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## Call for Papers for the Special Session on

# AI-ENABLED LEARNING-BASED AND DATA-DRIVEN MODELING, CONTROL, AND OPTIMIZATION OF POWER CONVERTERS AND MICROGRIDS

## Organized and co-chaired by


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## Technical Outline of the Session and Topics

The rapid growth of renewable energy, distributed generation, storage systems, and electrified transportation is transforming power systems into converter-dominated and highly dynamic networks. These systems operate under uncertainty, fast transients, and complex nonlinear interactions, challenging conventional model-based design and control methods. Recent advances in artificial intelligence (AI) and data-driven techniques offer powerful tools for high-fidelity modeling, adaptive control, and real-time optimization. By combining physics-based knowledge with learning approaches, improved performance, resilience, and reliability can be achieved. This special session focuses on AI-enabled solutions for modeling, control, optimization, and monitoring of power converters and microgrids, emphasizing theoretical developments and practical implementation.

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

- Data-driven and learning-based modeling of power converters and microgrids
- Reinforcement learning for converter control and energy management
- Learning-enhanced model predictive control (MPC)
- Adaptive, self-tuning, and intelligent control strategies
- AI-based optimization of microgrid operation and distributed energy resources
- Deep learning for load, renewable generation, and demand forecasting
- Multi-agent learning for distributed and cooperative control
- Stability analysis and enhancement using AI techniques
- Embedded and real-time implementation of AI algorithms in power electronic systems

## 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.