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LSA's Special Issue: Everbright Beijing

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Brief introduction of the special issue:

In the past decades, we have witnessed various great instruments and facilities rising in Beijing as everbright sources, which lit up many fields with an explosion of important discoveries and innovations. These facilities cover a broad range of optics and photonics research, such as Beijing Synchrotron Radiation Facility, High Energy Photon Source, Multi-modality cross-scale biomedical imaging center, with large microscope as real-time ultra-large-scale high-resolution (RUSH) mesoscopy, down to miniaturized multiphoton microscopy on the head of a mouse, etc.

This special issue aims to focus on the development and applications of emerging photonic research in Beijing. It will highlight the most distinguished research works, perspectives and reviews from all aspects of optics and photonics, including basic science, applied research and applications.

This special issue is edited by Prof. Liangyi Chen from Peking University, Prof. Liangcai Cao and Dr. Jiamin Wu from Tsinghua University, Prof. Guoqing Chang from Institute of Physics, Chinese Academy of Sciences, and Prof. Pietro Ferraro from CNR Institute of Applied Sciences and Intelligent Systems.

Guest Editors-in-Chief:

Prof. Liangcai Cao (Tsinghua University)



Liangcai Cao, professor of the Department of Precision Instruments, Tsinghua University, received his BS/MS and PhD degree from Harbin Institute of Technology and Tsinghua University, in 1999/2001 and 2005, respectively. Then he became an assistant professor at the

Department of Precision Instruments at Tsinghua University. He is now a tenured professor and director of the Institute of Opto-electronic Engineering. He was a visiting scholar at UC Santa Cruz and MIT in 2009 and 2014, respectively. His research interests are holographic imaging and holographic display. He is a fellow of SPIE and OPTICA.

Prof. Pietro Ferraro (CNR Institute of Applied Sciences and Intelligent Systems)



Pietro Ferraro is currently director of research at CNR Institute of Applied Sciences and Intelligent Systems (ISASI), Napoli Italy. Previously, he has been from 2014 to 2019 Director of ISASI and President of CNR Research Area in Pozzuoli from 2012 to 2019. Currently he has various roles in different public and private organizations in Italy.

He also worked as Principal Investigator with Alenia Aeronautics. He has published 12 book chapters, 350 papers in peer review journals, more than 300 papers at International Conferences. He edited two books with Springer. He holds 14 patents. Among his current scientific interests are: holography, interferometry, microscopy, fabrication of micro-nanostructures, ferroelectric crystals, optical fiber sensors, fiber bragg gratings, nano-microfluidics, optofluidics, EHD Ink jet printing, soft matter. Dr. Ferraro has chaired many International Conferences. Currently he is in the Editorial Board for LSA journal. He is Fellow of SPIE and Fellow of OSA. He is Senior Member of IEEE and Member of IEEE Photonics Italian Chapter and was recipient in 2020 of SPIE Dennis Gabor Award. According to Google Scholar he has more than 17,000 citations and H-index of 70. He has published his research in many high-ranked journals among which are for example: Nature Photonics, Nature Nanotechnology, Light & Science Applications, Science, Science Advances, PNAS, Advanced Materials, Advanced Functional Materials, Advanced Intelligent Systems, VIEW, Proceedings of IEEE, Nano Letters, ACS Materials and Interfaces, ACS Photonics, Lab On a Chip, Nature Communications, Advanced in Optics and Photonics, Opto-Electronic Advances, Applied Energy, Analytical Chemistry, Biosensors and Bioelectronics, Materials & Design.

Prof. Liangyi Chen (Peking University)



Liangyi Chen is a Boya Prof. at Peking University & Deputy Dir. of the Nat. Biomed. Imaging Sci. Center at PKU. He got his B.S. in Bioeng. & Med. Instruments from XJTU ('95), M.S. in Bioelectronics ('98) & Ph.D. in Biomed. Eng. ('01) from HUST. From '01-'04, he was a postdoc at U. of Washington, USA. Later, he was an Assoc. Res. at the Inst. of Biophysics, CAS ('04-'10). Since '10, Dr. Chen has been at the Inst. of Molecular Med. at PKU. In '19, he was appointed Long-Term Prof. at PKU, & in '21, he joined the PKU-Tsinghua Center for Life Sci. He is the recipient of the National Natural Science Foundation of China's Outstanding Youth Fund.

Dr. Chen created various high-resolution imaging techniques to study insulin secretion related to diabetes. Innovations include:

1. Miniaturized multiphoton microscopes for 3D imaging in freely moving animals' brains, recognized as a top scientific advance in China (2017) & a Nature Methods' Method of the Year (2018).
2. Hessian structured illumination microscope for live-cell SR imaging, enabling observation of mitochondrial cristae & insulin granule fusion pores, chosen as a top optical advance in China (2018).
3. Developing SR-FACT for panoramic super-resolution imaging and observing new organelle "dark-vacuolar bodies."
4. Introducing live-cell SR pathology concept to predict clinical phenotypes of hypomyelinating leukodystrophies and screen precise treatments.
5. Creating sparse deconvolution algorithm to surpass microscope resolution limits, enabling cross-modal multi-scale SR imaging and advancing mathematical SR. Sparse SIM achieves high-resolution (60 nm), fast speed (564 Hz), and long-duration (>1h) live-cell imaging.

Dr. Jiamin Wu (Department of Automation, Tsinghua University)



Dr. Jiamin Wu received B.S. and Ph.D. in the Department of Automation from Tsinghua University in China. Since 2021, Jiamin Wu works as an assistant professor in the Institute of Brain and Cognitive Sciences at Tsinghua University. His current research interests focus on computational imaging and system biology, with a particular emphasis on developing mesoscale optical setups for observing large-scale biological dynamics *in vivo*. In the past 5 years, He has proposed a series of new imaging frameworks including camera-array-based gigapixel mesoscale microscopy, scanning light-field microscopy, and two-photon synthetic aperture microscopy to overcome the barriers of mesoscale intravital imaging such as optical aberrations, phototoxicity, and 3D imaging bandwidth.

Prof. Guoqing Chang (Institute of Physics, Chinese Academy of Sciences)



Dr. Guoqing Chang graduated with both Bachelor and Master degree from Electronics Engineering department of Tsinghua University and Ph.D. degree in Electrical Engineering from the Center for Ultrafast Optical Science at the University of Michigan. After staying at the University of Michigan as a postdoctoral research fellow for about one year, he joined the Research Laboratory of Electronics at Massachusetts Institute of Technology as a postdoctoral research associate. In August 2012, he moved to the Center for free electron laser (CFEL) at Hamburg (Germany) as the head of the Helmholtz Young investigator group “Ultrafast Laser Optics and Coherent Microscopy” under the ultrafast optics and X-Rays division. He was granted Tenure in 2016 and then in 2017 he joined Institute of Physics, Chinese Academy of Sciences. His current research focuses on high-power ultrafast fiber lasers, ultrafast nonlinear optics, and multi-photon microscopy for biomedical imaging.