IEEE
SENSORS JOURNAL

Call for Papers

Special Issue on Advances in Resource-Efficient Sensors and Interfaces Fostered by Artificial Intelligence

New kinds of sensors, their technological advancements, and their increasing scale of deployment, have enabled breakthrough capabilities in a range of application domains, from transportation, to health, to industrial automation. In many contexts sensor outputs must be digitized, processed, stored, and transmitted, at energy efficiencies compatible with massive scale and diminishing formfactors. But recently, the explosion in embedded data has motivated sensory architectures that directly transform data into information, and sometimes drive autonomous actions, directly at the edge, in a highly energy- and resource-efficient way. The next generation of sensory systems will integrate even more sensors across increasing modalities, towards data fusion, embed decision-making, and intelligent adaption and reconfiguration to environmental and operational conditions to minimize resource consumption and maximize system value. It is clear, however, that to accomplish this vision, novel sensors, manufacturing technologies, circuit interfaces, system architectures, and design methodologies will be required together with system/algorithmic co-design to surpass traditional trade-offs and move beyond the boundaries of the current state-of-the-art. Recent breakthroughs in Artificial Intelligence (AI) have demonstrated how multi-modal learning algorithms can be extremely effective in solving complex and dynamic problems. Therefore, by complementing sensors and interfaces with AI-based learning techniques, sensor systems will be able to efficiently and effectively perform real-time data analysis even at the edge, learn from data patterns, and improve their performance over time, leading to unprecedented system performance

Topics

This Special Issue of the IEEE Sensors Journal will showcase state-of-the-art in sensor systems exploiting learning techniques. Original research contributions and review papers are sought in areas including (but not limited to):

- **Improving sensor system performance through AI**: leveraging learning algorithms to enhance the accuracy, efficiency, and reliability of sensor systems.
- **AI-Augmented sensor interfaces:** using AI to redefine and surpass conventional design trade-offs or capabilities, and establish novel sensory functions.
- **Adaptive and intelligent sensor systems:** developing sensor systems that can adapt their hardware to changing conditions and make intelligent decisions based on AI-driven insights.
- **AI-enhancement through new sensor technologies:** designing sensors to foundationally enhance AI-model performance either during inference or training
- **Innovative materials and technologies for sensors:** exploring new materials and fabrication techniques that are driven by AI to advance the sensors state-of-the-art.
- **Challenges and future directions in AI-driven sensor technologies:** identifying current grand challenges in the design and hardware implementation of AI-driven sensor systems, and discussing future advancements in the field.

Important dates

~~**November 30, 2025**~~ **January 31, 2026:**	Deadline for Manuscript Submission
~~**January 31, 2026**~~ **March 31, 2026:**	Completion of Final Review
~~**March 30, 2026**~~ **May 31, 2026:**	Publication

Upon acceptance papers appear as Early Access (preprints) in IEEExplore and are fully citable.

Guest Editors

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Submission and Peer Review of Papers

Manuscripts submitted to the special issue should maintain an explicit focus on sensors or sensor systems, to be considered within the scope of the IEEE Sensors Journal (please check full journal scope). All manuscripts must be submitted on-line, via the *IEEE Author Portal*, see https://ieee.atyponrex.com/journal/sensors. Choose the special issue listed in the dropdown menu during submission. For manuscript preparation and submission, please follow the guidelines in the *Information for Authors* at the IEEE Sensors Journal web page, https://ieee-sensors.org/ieee-sensors-journal/for-authors