NE-IECCE 2026 Special Session (SS-03)

Title of Proposed Session:

Cybersecurity Frontiers in Smart Grids, Electric Mobility, and Renewable Energy Systems

Technical Outline of the Session

This special session explores cutting edge research on cybersecurity for smart grids, electric vehicles, and renewable energy systems. It focuses on securing connected infrastructures such as EV charging networks, microgrids, distributed solar inverters, and intelligent transformers. Topics include AI and blockchain-based defense strategies, risk assessment frameworks, and cyber-resilience for IoT-enabled energy and mobility ecosystems. The session aims to foster collaboration among researchers and practitioners to develop secure, reliable, and sustainable cyber–physical systems for the next generation of intelligent energy networks.

Topics of Session

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

1. Cybersecurity, Vulnerability analysis in smart grids, microgrids, distributed renewable systems, battery management systems, and energy storage integration.
2. Cyber-resilience of power electronics converters, inverters, and control systems.
3. Data-driven cybersecurity strategies using big data analytics and machine learning.
4. Threat modeling, penetration testing, and resilience evaluation in hybrid energy systems using IoT, cloud security, Digital twin, etc.
5. Policy frameworks, privacy protection, and regulatory aspects of energy cybersecurity and V2G, V2X, and grid-interfaced systems.

Special Session Organizers

1. Dr. Manickam Chakkarapani
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Manickam Chakkarapani (Member, IEEE) is currently working as an Assistant Professor with Electrical & Electronics Engineering and serving as HoD (In - Charge), Rajiv Gandhi Institute of Petroleum Technology, Sivasagar Campus, Assam. He received the B.Tech. degree in electrical and electronics engineering, the M.Tech. degree in process control and instrumentation, and the Ph.D. degree from National Institute of Technology, Tiruchirappalli, India, in 2008, 2010, and 2017, respectively. From 2017 to 2021, he was an Associate Professor with the Madanapalle Institute of Technology and Science, Madanapalle, India. His research interests include digital control systems, applications of power electronics in renewable energy systems, and power conditioner for fuel cell system. Cybersecurity for battery management systems and energy storage integration.

2. Dr. B Mallikarjuna
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Dr B Mallikarjuna (Senior Member, IEEE) is currently working as an Assistant Professor with the Department of Electrical Engineering, NIT Silchar, Assam, India. He completed his B. Tech in 2010 and M. Tech in 2014 from JNTUCE Pulivendula and JNTU Anantapur, respectively. He received his PhD degree from the National Institute of Technology Tiruchirappalli, India, in 2019. He has more than six years of teaching and research experience. He was recognized for publishing research work in IEEE Journals for 2018/2019. He is passionate about researching in emerging fields like wide-area monitoring, control, protection of modern power system integrated with RES, EVs, HVDC using emerging technologies. His research group is making significant contribution to the field of cybersecurity of power system.

3. Dr. Vivekanandan S
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Dr Vivekanandan S (Senior Member, IEEE) is currently working as an Assistant Professor with the Department of Electrical Engineering, NIT Silchar, Assam, India. He received the B.E. and M.E. degrees in electrical and electronics engineering from Anna University, Chennai, India, in 2011 and 2013, respectively, and the Ph.D. degree from the Electrical and Electronics Engineering Department, National Institute of Technology Karnataka (NITK), Mangalore, India, in 2019. He awarded University Rank Holder in his M.E degree. Further, he served as an Associate Professor in REVA University, Bengaluru, India. His current research interests include low-voltage dc–dc converter topology design with particular emphasis on low power electronics for portable computing and power management IC and power chargers. He is also working cybersecurity of power system against various attacks.