Bin Huang

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Expertise: Renewable power generation and clean energy technology, distributed energy and storage, modern power system operation and planning, active distribution networks and microgrid applications, power system modeling and computational analysis, operation research, machine learning, quantum computing, data analytics;

Skills: **Python**: Pytorch, Tensorflow, pandapower, PYPOWER-Dynamics, numpy, pandas, matplotlib, etc.; **Matlab**: Simulink, MATPOWER; **Optimization solvers:** gurobi, mosek, ipopt; **AWS**: Certified Cloud Practitioner, S3, Braket, IAM, SNS; **Linux**: HPC server usage, Slurm, Bash script; SQL; LaTeX; Github

Education and Experience

Eversource energy, Berlin, U.S.
Data Science and AI for Electric Utilities, Senior Data Scientist, 2023.12–

Southern Methodist University, Dallas, U.S. |Electrical Engineering|*Ph.D.*   2019.09 - 2023.10
Advisor: Prof. Jianhui Wang, IEEE Fellow, GPA: 4.0/4.0

Brookhaven National Laboratory, Upton, U.S. |Visiting scholar/Student assistant   2022.06 - 2022.08/2023.06-2023.08, Advisor: Dr. Meng Yue, Dr. Tianqiao Zhao

South China Univ. of Tech., China |Electrical Engineering|*M.Sc.*   2016.09 - 2019.06
Advisor: Prof. Q.H. Wu, IEEE Fellow, GPA: 3.8/4.0

Huazhong Univ. of Sci. and Tech., China |Hydropower Engineering|*B.Sc.*   2012.09 - 2016.06
Advisor: Prof. Qin Hui, GPA: 3.9/4.0

Publications (7 first-authored papers and one patent), Cited 357 times on Google Scholar (dated 10/18/2024), h-index 5

1. **B. Huang** and J. Wang, "Bi-Level Adaptive Storage Expansion Strategy for Microgrids Using Deep Reinforcement Learning" . IEEE Trans. on Smart Grid. accepted, 2023. Link

2. **B. Huang** and J. Wang, "Physics-informed Neural Network and its Application on Power System: A Review" . IEEE Trans. on Power Systems. 38(1), 572-588, 2023. Link

3. **B. Huang** and J. Wang, "Deep Reinforcement Learning-based Capacity Scheduling for PV-Battery Storage System," IEEE Trans. on Smart Grid, 12(3), 2272-2283, 2020. Link

4. **B. Huang** and J. Wang, "Adaptive Static Equivalences for Active Distribution Networks with Massive Renewable Energy Integration: A Distributed Deep Reinforcement Learning Approach," accepted by IEEE Transactions on Network Science and Engineering, doi:10.1109/TNSE.2023.3272794.

5. **B. Huang**, Z. Li, J. H. Zheng, and Q. H. Wu, "Probabilistic active distribution network equivalence with correlated uncertain injections for grid analysis," IET Renewable Power Generation, 14(11), July. 2020. Link

6. **B. Huang**, P. Li, J. H. Zheng, and Q. H. Wu, "A Modified Ward Equivalent Based on Sensitivity Matrices for Static Security Analysis," IEEJ Trans. Electr. Electron. Eng., vol. 13, pp. 1675-1676, May. 2018.

7. **B. Huang**, H. Guo, J. Li, J. Wang, "Evidential Reasoning for Enhanced Node Selection in Power Network Reduction: a Complex Network Perspective," accepted for publication in PESGM2024

8. H. Guo, **B. Huang***, J. Wang, "Probabilistic Load Forecasting for Integrated Energy Systems using Attentive Quantile Regression Temporal Convolutional Network," accepted for publication in Advances in Applied Energy, *corresponding author

9. X. Huang, T. Zhao, **B. Huang**, Z. Zhang, Y. Meng, "Advancing Energy System Optimization via Data-centric Task-oriented Forecasting: An Application in PV-Battery Operation," accepted for publication in Applied Energy

10. Y Ji, X Zhang, X Wang, X Huang, **B Huang,** JH Zheng, Z Li, "An Equivalent Modeling Method for Multi-port Area Load Based on the Extended Generalized ZIP Load Model," 2018 International Conference on Power System Technology (POWERCON), Guangzhou, China, 2018, pp. 553-558, doi: 10.1109/POWERCON.2018.8601588.

