

## Spatial-Spectral Holographic Fluorescence Microscopy (Invited)

Yuan LUO<sup>1,2\*</sup>

<sup>1</sup>Institute of Medical Device and Imaging, National Taiwan University, Taipei, Taiwan, 10051

<sup>2</sup>Molecular Imaging Center, National Taiwan University, Taipei, Taiwan, 10672

\*yuanluo@ntu.edu.tw

### Abstract

Laser induced fluorescence has been developed for a variety of clinical applications. However, many of the existing biomedical imaging systems typically require scanning in two lateral dimensions as well as depth focusing. Efforts to improve scanning efficiency by optimizing the scanning algorithm or increasing the number of focal points are ongoing. However, these methods can increase system complexity and do not eliminate the need for moving parts. This talk will introduce volume holographic imaging systems to acquire spatial images with spectral selectivity and no scanning in both transverse and longitudinal directions. The imaging modality is based upon multiplexed volume holographic (MVH) gratings acting as spatial-spectral filters used in an optical imaging system. In addition, with proper multiplexed holographic pupil engineering, the MVH systems can obtain multiple depth-resolved phase-contrast imaging in real-time in a single shot. Moreover, the talk will address MVH techniques incorporating other state-of-the-art imaging methods to better manipulate light for imaging in a variety of applications.