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IEEE Internet of Things Journal

Special Issue on IoT-Empowered AI4Science: Data Acquisition, System Modeling, and Knowledge Discovery

The rapid evolution of the Internet of Things (IoT) has transformed scientific data collection, enabling continuous, high-resolution sensing across environmental, industrial, biomedical, and planetary systems. Modern scientific missions rely on dense, heterogeneous sensor networks and distributed instruments that generate massive, multimodal data streams. At the same time, Artificial Intelligence for Science (AI4Science) has emerged as a powerful paradigm for accelerating modeling, simulation, prediction, and discovery using advances in deep learning, transformer architectures, generative models, and physics-informed AI. The convergence of IoT and AI4Science is both timely and essential. Traditional cloud-centric analytics cannot meet the demands of real-time operations, remote-field deployments, or safety-critical environments. Scientific workflows increasingly require in-situ intelligence—the ability to analyze data, adapt sensing strategies, and make autonomous decisions directly at the edge where data is produced. IoT-empowered AI enables dynamic hypothesis testing, responsive experiment control, and closed-loop discovery, marking a transformative shift in how scientific knowledge is generated.

This Special Issue aims to bring together cutting-edge research that integrates IoT with AI4Science to support data-driven discovery across diverse scientific domains. By highlighting advances in intelligent sensing, distributed learning, digital twins, trustworthy analytics, and autonomous experimentation, this issue seeks to position IoT as a foundational enabler of next-generation scientific workflows. Contributions from academia, industry, and government laboratories are encourageds.

Topics of interest include, but not limited to:

- Physics-Informed Machine Learning on IoT Platforms
- Distributed and Federated Learning for Scientific IoT
- IoT-Enhanced Digital Twins for Scientific Discovery
- Edge Intelligence for In-Situ Scientific Experimentation
- Multimodal IoT Data Fusion for Scientific Applications
- Generative AI for IoT-Driven Scientific Modeling
- Uncertainty Quantification and Trustworthy AI in IoT-Enabled Science
- Energy-Efficient IoT Architectures for Large-Scale Scientific Missions
- Real-Time Scientific Sensing and Control via IoT–AI Integration
- Security and Privacy Preservation in Scientific IoT Analytics
- Cross-Domain Scientific Applications of IoT-Empowered AI4Science

Important Dates

- Submission Deadline: June 30th,2026
- First Review Due: September 15th, 2026
- Revision Due: October 15th, 2026
- Second Reviews Due/Notification: November 15th, 2026
- Final Manuscript Due: January 1st,2027
- Publication Date: March 2027

Submission

The original manuscripts to be submitted need to follow the guidelines at: https://ieee-iotj.org/wp-content/uploads/2025/02/IEEE-IoTJ-Author-Guidelines.pdf, which should not be concurrently submitted for publication in other venues. Authors should submit their manuscripts through the IEEE Author Portal at: https://ieee.atyponrex.com/journal/iot. The authors must select as "SI: IoT-Empowered AI4Science: Data Acquisition, System Modeling, and Knowledge Discovery" when they reach the "Article Type" step in the submission process.

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