**Non-axial-scanning multifocal confocal microscopy with volume holography**

Po-Hao Wang,¹,² and Yuan Luo ¹,²

¹Institute of Medical Device and Imaging, National Taiwan University, Taipei 10051, Taiwan, R.O.C
²Molecular Imaging Center, National Taiwan University, Taipei, 10672, Taiwan, R.O.C

E-mail: pohaowang@ntu.edu.tw

**Abstract**

Wide-field fluorescence microscopy is a commonly used imaging technique by researchers and clinicians. A standard wide-field microscope has no optical sectioning capabilities and this limits its use in imaging thick biological samples. Although standard wide-field fluorescence microscopy with deconvolution techniques can improve image quality [1], it does not provide true optical sectioning, due to the missing cone in system’s transfer function. The most commonly used optical sectioning imaging method with good background rejection in biomedicine is based on the confocal approach [2-4]. However, the price to pay for improved image quality in 3D confocal microscopy is a point-by-point scan time that is proportional to the number of desired voxels (i.e. the 3D space-bandwidth product). Here, we demonstrate the first experimental realization of a non-axial-scanning multi-focal confocal microscope for 3D imaging where contrast and speed are achieved from a combination of confocal imaging pinholes and multiplexed holographic Bragg illumination filters.

**Figure 1:** Schematic drawing of the proposed microscope in epi-illumination format.

**Figure 2:** Experimental measurement of point-spread function at different planes.

**References:**