NE-IECCE 2026 Special Session (SS-02)

Title of Proposed Session:

Smart Intelligence for Sustainable and Secure Power Systems

Technical Outline of the Session

The Smart Intelligence for Sustainable and Secure Power Systems (SISPS) session focuses on cutting-edge research and practical innovations leveraging artificial intelligence, machine learning, and deep learning for sustainable, reliable, and secure power system operation. Topics include intelligent forecasting of renewable generation and demand, AI-based grid stability enhancement, cyber-physical security, optimal energy management, and resilience of microgrids and distributed energy systems. The session aims to bridge data-driven decision-making with real-time control to achieve carbon-neutral, flexible, and robust power networks. SISPS brings together experts and researchers to explore AI's transformative role in achieving future ready, sustainable power systems.

Topics of Session

The scope of this Special Session includes, the following topics:

1. AI-Driven Predictive Analytics for Renewable Energy Forecasting.
2. Reinforcement Learning for Optimal Power System Operation and Control.
3. Cyber-Physical Security Using Artificial Intelligence in Smart Grids.
4. Intelligent Energy Management for Microgrids and Distributed Energy Resources.
5. Explainable and Trustworthy AI for Decision Support in Power Systems.

Special Session Organizers

1. Dr. Sreenu Sreekumar,
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Sreenu Sreekumar received the B.Tech. degree in Electrical and Electronics Engineering from Government Engineering College, Idukki, Mahatma Gandhi University, Kerala, India, in 2012, and the M.Tech. (Power Systems) and PhD degrees in Electrical Engineering from Malaviya National Institute of Technology, Jaipur, India, in 2015 and 2020, respectively. He is currently an Assistant Professor in the Department of Electrical Engineering at the National Institute of Technology Silchar, Assam, India. He was previously a Post-Doctoral Research Fellow at NIT Tiruchirappalli. His research interests include power system flexibility enhancement, load forecasting, renewable generation forecasting, inertia forecasting, imbalance forecasting, synthetic inertia, mathematical modelling of motors for electric vehicles, and net-zero targets. He has authored over 50 peer-reviewed publications (including approximately 20 journal papers and 30+ conference papers) and holds one patent. He is a Senior Member of the IEEE. Dr. Sreekumar received the POSOCO Power System Award in 2016 for

best M. Tech-level power system research and has served as a session chair and organiser in international conferences focused on power, energy, and control systems.

2. Dr. Rahul Satheesh
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Rahul Satheesh (Senior Member, IEEE) received the B.Tech. degree in electrical and electronics engineering from the University of Kerala, Thiruvananthapuram, India, in 2012, the M.E. degree in power systems from Anna University, Chennai, India, in 2014, and the PhD. degree in power systems from the National Institute of Technology Calicut, Kozhikode, India, in 2022. Following his doctoral studies, he was a Senior Engineer with Bosch Global Software Technologies, where he specialized in electrification and system engineering topics in electric vehicles (EVs). He is currently an Assistant Professor (Sr. Gr) with the Amrita School of AI, Amrita Vishwa Vidyapeetham, Coimbatore, India. He has authored or coauthored several research articles and participated in various conferences. His research interests include computational and data driven algorithms, wide-area monitoring systems, power oscillation studies, power grid resilience, smart grids, electric vehicle technology, and AI applications in power systems. Dr. Rahul is an active member of the IEEE Power and Energy Society. He has been recognized with multiple awards, including the 2019 Young Innovator Award by the Kerala State Government, the Outstanding Engineer Award (2022) from IEEE PES HQ, the Outstanding Chapter Volunteer Award (2023) from IEEE Kerala Section, and the Outstanding Young Professional Award from IEEE PES Kerala Chapter (2023).

3. Dr. Ankur Singh Rana
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Dr. Ankur Singh Rana received the Ph.D. degree in Electrical Engineering from Jamia Millia Islamia, New Delhi, India, in 2018. He obtained the M.Tech. degree in Electrical Power Systems Management at Jamia Millia Islamia in 2013 (9.67/10), and the B.Tech. degree in Electrical and Electronics Engineering from Maharaja Surajmal Institute of Technology, New Delhi, India, in 2010. He is currently working as an Assistant Professor in the Department of Electrical and Electronics Engineering at the National Institute of Technology, Tiruchirappalli (NIT Trichy), Tamil Nadu, India, where he joined in March 2020. Before this, he served as a Post-Doctoral Fellow at NIT Trichy from December 2019 to February 2020. His research interests include microgrids and their applications in power systems (including wide-area measurement systems, protection, PMUs), smart grid communications, power system reliability and protection, and integration of renewable energy and electric vehicles. Dr. Rana received the Best Paper Awards at various IEEE conferences, to name some: INDICON 2015, REEDCon 2023 (2 papers), and ICSPCRE 2024. He is a member of the Institute of Electrical and Electronics Engineers (IEEE), membership no. 93392834.

4. Dr. Vishnu Suresh

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Vishnu Suresh (Member, IEEE) received the B.Tech. degree in power systems from the University of Petroleum and Energy Studies, Dehradun, India, in 2014, and the M.S. degree in control in electrical power engineering and the PhD degree in microgrid energy management systems from Wroclaw University of Science and Technology, Wrocław, Poland, in 2016 and 2021, respectively, with deep learning forecasters and hybrid optimizers. In 2021, he was an Associate Scientist with the Embedded Power Systems Department, HITACHI ABB Power Grids Research and Development Centre, Krakow. He participated as a Guest Researcher for research in microgrids at the Centre, Aalborg University, Aalborg, Denmark. Currently, he is an Assistant Professor with the Faculty of Electrical Engineering, Wroclaw University of Science and Technology. His current research interests include designing energy management systems for microgrids, entailing the use of deep learning-based forecasting algorithms and meta-heuristic/hybrid optimization algorithms.