

Junjie Yin

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Summary

PhD candidate in Electrical Engineering specializing in AI/ML for power systems, with hands-on experience in power flow, state estimation, grid modeling, data-center planning, and IBR frequency dynamics. Skilled in physics-informed and deep-learning models, including CNN/DNN surrogates for power-flow prediction and topology-aware N-k contingency analysis. A core developer of the CURENT Large-Scale Testbed (LTB) advancing its AI/LLM-driven simulation, proficient in Python (LangChain, PyTorch, TensorFlow) and power-system tools (OpenDSS, PSS®E, PSCAD, Pandapower, MATPOWER), with strong technical writing and presentation skills.

Education

University of Tennessee, Knoxville (UTK)

PhD in Electrical Engineering, GPA: 3.93/4.0

Knoxville, TN

Aug. 2023 - May 2027 (Expected)

Southeast University (SEU)

MS in Electrical Engineering, GPA: 3.79/4.0 (Top 5%)

Nanjing, China

Sep. 2020 - Jun. 2023

North China Electrical Power University (NCEPU)

BS in Electrical Engineering, GPA: 3.73/4.0 (Top 1%)

Beijing, China

Sep. 2016 - Jun. 2020

Professional Experience

Research Intern – Microsoft, AI/ML for Electricity Infrastructure Planning

Jun. 2026 – Aug. 2026

- Developed the Power-Grid Dataset Restoration Agent that uses limited grid information to “build-diagnose-repair-verify-visualize” for hyperscalers’ critical infrastructure planning.
- Built a game-theory-based simulation environment for hyperscaler data-center planning, integrating a public-information retrieval agent to design competitive siting and capacity strategies.
- Designed a data-center interconnection-queue agent that optimizes hyperscalers’ interconnection applications while accounting for ISO interconnection processes and grid-upgrade costs.

Course Developer – IEEE PES Tutorial Course

Apr. 2025 – Now

- [AI for Power and Energy Systems: Applications, Challenges, and Opportunities](#)

Technical Coordinator – IEEE PES AI for Power Systems Coordinating Committee

Dec. 2024 - Now

IEEE PES Work Group on Machine Learning for Power Systems

Research Assistant – CURENT & EECS Department at UTK

Aug. 2023 - Now

Teaching Assistant – EECS Department at UTK

Aug. 2023 - Aug. 2025

Graduate R&D Intern – Yangzhou Electric Power Company, State Grid

Jul. 2021 - Jan. 2022

Peer Reviewer – 150+ reviews for IEEE, Elsevier, Nature, etc.

Oct. 2020 – Now

Technical Skills

AI & Programming

Python (PyTorch, TensorFlow) | ML | RL | CNN | GNN | LLM & AI Agents | MATLAB | C

Power System Modeling & Simulation

PSCAD | PSS®E | OpenDSS | Simulink | PLECS | Pandapower | PYPOWER | MATPOWER

Optimization Solvers

Gurobi | CPLEX | YALMIP | CVX (MILP, OPF, SCUC)

Testbed Platforms

CURENT Large-Scale Testbed (LTB) | RT-Box

Research Projects

LLM-Enabled Power System Simulation and Planning Platform - DOE Project

Feb. 2025 – Now

- Developed an LLM-assisted workflow for power system simulation to enable natural-language

interaction for grid data input, parameter configuration, and automated result interpretation.

- Implemented AI-supported workflows for PV curve visualization and continuation power flow analysis to assess voltage stability and planning-relevant operating margins
- Developed Python-based DNN/CNN prototypes for surrogate modeling, including load curve fitting and power flow prediction on benchmark systems.

Grid Resilience Operation & Scheduling - DOE Project

Jul. 2024 - Oct. 2025

- Developed N-k contingency simulation tools based on DL Variational Autoencoder (VAE) to assess system performance under contingency and extreme-event scenarios
- Integrated steady-state and dynamic simulations to evaluate system resilience and stability margins
- Performed probabilistic contingency assessments to support resilience planning and improve computational efficiency in large-scale grid studies

Microgrid Control & Resilience (ESTCP) - DoD Project

Jul. 2020 - Apr. 2024

- Designed reinforcement learning (RL)-based V-f and P-Q control strategies for Grid-forming (GFM) and Grid-following (GFL) converters to enhance stability and resilience under varying grid conditions
- Verified by Large-Scale Testbed (LTB) and Hardware Testbed (HTB) at CURENT Center

Selected Publications

- [1] **J. Yin**, B. She, X. Feng, et al. "Bridging Artificial Intelligence and Power Systems Education Through Hands-On, Executable Learning Frameworks," *IEEE Transactions on Power Systems*, 2026. (Under review)
- [2] X. Feng, **J. Yin**, C. Li, et al. "Grid Resilience, Extreme Weather Events, and Clean Energy Development," *Nature Reviews Clean Technology*, 2026. (Invited paper, co-first author, under review)
- [3] **J. Yin**, X. Feng, J. Han, et al. "Topology-Aware Propagation-Based Assessment of Extreme-Weather Impacts on Distribution System Resilience," *North American Power Symposium (NAPS)*, 2026.
- [4] **J. Yin**, X. Feng, B. She, et al. "VAE-based Credible Scenario Reduction for Probabilistic N-k Resilience Assessment of Distribution Systems under Extreme Events," *IEEE Transactions on Smart Grid*, 2026. (Pending submission)
- [5] **J. Yin**, B. She, J. Wang, et al. "Encoding Frequency Dynamics into Economic Operation of IBR-Penetrated Power Systems: Quantification, Integration, and Validation," *IEEE Transactions on Smart Grid*, 2025. (Under review)
- [6] A. Ali, **J. Yin**, F. Li, et al. "Pathway Toward an Open-Source Ecosystem in Power Systems," *IEEE Electrification Magazine*, vol. 13, no. 2, 2025.
- [7] S. Fahad, B. She, **J. Yin**, et al. "A Data-driven Adaptive Control Approach for Enhancing the Dynamic Response of VSGs in Varying Grid Conditions," *IEEE Transactions on Power Delivery*, 2025.

Invited Talks

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| "AI Applications in Power Systems" – IEEE PES DIU Student Branch Chapter | Jun. 2026 |
| "AI-Enabled Resilient and Interactive Power Grid" – CURENT Industry Conference | Apr. 2026 |
| "Scheduling-Dynamics Interoperated Virtual Power Grid" – CURENT Industry Conf. | Apr. 2025 |

Awards

- IEEE PES PCCC Best Oral Presentation Award, 2025
- UTK Graduate Fellowship (2023–2027)
- National Mathematical Modeling Competition – 1st & 2nd Prizes
- Academic Scholarship & Excellent Student Leadership (Multiple-Year Recipient)