11. Patent: A probabilistic equivalence modeling method for active distribution networks considering the stochastic nature of new energy sources, China, No. 109687431, July 14, 2019

Reviewer Experience (224 times in total)

IEEE: IEEE Transactions on Neural Networks and Learning Systems x2 IEEE Transactions on Smart Grid x4 IEEE Transactions on Power Systems x17 IEEE Transactions on Power Electronics x8 IEEE Transactions on Energy Markets, Policy, and Regulation x1 IEEE Transactions on Industrial Informatics x2 IEEE journal of emerging and selected topics in power electronics x2 IEEE Transactions on Network Science and Engineering x1 IEEE Open Access Journal of Power and Energy x2 IEEE Power & Energy Society General Meeting 2022 x1 IEEE Power & Energy

Society General Meeting 2023 x7 IEEE Power & Energy Society General Meeting 2024 x17 IEEE Transmission & Distribution Conference and Exposition 2024 x6 IEEE Energy Conversion Congress & Exposition 2024 x6 IEEE Energy Conversion Congress & Exposition 2023 x9 IEEE Transportation Electrification Conference and Expo 2023 x12 IEEE Transportation Electrification Conference and Expo 2024 x8 TEXAS POWER AND ENERGY CONFERENCE (TPEC) x3 IEEE Transactions on Emerging Topics in Computational Intelligence x2

Elsevier: International Journal of Electrical Power and Energy Systems x2 Renewable and Sustainable Energy Reviews x9 Knowledge-Based Systems x7 Expert Systems With Applications x15 Energy and AI x16 Energy Reports x21 Electric Power Systems Research x17 **Hindawi:** International Transactions on Electrical Energy Systems x3

Springer: International Journal of Data Science and Analytics x2

ACM: ACM SIGKDD Conference on Knowledge Discovery and Data Mining 2023 x3 ACM SIGKDD Conference on Knowledge Discovery and Data Mining 2024 x5 ACM SIGKDD Conference on Knowledge Discovery and Data Mining 2025 x2

IET Renewable Power Generation x5 IET Generation, Transmission & Distribution x3

AASG2024 (5th International Workshop on Autonomous Agents for Social Good) x2

National Science Foundation 2024 x5

Journal of Modern Power Systems and Clean Energy x2

Editorial Role

1. Frontiers in Smart Grids: Review Editor on the Editorial Board of Smart Grid Control

International Conference Organization and Coordination

1. Stage Manager, eGrid 2021 (IEEE PES & PELS 2021 6th Workshop on the Electronic Grid), Nov. 8th to Nov. 10th, 2021, virtual

2. Volunteer, IEEE Power & Energy Society General Meeting 2023, Jul. 16 to Jul. 20, 2023, Orlando, U.S.

3. Volunteer, 2018 International Conference on Power System Technology, Nov. 6th to Nov. 8th, 2018, Guangzhou, China

Invited Talks

1. INFORMS Annual Meeting Energy Efficient Vehicle Sharing System Session, "Capacity Scheduling of Battery Storage System for EV Charging and Frequency Regulation: A Proximal Policy Optimization Approach", one of the largest conferences in the field of operations research, Virtual, November 13, 2020.

2. Electric Power Research Institute visiting (Invited by Dr. Ben York), "Detecting False Data Injection Attacks in Smart Grids Using Quantum Embedding Kernels", SMU, May 11, 2023.

3. "Opendss Tutorial", Invited by Dr. Jianhui Wang, Southern Methodist University, Oct 17, 2023.

4. "Introduction to Quantum Computing", Invited by Dr. Meng Yue, Brookhaven National Laboratory, Jun, 2023.

Projects

i. **U.S. DOE DE-EE0009337** |*Resilient Community Microgrids with Dynamic Reconfiguration to Serve Critical Loads in the Aftermath of Severe Events, Link* 2021.06-now

1. Developed a **decentralized state estimation** algorithm for community microgrids on **Matlab**. 2. Developed algorithms for handling **bad and missing data in SCADA** systems. Utilized residual statistic metrics and measurement matrix to identify bad data and recover it to normal values. Built a time-series prediction model to construct pseudo-measurements for low-observability. 3. Devised a method to identify **false data injection attacks** on measurement data, leveraging a 1D-CNN **deep learning** algorithm. 4. Conducted rigorous testing and verification on the IEEE 123-node system. The project passed the DOE's quarterly and annual reviews. Maintained consistent communication with the team, providing weekly progress updates and drafting comprehensive quarterly reports.

ii. **Southwest Research Institute 15-R6035** |*Machine Learning-power Battery Storage Modeling and Evaluation for Fast Frequency Regulation Service, Link* 2019.11-2021.06

1. Developed a **battery capacity scheduling** algorithm based on deep reinforcement learning. 2. Devised battery arbitrage and **frequency regulation** provision for **energy and ancillary service markets**. 3. PJM RegD signal for verification.

iii. **Guizhou Power Grid Corp.** |*Hierarchical Multi-Objective Reactive Power Optimization and Decision Making for Large Scale Power Systems* 2016.11-2018.09

Developed a **load-flow** based module on **Matlab** for network reduction (Ward, Extended Ward, REI), which can adaptively reduce the scale of the power system by eliminating the low voltage level buses (scale to 10,000+ buses).

Award

2023 IEEE Transactions on Power Systems Outstanding Papers (first author), Popular Articles at IEEE Transactions on Power Systems (first author, dated 01/12/2024), Highly Cited Papers at Clarivate (top 1%), Frederick E. Terman Engineering Scholastic Award, AWS Cloud Credit for Research, Computational science and engineering fellowship (2022-2023,2023-2024), Research assitanceship (2019-2023), China National Scholarship (2013), Outstanding Graduate (2016), Pan Jia Zheng Hydropower Scholarship (2014)