Special Session XXI

Special Session Basic Information:

专栏题目 Session Title	中文：面向智能电网的人工智能驱动电动汽车融合技术 英文：AI-Driven Electric Vehicle Integration for Smart Grids

专栏介绍和征稿主题
Introduction and topics

中文：电动汽车（EV）的大规模接入加速了交通系统、电力系统与数字基础设施的深度耦合，推动形成结构日益复杂的能源系统。EV 充电行为的随机性、显著的时空耦合特征以及实时运行需求，使传统基于物理模型的方法在系统分析与调控中面临挑战。人工智能（AI）为 EV 融合电力系统的建模、控制与优化提供了有效的数据驱动手段。通过挖掘大规模充电数据与实时运行信息，AI 方法能够提升需求预测精度，实现充电协调，并充分挖掘 EV 柔性，以支撑智能电网与智慧乡村能源系统的安全高效运行。

英文：The large-scale integration of electric vehicles (EVs) is strengthening the coupling between transportation systems, power grids, and digital infrastructures, leading to increasingly complex cyber-physical energy systems. Stochastic charging behaviors, strong temporal-spatial coupling, and real-time operational requirements pose significant challenges to traditional model-driven approaches. Artificial intelligence (AI) provides effective tools for data-driven modeling, adaptive control, and intelligent optimization of EV-integrated power systems. By leveraging large-scale charging data and real-time system information, AI-enabled methods can improve demand forecasting, enable coordinated charging, and exploit EV flexibility to support efficient and reliable operation of smart grids and smart village energy systems.

1. AI-based modeling and charging behavior analysis of electric vehicles;
2. Data-driven forecasting of EV charging demand and mobility patterns;
3. Intelligent and adaptive EV charging control under uncertainty;
4. Reinforcement learning and multi-agent coordination for EV–grid interaction;
5. AI-driven optimization of EV charging, discharging, and V2G services;
6. EV integration in smart grids, microgrids, and smart village energy systems.

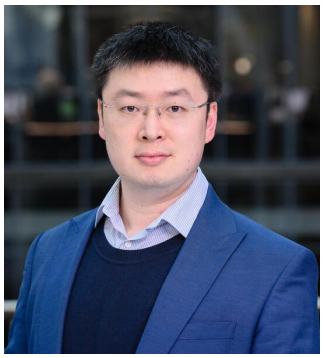
Special Session Chair(s):

姓名 Name	王思琪, Siqi Wang
称谓 Prefix	副研究员, Associate Professor
部门 Department	电网技术研究部, Department of Power Grid Technology
单位 Organization	中国科学院电工研究所, Institute of Electrical Engineering, Chinese Academy of Sciences
城市/地区 City/Region	北京, Beijing, China
邮箱 Email	wangsiqi@mail.iee.ac.cn

Organizer's Brief Biography

中文：王思琪，现任中国科学院电工研究所电网技术部副研究员。2020 年在英国克兰菲尔德大学获得博士学位，2020-2023 年任英国克兰菲尔德大学研究员，2023-2024 年任英国赫特福德大学物理工程与计算机科学学院讲师。她的研究方向包括混合可再生能源系统的能量管理策略以及人工智能在交通和能源系统中的应用。

英文：Siqi Wang is currently an associate professor of Electrical Engineering with Institute of Electrical Engineering, Chinese Academy of Sciences, Beijing, China. She received a Ph.D. degree in autonomous vehicle dynamics and control from Cranfield University, U.K., in 2020. From 2020 to 2023, she was a Research Fellow with Cranfield University, U.K. From 2023 to 2024, she was a lecturer with the School of Physics, Engineering and Computer Science, University of Hertfordshire, U.K. Her research interests include energy management strategies for hybrid renewable power systems, AI for transport and energy systems.



姓名 Name	张新, Xin Zhang
称谓 Prefix	教授, Professor
部门 Department	电力系统与控制, Control and Power Systems
单位 Organization	谢菲尔德大学, University of Sheffield
城市/地区 City/Region	英国谢菲尔德, Sheffield, UK
邮箱 Email	xin.zhang1@sheffield.ac.uk

Organizer's Brief Biography

中文：

英文：