

Dr. JIE SHI
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Brief Introduction

Jie Shi (S'11-M'16) received Ph. D. degree from North China Electric Power University, Beijing, China, in 2013. She was also a visiting scholar in Energy Center of Mälardalen University, Västerås, Sweden in 2019. She is currently an associate professor at University of Jinan, China and a visiting postdoc at Cardiff University, UK. Her current research interests mainly include Wind-Energy Storage System design and operation, centralized/distributed renewable power output forecasting.

Academic Record

Dr. Jie Shi has focused to the research areas including new energy (wind power, photovoltaic) power forecasting mechanism, large proportion integration of new energy, multi-energy complementary mechanism consisting of wind/solar/energy storage, distributed aggregation demand response from the information-physics-society perspective. She has undertaken/participated in a number of scientific research projects such as the *National Natural Science Foundation of China* and the *National Key Research and Development Programme*, publishing over 30 academic articles. Based on those research contributions, she has been selected as **ESI highly cited scholar**. In addition, she has applied or authorized more than 20 Chinese/American patents and 2 software copyrights.

Engineering Achievements

Besides her technical research records, Dr. Jie Shi has made multiple contributions to power industry during her academic career. The above research results based on the academic research funding provide support to solve key problems from industrial enterprises. Hence, she has carried on research projects of enterprises and research institutes, with a total project funding of more than **3.5 million RMB**. In addition, her patents have been effectively transformed to a solar power plant company in Shandong Province by **500,000 RMB**.

One of her research focuses is the distributed forecasting of photovoltaic power output. As the principal investigator of her research team, Dr. Jie Shi has collaborated with Shandong Electric Power Consulting Institution for the economic battery capacity and management of solar-energy storage system and helped the company save more than **1.5 million RMB design/operation cost**. She also collaborated with State Grid Shandong Branch for designing an optimal distributed power forecasting software, which increased the distributed photovoltaic power integration and system resilience. She and her team members collaborated with researchers in China Huaneng Group Clean Energy Technology Research Institute Co. on optimal energy management scheme for large scale wind-hydro-energy storage hybrid pilot system to participate in ancillary service market. Because of her contribution on the energy management and forecasting model for the distributed solar power in Shandong province, Dr. Jie Shi was awarded the **Shandong Energy Innovation Award by the Shandong Energy Research Society in 2022**.

IEEE IAS Volunteer Activities

Dr. Jie Shi has been an active member for IEEE IAS since 2011, and she has been actively involved in engineering and educational activities. She **founded the IAS student branch chapter at University of Jinan (UJN) in 2017** and she has been serving as the advising professor since then. By inviting distinguish experts and organizing seminars, she made more faculties and students get familiar with IAS and encouraged increasingly numbers of students to join IAS activities, such as submitting papers to IAS conferences and co - organizing IAS sponsored student conferences. Also, she has helped more than 15 undergraduate and graduate students from UJN to attend IAS Annual Meetings and I&CPS Technical Conferences.

Meanwhile, Dr. Jie Shi is working on introducing IAS educational activities to Chinese universities and helping them with the preparation for establishing IAS student branch chapters. Those universities include Shanghai Dianji University, Xiamen University, North China University of Water Resources and Electric Power, and the number is still counting.

To better connect researchers from both industry and academic area, Dr. Jie Shi and her colleagues **founded IEEE/IAS I&CPS Asia conference**. As the secretary of I&CPS Asia operating committee and technical program vice chair, she is working together with local team and preparing **the first I&CPS Asia conference in Weihai, China** in July 2020. This is the first I&CPS conference in Asia. After that, she and her colleague continue to focus on enlarging the conference impact in Asia and Pacific area. The annual conference has been taken every year since 2020, with the dramatically increasing participated papers from 337 in Weihai 2020 to 436 in Chongqing 2023.

