

# SEMINAR SERIES

## Summer 2018

Ming Wai Lau Centre  
for Reparative Medicine  
劉鳴煒復修醫學中心



## Noninvasive high-resolution optical imaging, focusing, and stimulation at depths in tissue

### Dr Puxiang Lai

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The Hong Kong Polytechnic University

**Date:** 14th August 2018 (Tuesday)  
**Time:** 10:30 am - 11:30 am  
**Venue:** Ming Wai Lau Centre for Reparative Medicine,  
Science Park, Sha Tin



### Abstract

Light and sound are the two most dominant ways through which our human being perceives the world. In many ways, they are also ideal forms of electromagnetic/mechanical waves to probe and treat biological tissues. But both has its own limitations. For example, ultrasound has low contrast and sensitivity when dealing with heterogeneity of soft tissue, while optical techniques encounter an inevitable trade-off between resolution and penetration depth due to the strong scattering of light in tissue; existing microscopic optical modalities seldom can see beyond the so-called optical soft/diffusion limit (~1 mm for human skin). In this talk, we present our endeavors in the past years of using the synergy of light and sound to achieve noninvasive high-resolution optical imaging, focusing, and stimulation in thick biological tissue. Applications and future direction are also discussed. Potential collaborations are highly welcome.

### Biography

Dr Puxiang Lai received his Bachelor of Engineering in Biomedical Engineering from Tsinghua University, China in 2002, Master of Science in Acoustics from the Chinese Academy of Sciences, China in 2005, and PhD in Mechanical Engineering from the Boston University, USA in 2011. After that, Dr Lai joined Dr Lihong Wang's Optical Imaging Lab in the Washington University in St Louis as a Postdoctoral Research Associate. In September 2015, he joined the Department of Biomedical Engineering at the Hong Kong Polytechnic University as tenure-tracked Assistant Professor.

Dr Lai's research focuses on the development of novel biomedical imaging, therapy, and manipulation modalities by using light and sound. Current research interests include, but are not limited to, optical wavefront shaping, adaptive optics, photoacoustic imaging, acousto-optic imaging, optogenetics, neuron imaging, as well as their applications in biomedicine. These studies have served to substantially advance the state of the art in biomedicine, and made Dr Lai being recognized within and outside his field. For example, his research has thus far fueled more than 30 top journal publications, such as Nature Photonics and Nature Communications, more than 55 invited or contributing talks at important international conferences and winning several best paper/poster awards. Dr Lai has also been invited to give seminars in many famous universities and research institutions, and served as reviewer or editor for more than 25 premium journals. Since joining BME at PolyU in September 2015, Dr Lai aims to continue his research on deep-tissue probing and treatment by using light and sound, which has been supported by the Hong Kong Polytechnic University, the Hong Kong Research Grants Council (RGC), the National Natural Science Foundation of China (NSFC), and the Shenzhen Science and Technology Innovation Commission. He has been awarded the 12th Chinese National 1000 Talent Plan Youth Scholar (國家青年千人), the 2016-2017 Hong Kong RGC Early Career Award (香港傑出青年學者), and the Hong Kong Polytechnic University Faculty of Engineering Research Grant Achievement Award.