

ADVANCING BATTERY TECHNOLOGIES: PARAMETER ESTIMATION, PERFORMANCE OPTIMIZATION, AND MANAGEMENT FOR GRID FLEXIBILITY

ORGANIZED BY

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SPECIAL SESSION OVERVIEW

The demand for efficient, reliable, and sustainable energy storage solutions has led to unprecedented advancements in battery technologies. These innovations are vital for applications ranging from electric vehicles (EVs) to renewable energy systems and portable electronics. However, achieving optimal battery performance requires significant progress in understanding and addressing challenges related to parameter estimation, performance monitoring, and Battery Management Systems (BMS). This special session aims to bring together researchers, practitioners, and industry experts to discuss cutting-edge developments in battery technologies, with a focus on: 1. Parameter Estimation Techniques: Exploring advanced methods for determining critical battery parameters such as state-of-charge (SOC), state-of-health (SOH), and internal resistance. 2. Performance Analysis and Optimization: Addressing strategies for enhancing energy density, efficiency, and lifecycle performance. 3. Battery Management Systems: Investigating innovative approaches for real-time monitoring, fault diagnosis, and thermal management in BMS. 4. Grid Integration of Batteries: Exploring the role of batteries in increasing grid flexibility, load balancing, and renewable energy integration.

TOPICS OF INTEREST

We invite original contributions and review articles addressing, but not limited to, the following topics:

- Advanced algorithms for SOC, SOH, and state-of-power (SOP) estimation.
- Machine learning and AI-driven approaches for battery diagnostics and prognostics.
- Embedded systems, edge computing and tiny machine learning for BMS.
- Techniques for thermal management and heat dissipation in batteries.
- Integration of BMS with renewable energy systems and EVs.
- Impact of material innovations on battery performance and durability.
- Real-time data acquisition and sensor integration in BMS.
- Cybersecurity challenges and solutions for BMS in connected systems.

Join us in exploring the future of battery technologies and contributing to advancements that power a sustainable tomorrow!