SASIGD 2026

2026 International Conference on Sustainable AI for Social Impact and Global Development

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CALL FOR PAPERS – SPECIAL SESSION

Fuzzy Systems and Computational Intelligence for Renewable Energy and Smart Grids

Session Code: **SS193**

Session Co-Chairs

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Session Description

This special session deals with the problem of effectively modeling, managing and controlling power systems based on renewable energy in Smart Grid settings while dealing with uncertainty, intermittency, and nonlinear system dynamics. Power grid operations experience increased variability, stochastic behaviour, and decreased system inertia when renewable energy sources like wind and solar photovoltaic (PV) systems are integrated on a big scale. The grid transforms into a highly decentralized, cyber-physical system with bidirectional power and information flows when smart meters, microgrids, electric vehicle (EV) charging infrastructure, and distributed energy management systems are deployed. Real-time state estimation, frequency and voltage management, optimal power flow, demand response coordination, protection mechanisms and cyber-physical security are all severely hampered by this transition. The nonlinear, time-varying dynamics and uncertainty present in such systems are frequently beyond the capabilities of traditional model-based control and optimization techniques. Therefore, to guarantee stable, resilient, and effective Smart Grid operation under high renewable penetration, sophisticated intelligent techniques—capable of adaptive learning, uncertainty handling, and distributed decision-making are required. The goal of this special session is to bring together scholars and practitioners working on computational intelligence and fuzzy logic-based methods for Smart Grid and renewable energy applications. By showcasing new developments, emerging approaches, and best practices in fuzzy-based modeling, control, optimization, resource balancing, and security enhancement, the session hopes to facilitate the shift from traditional power grids to scalable, resilient, and self-organizing Smart Grid systems that are in line with carbon reduction and Smart City goals.

The topics of interest include, but are not limited to:

Fuzzy-based modeling of renewable power generation systems, decentralized and cooperative sensor networks for dynamic loading and monitoring of power equipment, fuzzy logic-based energy management systems, renewable energy forecasting using fuzzy and neuro-fuzzy approaches, fuzzy control strategies for renewable power generation systems, applications of fuzzy logic in smart city energy infrastructures, probabilistic and non-probabilistic approaches for smart grid analysis under data uncertainty, meta-heuristic optimization methods for fast and efficient contingency analysis, fuzzy-enabled automation of power distribution networks, fuzzy-based power quality assessment, protection schemes, and reliability analysis, hybrid computational intelligence frameworks for renewable power generation systems, proactive and predictive control paradigms for smart grid operation and regulation, decision-making and motion planning using fuzzy logic and computational intelligence, fuzzy inference systems for short- and long-term renewable power forecasting, pervasive sensing and intelligent monitoring systems for asset condition assessment in smart grids.

IMPORTANT SUBMISSION DEADLINES

Call for Special Session proposals: **February 12, 2026**

Call for Regular Papers: **March 1, 2026**

Call for Student Posters: **March 8, 2026**

PAPER SUBMISSION

Scan the QR Code or Visit

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REVIEWERS REGISTRATION

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Experts are invited to join as reviewers for SASIGD 2026.

All the accepted & presented papers will be submitted for possible inclusion in IEEE Xplore.

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