



Master and Bachelor Theses in Biophotonics

The Biophotonics group at the Institute of Applied Physics investigates the interaction of light and ultrasound waves with biological tissues for the development of novel imaging modalities and laser procedures for medical diagnosis and therapeutic treatment.

We currently offer Master and Bachelor projects on the following topics:

Experimental topics

- Polarization imaging of brain tissues: Identification of the relevant polarimetric parameters to identify tumors
- Time-of-flight measurements of diffused light pulses with single-photon avalanche diode arrays
- Photoacoustic microscopy of melanocyte cells
- Investigate the influence of tissue heterogeneity on the artifact level in speed-of-sound images based on a phantom study
- Reduce sound reflection artifacts in photoacoustic imaging via shear-wave based tagging of true signals

Numerical topics

- Monte-Carlo simulation of light propagation through anisotropic scattering media, including time-of-flight and polarization.
- Numerical solutions of the radiative transfer equation by finite element method
- Compare different sound propagation models for the correction of ultrasound aberrations in speed-of-sound imaging

For more information, please contact, Prof. André Stefanov (andre.stefanov@unibe.ch) or Dr. Michael Jaeger (michael.jaeger@unibe.ch)