Special Issue

Advances in Super-Resolution Optical Imaging and Microscopy

Message from the Guest Editors

The diffraction barrier (~200–300 nm) long limited optical microscopy, masking nanoscale biological details. Super-resolution microscopy (SRM) techniques such as STED, SIM, and SMLM (PALM/STORM) overcame this, enabling 10–100 nm imaging of proteins, viruses, and synapses. Today, SRM advances emphasize real-time live-cell imaging, novel nanoprobe designs, AI-driven analysis, and multimodal imaging integration, providing deeper insights into biology and enabling theranostic applications. We invite submissions to the Special Issue on Super-Resolution Optical Imaging and Microscopy. This collection focuses on cutting-edge SRM technologies and applications addressing challenges like spatiotemporal resolution, phototoxicity, and tissue penetration. Topics include live-cell and intravital SRM, AI-based reconstruction, probe engineering, multimodal approaches, neural circuit imaging, viral interactions, quantitative cell analysis, and theranostic platforms. We look forward to your valuable contributions.

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You are invited to contribute a research article or a comprehensive review for consideration and publication in *Photonics* (ISSN 2304-6732). *Photonics* is an online open access journal covering both the fundamental and applications of optics and photonics. *Photonics* strives to provide an avenue to allow authors to disseminate their scientific findings—both theoretical/ simulations and experimental works—in highly accessible peer-reviewed journal publications. The manuscript in *Photonics* will be handled with quick turnaround production processing time. We welcome authors to submit their manuscripts for publications in *Photonics*. Our goal in *Photonics* is to enable fast dissemination of high impact works to the scientific community.

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