Master Thesis:

FPGA based control and data acquisition in a parallel super-resolution fluorescence microscope

TOPIC:

Imaging of dynamic processes within biological tissue or living cells is a challenge in the field of microscopy. Many processes happen either on fast time scales or in nanoscopic dimensions and call for microscopes with fast data acquisition and high resolution.

In the Institute of Biophysics we are designing a new fluorescence microscope, which relies on the effect of stimulated emission depletion (STED) and a high degree of parallelization. A bundle of 64 laser beams will be scanned accross biological samples and the emitted fluorescence will be detected by a custom-designed fast single photon detector array.

GOALS:

The aim of this thesis is to design and implement a real-time read-out and control unit for the microscope. This includes FPGA design and programming using VHDL and fast hardware.

The project is at the interface of real-time computing and novel applications in biophysics and biological imaging, thus we are looking for highly motivated students open for working at the boundary of computing and instrumentation development

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