectroscopic OCT in tissue-differentiation during laser surgery

In recent times, laser surgery has garnered increasing interest due to its precision and ability to execute non-contact incisions in desired shapes. Various technologies have been developed to enhance the safety of laser surgery, offering visual feedback and tissue type detection. Among these methods, optical coherence tomography (OCT) has shown promising potential in providing comprehensive feedback. OCT provides real-time visualization of the ablation site, and recent advancements in deep learning-assisted OCT have demonstrated its efficacy as a non-invasive, non-contact method for tissue differentiation during laser surgery, thereby mitigating damage to critical surrounding tissues. OCT, a non-invasive and high-resolution imaging technology, can generate detailed three-dimensional images of the sample of interest.

The aim of the current master's thesis project is to augment the existing OCT system at the Centre of Intelligent Optics (CIO) with depth-resolved spectroscopic analysis. This will enhance the capability of OCT as a method for tissue differentiation during laser surgery.

Nature of the Thesis:
Experimental: 20%
Programming: 70%
Documentation: 10%

Credit points: 12

Specific Requirements:
Basics knowledge of optics and laser physics
Experience with MATLAB, Python, and signal processing

Group Leader / Supervisor:
Dr. Arsham Hamidi
Dr. Ferda Canbaz, group leader

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