

BioSyM Seminar Series 2018

Adaptive Optics for Stimulated Raman Scattering Imaging and Optical Tweezers

Dr. Zhu Hai

Singapore-MIT Alliance for Research and Technology

Email: zhuhai@smart.mit.edu

Date : 18th June 2018, Monday

Time : 12 pm to 1 pm

Venue : Level 5, Perseverance Room



Abstract

We aim to enhance the stimulated Raman scattering signal for label-free deep tissue imaging based on molecular vibrational spectroscopy, as well as a stronger optical trapping force. Our setup employed a piezoelectric deformable mirror and different kinds of optimization algorithm to enhance SRS signal intensity, optical trapping stiffness and image quality at large sample depths. We demonstrate the ability to correct for both system and sample-induced aberrations in test samples. The combined system and sample-induced aberration correction increased the SRS signal and optical trapping stiffness by an average factor of $\sim 3x$ for the test samples at different depths. The enhanced signal and higher penetration depth offered by adaptive optics will improve SRS microscopy as an in vivo and in situ biomedical imaging modality, and improve the optical trapping force.

Short Biography

Zhu Hai joined SMART-BioSyM in 2017 as a Postdoctoral Associate under Prof. Matthew Lang. He obtained his doctoral degree at National University of Singapore at 2017, and master and bachelor degree of electrical engineering at Harbin Institute of Technology at 2013 and 2011. His research interests are laser spectroscopy and ultrafast optics.