Super-Resolution Light-sheet Fluorescence Microscopy

Supervisor: Oren Solomon

Project description:

Super resolution fluorescence microscopy techniques are an ensemble of light-microscopy techniques which achieve spatial resolution beyond the limitations imposed by the diffraction of light. However, these techniques are currently limited by low temporal resolution and long acquisition times. Super-resolution optical fluctuation imaging (SOFI) is a fluorescence microscopy technique enabling sub-diffraction limit imaging with high temporal resolution by calculating high order statistics of the fluctuating optical signal. On the other hand, Light-sheet microscopy enables fast 3D volumetric imaging of living specimens, but with degraded spatial resolution.

In this project, we will investigate an exciting new direction which will combine the SOFI technique for sub-diffraction imaging and light-sheet microscopy, which potentially may lead to a new type of fast super-resolution microscope for living specimen.

The students will get a hands on experience with a research project, combining disciplines in fluorescence microscopy, sparse representations and optimization techniques.

Required background: Signal and systems, Mavlas, Mavla.

Environment: Matlab.

For further details, please contact Oren: orensol@campus