

KEYNOTE SPEAKER INFORMATION

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KEYNOTE TITLE

Trustworthy AI-Based Cyber-Physical Power Systems for Renewable Energy Generation and Grid Resilience

ABSTRACT

Modern power systems are being reshaped by decentralisation, decarbonisation and digitalisation. Renewable generation, PMU-based monitoring, distributed energy resources, digital platforms and AI-supported control improve grid operation, while they also introduce new cyber-physical risks. This keynote presents a trustworthy AI perspective for future power systems, building on recent work on duelling AI algorithms for PMU anomaly detection and cybersecurity. It discusses AI-based anomaly detection, renewable energy forecasting, digital twins for monitoring and operational intelligence, cyber-physical security, digital privacy, explainable decision-making and resilient system operation. The talk also addresses techno-legal aspects, including data governance, cybersecurity obligations, AI accountability, risk management and regulatory compliance for critical energy infrastructure. The central message is that AI methods for high-impact energy applications must be accurate, robust, privacy-aware, explainable, secure and operationally suitable for safe energy infrastructure.