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Oral presentation | 4 JSAP-OSA Joint Symposia 2016 | 4.2 Bio-and Medical Photonics

## [15a-C31-1~9]4.2 Bio-and Medical Photonics

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Thu. Sep 15, 2016 9:15 AM - 12:15 PM C31 (Nikko Kujaku AB)

△ : Presentation by Applicant for JSAP Young Scientists Presentation Award

▲ : English Presentation

▼ : Both of Above

No Mark : None of Above

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9:45 AM - 10:15 AM

### ▲[15a-C31-3][JSAP-OSA Joint Symposia 2016 Invited Talk] Hybrid light microscopy methods for multi-dimensional imaging of small animal models

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Keywords:Light microscopy, Imaging speed, Optical sectioning

Light microscopy methods have been widely used in biomedical research. Different microscopy techniques have different advantages and disadvantages. For example, wide-field optical microscopy is known for its convenience and high imaging speed. However, it has no depth sectioning capability due to the missing axial high-frequency components in its 3D optical transfer function. It is therefore impossible to obtain 3D structures of specimen based on wide-field images stacks. Laser scanning microscopes (e.g., confocal microscopes), on the other hand, can provide the so-called optical sectioning capability and high axial resolution. While conventional confocal microscopy is a standard tool for 3D visualization of fixed samples, their slow scanning speed and excessive photobleaching make it less suitable for real-time in vivo imaging of live samples. We have developed a hybrid strategy to combine information information from both scanning microscopy and wide-field microscopy imaging modes. A prototype hybrid microscope has been designed and implemented. We have verified its imaging performances, such as reduced photobleaching, improved imaging speed, and improved optical sectioning, with imaging results acquired from a wide range of live samples.