

Open PhD or Post-Doc Position

Bessel light-sheet microscopy: object adapted illumination and opto-genetic switching with computer holograms

In a project funded by the new excellence cluster CIBSS (University of Freiburg), the lab for Bio- and Nano-Photonics seek a physicist or engineer to continue and extend our research on light-sheet microscopy using scanned holo-graphically shaped Bessel beams.

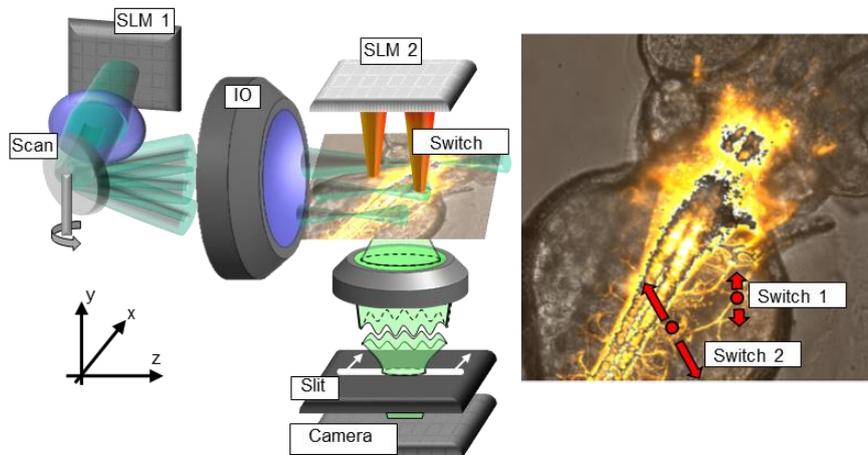


Figure: Sketch of the planned light-sheet microscope with holographically controlled illumination and optogenetic switching based on fast digital mirror devices as spatial light modulators (SLM).

In this project, we will extend/develop a light-sheet microscope, which will be equipped with two spatial light modulators (SLM) for high-end 4D imaging of large, scattering specimen and for precise opto-genetic switching with either blue light or pulsed NIR light. Unprecedented image quality will be achieved by using holographically shaped, object adapted, confocal Bessel beams for imaging various samples provided by the collaboration partners. By a novel postprocessing method, we are able to separate diffusive and ballistic photons, which leads to a high image quality also deep inside the specimen. By developing a feedback controlled, holographic multipoint laser illumination through the second SLM, we will realize dynamic and precise opto-genetic switching in large specimen with superior precision and efficiency.

We are seeking ...

.....a motivated candidate with a strong background in optics and microscopy. The candidate (PhD/PostDoc salary of 65%/100% E13) should perform advanced experiments in optics and biology, together with hardware and software programming, with theoretical considerations and computer simulations to better understand

- coherent laser beam propagation (NIR and visible light) through complex cell arrangements
- Inducing calcium releases within neurons by switching proteins with blue light, which is holographically steered in space and time.