**Special Session: Advancing Networked Microgrids for Resilient and Sustainable Energy Systems**

**Background**

As the global energy landscape shifts towards renewable and decentralized generation, microgrids have emerged as key components in achieving sustainability, efficiency, and resilience. However, traditional microgrids, often isolated and independently operated, face limitations in scalability, flexibility, and economic viability. To address these challenges, networked microgrids—interconnected and interoperable microgrid clusters—offer an innovative solution by enabling coordinated energy sharing, improved reliability, and enhanced system resilience.

Developing efficient, optimized, and resilient networked microgrid systems requires cross-disciplinary research, such as power electronics, control theory, optimization algorithms, communication systems, cyber-physical security, and big-data analytics. Moreover, economic, regulatory, and policy considerations play a critical role in facilitating the transition from isolated microgrids to robust networked microgrid systems.

This special session seeks innovative research contributions that address key challenges, technological advancements, and practical implementations of networked microgrids. We invite researchers, industry experts, and policymakers to submit papers that align with, but are not limited to, the following topics:

- **System Modeling and Optimization**
    - Advanced modeling techniques for networked microgrid operation
    - Optimization algorithms for energy management
- **Control Strategies and Grid Stability**
    - Distributed control and decentralized decision-making
    - Data-driven and AI-powered control strategies
    - Stability analysis and frequency regulation
    - Small signal and large signal stability analysis
- **Cybersecurity and Resilience**
    - Cyber-physical security threats and mitigation strategies
    - Self-healing mechanisms: fault detection, location, and reconfiguration
    - Resilience-oriented energy system hardening measures
- **Integration of Renewable Energy and Energy Storage**
    - Energy storage technologies and management strategies
    - Coordinated operation of renewable energy sources (solar, wind, etc.)

    - Demand-side flexibility and prosumer-based energy trading
- **Market Mechanisms and Policy Implications**
    - Peer-to-peer energy trading frameworks
    - Regulatory challenges and policy recommendations for networked microgrids
    - Economic analysis and business models for sustainable deployment
- **Communication and Data Infrastructure**
    - Secure and reliable communication protocols for microgrid coordination
    - Real-time monitoring and data analytics for decision-making
    - Edge computing and IoT applications in networked microgrids

**Special Session Editors**

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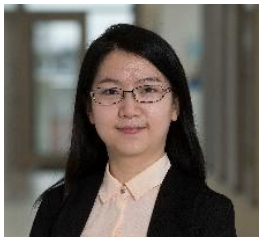
Changli Shi is a senior engineer at the Institute of Electrical Engineering of the Chinese Academy of Sciences. He holds a doctorate degree and is a senior member of the Chinese Society of Electrical Engineering, a member of the Professional Committee of Active Distribution Networks and Distributed Power Sources of the Chinese Society of Electrical Engineering, a member of the Professional Committee of Power Quality of the Chinese Power Supply Society, and a director of the Professional Committee of Energy Storage of IEEE PES. He has been engaged in the research of key technologies of renewable energy and energy storage for a long time. He has led or participated as a technical backbone in more than 10 national and provincial and ministerial projects, including the National Key R&D Program, the National "863" Program, the National Natural Science Foundation of China, the Strategic Priority Research Program of the Chinese Academy of Sciences, and the Important Direction Project of the Knowledge Innovation Project of the Chinese Academy of Sciences. He has published more than 40 papers in the three major retrievals, applied for more than 40 invention patents, and has authorized more than 20 of them. He has participated in the formulation of 2 national standards, 1 industry standard, and 1 group standard as a core personnel, participated in the publication of 1 monograph, and won 5 provincial, ministerial and social awards.



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Yajuan Guan is an associate professor, PhD supervisor, at the Department of Energy, Aalborg University, Denmark.

Her research interests include integration of renewable energy generation systems, microgrids, Internet of Things (IoT), grid-forming wind power systems, power supply resilience, and maritime microgrids. She has published more than 90 papers in academic journals and international conferences. As the second editor, she has edited a Springer book on IoT. She has an an authorized invention patent.

She serves in several international academic organizations, such as the European Organization for Scientific and Technological Cooperation, the European Microgrid Steering Committee, etc. She has keynote speeches at international academic conferences; she has served as a guest editor for several journal special issues and the chairman of special session of international conferences.

She has led or participated in a number of research and industrial projects, including an EU Horizon H2020 project, the Danish Ministry of Foreign Affairs International Cooperation Projects, the European Enterprise Cooperation Projects, a Danish Villum project, 863 projects, etc.