

Call for Papers for the Special Session on

SELF-AWARE AND RESILIENT OPERATION OF INTELLIGENT MICROGRIDS

Organized and co-chaired by

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Technical Outline of the Session and Topics

With the growing penetration of distributed energy resources, power electronics, and communication-enabled control, modern microgrids are evolving into complex cyber-physical systems. Ensuring reliable, resilient, and efficient operation under varying operating conditions, disturbances, and potential cyber threats is a critical challenge. This special session will address and disseminate the state-of-the-art ongoing research and development results on self-aware and resilient operation of microgrids that integrate situational awareness, adaptive control, and AI-driven decision-making. The session will bring together researchers and practitioners from academia and industry to discuss novel methodologies, practical implementations, and experimental results. By focusing on the combination of self-awareness, resilience, and intelligence, the session aims to foster knowledge exchange on developing microgrids that can autonomously monitor, adapt, and respond to both operational and environmental uncertainties, supporting the next generation of reliable and sustainable energy systems.

Topics of the session include, but are not limited to:

- Condition monitoring for operational awareness
- Predictive maintenance for proactive resilience
- Power flow optimization
- Real-time energy management
- Grid-forming inverter controls
- Self-monitoring and self-diagnostic architecture
- Adaptive and reconfigurable control strategies
- Multi-agent coordination
- Cybersecurity-aware operation
- Data-driven machine learning approaches
- Physics-based machine learning approaches
- Digital twin-enabled solutions and applications

Timeline for Authors

All the instructions for paper submission are available on the conference website. Please visit www.iecon2026.org or scan the QR code for the timeline.

