

Software integration of laser systems

The nonlinear optical microscopy laboratory is used to study nonlinear optical phenomena in different materials, primarily for biomedical applications.

To generate a nonlinear optical response in materials pulsed lasers with very short pulse durations (about 100 fs) are used. These sophisticated lasers can be tuned to different wavelengths for spectroscopic studies where different molecules can be excited and imaged.

Manual tuning of these lasers is time-consuming. However, the lasers can be controlled through commands sent through an RS-232 port. To control the microscope and acquire the imaging signals we use a program written in Matlab (ScanImage).

The goal of this project is to program an interface between Matlab and the laser so that we can control the laser through ScanImage. The work will consist of identifying the necessary drivers and protocols for communication with the serial port through Matlab as well as programming a user interface sending the appropriate RS-232 commands. The work is primarily independent, but guidance will be given both by principal investigator and engineer for the system.

The project requires some experience and interest in programming. Experience with programming in Matlab as well as interfacing with external peripherals is useful but not essential. The project is probably appropriate for students from the third year onwards but younger students will also be considered if they have relevant experience from elsewhere.

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Deadline: First come, first serve.