Special Issue

Silicon Photonics: From Fundamentals to Future Directions

Message from the Guest Editors

Silicon photonics development involves not only the evolution of pure-silicon devices but also integrating new materials. Early work combined silicon with semiconductors for on-chip lasers and amplifiers. Silicon nitride enabled ultra-low-loss waveguides and nonlinear applications. Hybrid integration, ferroelectric materials revolutionized high-speed electro-optical modulators. Two-dimensional and phase-change materials enabled ultra-compact modulators, photodetectors, and reconfigurable devices. Emerging materials, such as topological photonic structures, redefine light–matter interactions on silicon chips. Researchers focus on building reconfigurable photonic integrated systems for applications such as datacom and optical computing. Advancements in silicon photonics and AI are linked. Integrating components creates a photonic platform for neural networks, improving efficiency and reducing energy consumption in big data tasks. This Special Issue covers the developments in silicon photonics, from basic principles to innovations. It invites contributions on heterogeneous integration, device engineering, and new applications. Original research articles and reviews are welcome.

Guest Editors

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Deadline for manuscript submissions

10 September 2025

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CiteScore 3.5

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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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