Selected Research Projects

1. 2022.01-2024.12 Key Research Investigator Funding of Jinan, T202116, PI
2. 2021.01-2023.12 National Key Research and Development Program of China , 2019YFE0118400, Co-PI
3. 2017.01-2019.12 National Science Foundation of China, 51606085, PI
4. 2014.03-2017.03 Talent Training Program in Beijing, 2014000020124G095, PI

Voluntary Activities

1. IEEE IAS I&CPS Asia Operation Committee
2. IEEE Industry Application Society Student Branch Chapter at UJN
3. IEEE, IAS, PES
4. IEC SC8A working group

Selected Publications

1. **Jie Shi**, Yaobang Chen, Four-Stage Space-Time Hybrid Model for Distributed Photovoltaic Power Forecasting, *IEEE Transactions on Industry Applications*, 2022, 59(1): 1129-1138.
2. Jingli Fan, Xi Huang, **Jie Shi**, Complementary Potential of Wind-solar-hydro Power in Chinese Provinces: Based on a High Temporal Resolution Multi-objective Optimization Model. *Renewable and Sustainable Energy Reviews*, 2023: 113566.
3. **Jie Shi**, Luhao Wang, Hybrid Energy Storage System (HESS) optimization enabling very short-term wind power generation scheduling based on output feature extraction. *Applied Energy*. 2019, 256: 113915.
4. **Jie Shi**, Wei-Jen Lee, Xiaofei Liu, Generation Scheduling Optimization of Wind-Energy Storage System Based on Wind Power Output Fluctuation Features. *IEEE Transactions on Industry Applications*, 2018, 54 (1): 10-17.
5. **Jie Shi**, Zhaohao Ding, Hybrid Forecasting Model for Very-short Term Wind Power Forecasting Based on Grey Relational Analysis and Wind Speed Distribution Features. 2014. *IEEE Transactions on Smart Grid*, 5 (1): 521-526.
6. **Jie Shi**, Wei-Jen Lee, Yongqian Liu, Forecasting Power Output of Photovoltaic System Based on Weather Classification and Support Vector Machine. 2012. *IEEE Transactions on Industry Applications*, 48(3): 1064-1069. (highly-cited paper)
7. Yongqian Liu, **Jie Shi**, Yongping Yang, Short-term Wind Power Prediction Based on Wavelet Transform-Support Vector Machine and Statistic Characteristics Analysis. 2012. *IEEE Transactions on Industry Applications*, 48(4): 1136-1141.
8. **Jie Shi**, Haoran Sun, Influence of Regional Climate Characteristics on Short-term Photovoltaic Power Prediction. *IEEE I&CPS Asia 2020*. Weihai, China.
9. Yaobang Chen, **Jie Shi**, Hybrid Models Based on LSTM and CNN Architecture with Bayesian Optimization for Short Term Photovoltaic Power Forecasting. *IEEE I&CPS Asia 2021*, Chengdu, China.
10. Yuming Wang, **Jie Shi**, Yan Ma, Ultra-short-term Interval Prediction Model for Photovoltaic Power Based on Bayesian Optimization, *IEEE I&CPS Asia 2022*, Shanghai, China.
11. Zuan Fu, Xingong Cheng, **Jie Shi**, Probability Estimation of Distributed Photovoltaic Power Prediction Based on KMC-optimized Copula, *IEEE I&CPS Asia 2022*, Shanghai, China.
12. Jingwen Cai, **Jie Shi**, Jinrui Guo, Sizing Optimization of Wind-Hydro Combination System Based on Frequency Division, *IEEE I&CPS Asia 2022*, Shanghai, China.
13. **Jie Shi**, Yulei Gong, Xiaofei Liu, Model optimization for very-short-term wind power forecasting using Hilbert-Huang Transform. 2016. *IEEE International Conference on Smart Grid and Clean Energy Technologies*. Chengdu, China.
14. **Jie Shi**, Guoyu Zhang, Evaluating the Impact of Wind Power Probabilistic Forecasting on Very-short-term Generation Scheduling for Wind-Storage Combined Generation System. 2018. *IEEE I&CPS Annual Meeting*. May 6-10, Niagara Falls, ON, Canada.