Call for Papers

Announcing an Issue of the IEEE

JOURNAL OF SELECTED TOPICS IN QUANTUM ELECTRONICS on

Integrated Opto-electronics in AI/ML

Submission Deadline: August 1, 2024

Hard Copy Publication: May/June 2025

The IEEE Journal of Selected Topics in Quantum Electronics (JSTQE) invites manuscript submissions in **Integrated Opto-electronics in Artificial Intelligence and Machine Learning (AI/ML)**. The recent unprecedented explosive growth of **AI/ML** is opening up humongous application space and market opportunities, likely beyond the large language model (LLM). The fast-growing workloads and large computing power required to deal with ever increasing complexity in various computations, along with the concern of unsustainable power consumption, clearly demand new generations of hardware architectures with pertinent components. These essentially demand the parallel strategies of scaling-up and scaling-out, in which the photonics have been well-recognized as a promising technology to support. Building upon the previous JSTQE special issues (such as "Photonics for Deep Learning and Neural Computing" in 2020, and "Optical Computing" in 2023), the ***IEEE Journal of Selected Topics in Quantum Electronics*** invites manuscript submissions in the area of **Integrated Opto-Electronics in AI/ML**, with the purpose of this issue of JSTQE is to highlight the recent progress and future trends addressing the challenges and opportunities in the areas of leading-edge Integrated Optoelectronics technologies. These are not only on Computing, but also on the efforts, such as in solving the so-called "interconnect bottleneck" in dealing with training and inference. With additional emphasis, this issue would like to pay particular attention to industrial productization and implementation status in relevant fields. Areas of interest include (but are not limited to):

- Next generation AI/ML related Topologies, Architectures, and various required hardware, roles and challenges of Photonics technologies;
- Information Processing, e.g., Photonic Reservoir computing, photonic-neuromorphic, Spike neural networks, coherent neural networks, multi-wavelength neural networks, Ising machines, free-space neural networks, Optical logic gates, Analog Computing;
- Photonics based Integrated large density Memories, relevant integration/communication with Computing units, and relevant new technologies;
- Technologies addressing photonic circuits' Reconfigurability and programmability, e.g., compact MEMS, Optical Memristors
- Next generation Optical Interconnect technology from high-performance device level to large-scale on-chip integration and to advanced packaging level, e.g., 2.5D/3D co-packaged optics and in-package optics. to address the short-reach data-transport limitation.
- Discussions of various integration platforms are welcome, including, Silicon, InP, Si_3N_4, $LiNbO_3$ etc.

The Primary Guest Editor for this issue is **Dr. Lo Guo-Qiang**, Advanced Micro Foundry, Singapore. The Guest Editors are: **Ms. YooJin Ban**, IMEC, Belgium; **Dr. Marco Fiorentino**, HPE, USA; **Prof. Di Liang**, University of Michigan, USA; and **Dr. Ashkan Seyedi**, Nvidia, USA.

JSTQE will begin accepting submissions for this special issue on **February 1, 2024.** The deadline for submission of manuscripts is **August 1, 2024.** Hardcopy publication of the issue is scheduled for **May/June 2025.**

Unedited preprints of accepted manuscripts are normally posted online on IEEE Xplore within 1 week of the final files being uploaded by the author(s) on ScholarOne Manuscripts. Posted preprints have digital object identifiers (DOIs) assigned to them and are fully citable. Once available, the preprints are replaced by final copy-edited and XML-tagged versions of manuscripts on IEEE Xplore. This usually occurs well before the hardcopy publication date. These final versions have article numbers assigned to them to accelerate the online publication; the same article numbers are used for the print versions of JSTQE.

For inquiries, please contact:
IEEE Photonics Society JSTQE Editorial Office – Alexandra Johnson (Email: johnson.a@ieee.org)

Paper submission via IEEE Author Portal: https://ieee.atyponrex.com/journal/jstqe-pho

1) PDF or MS Word manuscript (double column format, up to 12 pages for an invited paper, up to 8 pages for a contributed paper). Manuscripts over the standard page limit will have an overlength charge of $220.00 per page imposed. Biographies of all authors are mandatory, photographs are optional. See the Tools for Authors link: www.ieee.org/web/publications/authors/transjnl/index.html.

2) JSTQE uses the iThenticate software to detect instances of overlapping and similar text in submitted manuscripts and previously published papers. Authors should ensure that relevant previously published papers are cited and that instances of similarity are justified by clearly stating the distinction between a submitted paper and previous publications.