

# ***Multiphoton Microscopy in the Biomedical Sciences XVII***

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*Editors*

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## Introduction

Multiphoton microscopy has been established as the 3D imaging method of choice for studying biomedical specimens from single cells and whole animals to patients with sub-micron resolution. 26 years have passed since the realization of two-photon laser scanning microscopy. The ever-expanding scope of applications and the continuing instrumental innovations require a forum where new ideas can be exchanged and presented. Our conference at the SPIE Photonics West meeting continues to address this need.

This is the 17th year of this conference, and it began with four keynote lectures from leaders in the field:

- Dr. Paras N. Prasad, University of New York at Buffalo, (United States), “**Multiphoton microscopy and image guided light activated therapy using nanomaterials**”
- Dr. Martin J. Booth, University of Oxford (United Kingdom), “**Dynamic optics for multi photon microscopy**”
- Dr. Na Ji, Howard Hughes Medical Institute, (United States), “**Wavefront shaping enables clearer and faster two-photon fluorescence microscopy**”
- Dr. Chi-Kuang Sun, National Taiwan University (Taiwan), “**Molecular imaging of melanin distribution in vivo and quantitative differential diagnosis of human pigmented lesions using label-free harmonic generation biopsy**”

For the sixth year in a row, the conference included the JenLab Young Investigator Award, in addition to our regular poster awards. The JenLab Young Investigator Award is sponsored by JenLab GmbH (Germany). The award selection committee included Drs. Arnd Krueger, Newport-Spectra Physics, (United States), Francesca Pavone, University of Florence (Italy), Paul Campagnola, University of Wisconsin-Madison, (United States), Conor Evans, Massachusetts General Hospital, (United States), and the conference chairs. The selection process included reviewing seven abstracts, manuscripts, and poster presentations. Two finalists were selected for oral presentation after their poster presentation. The two finalists were:

1. Mr. Tianyu Wang, Cornell University (United States), “**Multimodal optical imaging database from tumor brain human tissue: endogenous fluorescence from glioma, metastasis and control tissues.**” (Paper 10069-94 )
2. Ms. Maria Lukina, Nizhny Novgorod State Medical Academy (Russian Federation), “**In vivo metabolic imaging of mouse tumor models in response to chemotherapy**” (Paper 10069-86)

The review panel selected **Mr. Tianyu Wang, Cornell University, (United States)** as the winner of the JenLab Young Investigator Award 2017. The winner received a certificate and \$2000. This year, for the first time, we gave a certificate and \$500 award for the runner-up. The awards were presented by **Dr. Karsten König, President and Founder of JenLab GmbH, Germany.**

For 17 years in a row, the conference organized poster awards for the students and postdoctoral fellows. The poster award was donated by all of the conference sponsors including: Applied Scientific Instruments (ASI), Becker & Hickl, Carl Zeiss, Chroma Technology, Coherent, ISS Inc., Leica Microsystems, Semrock (IDEX), and Spectra Physics (A Newport Company).

The 4 poster award winners were:

1. Alexei Kazarine, McGill University (Canada), "**Multimodal imaging of vocal fold scarring in a rabbit model by multiphoton microscopy**" (Paper 10069-84)
2. Fanny Poulon, Institut National de Physique Nucléaire et de Physique des Particules (France), "**Multimodal optical imaging database from tumour brain human tissue: endogenous fluorescence from glioma, metastasis and control tissues**" (Paper 10069-94)
3. Michael D. Young, Colorado School of Mines (United States); "**Spatial frequency modulated imaging (SPIFI) with amplitude or phase grating from a spatial light modulator**" (Paper 10069-97)
4. Chenyang Wen, The Chinese University of Hong Kong (Hong Kong, China), "**High-speed focal plane control via a liquid-crystal spatial light modulator for light sheet microscopy**" (Paper 10069-69)

Some of the most valuable contributions in this volume are articles written by highly experienced practitioners of multiphoton microscopy. They have enumerated the most important considerations in designing multiphoton microscopes and imaging experiments. Further, updates on the state-of-the-art commercial multiphoton microscope systems are included. This volume also features articles describing some recent advances in major multi-photon microscope components and applications including laser light sources, ultra-fast optics, filters, FRET, FLIM, FCS, Raman, CARS, SRS and CRS microscopy and spectroscopy, single molecule, endoscopy, in vivo/intravital imaging, metabolism measurements including NADH, FAD, tryptophan in cells and tissues, and various scientific and clinical applications.

On a personal note, the conference chairs are grateful for the participation of all authors and session chairs and acknowledge the innovation-driven manufacturers and sponsors of this conference for their enthusiastic support in organizing this conference successfully for the last 16 years. We look forward to other exciting conferences in the future and welcome your continued participation and support.

**Ammasi Periasamy  
Peter T. C. So  
Karsten König  
Xiaoliang S. Xie**