

Jinshun Su

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APPOINTMENT

Postdoctoral Research Associate

Department of Civil & Environmental Engineering, University of Virginia

July 2025-Present

Charlottesville, VA

EDUCATION

The George Washington University, Washington, DC

Aug. 2019-May 2025

Ph.D. in Electrical Engineering

- *Advisor:* Prof. Payman Dehghanian
- *Dissertation:* Decision Making on Transportable Resilience Delivery for Short-Term Disaster Management in Power Distribution Systems

The George Washington University, Washington, DC

Aug. 2017-May 2019

M.Sc. in Electrical Engineering

- *Advisor:* Prof. Payman Dehghanian
- *Thesis:* On the Use of Wind Power and Pumped-Storage Hydro for Blackout Restoration and Resilience

Xi'an University of Technology, Xi'an, China

Aug. 2013-July 2017

B.Eng. in Electrical Engineering

SKILLS

- **Optimization & Modeling:** AMPL, GAMS, Gurobi, Pyomo, JuMP
- **Programming & Data Analysis:** Python, Julia, SQL, MATLAB, SAS
- **Simulation & Power Systems:** PowerWorld, PSCAD
- **Data Visualization & GIS:** Power BI, ArcGIS
- **Collaboration & Version Control:** Azure DevOps, Git

RESEARCH INTEREST

Theories: Applications

- **Decision-dependent uncertainty:** Post-disaster assignment of mobile power sources
- **Chance-constrained programming:** Pre-positioning of mobile power sources
- **Second-order Stochastic dominance:** Mitigating wildfire risks
- **Tri-level optimization:** Defending against false data injection
- **Logistic regression:** Multi-dimensional fragility function for power line conductors in wildfires
- **Reinforcement learning:** Dispatching transportable wind turbines

WORK EXPERIENCE

Graduate Research Assistant

Sep. 2019-Dec. 2024

Department of Electrical & Computer Engineering, George Washington University

Washington, DC

- Developed a wildfire fragility model using logistic regression and Latin Hypercube Sampling to estimate power line failure under wildfire exposure, based on 20,000+ synthetic data samples
- Built a multi-agent deep reinforcement learning framework to optimize mobile wind turbine dispatch, improving grid resilience under uncertain outage and weather conditions
- Designed a risk-averse decision model combining public safety power shutoffs with mobile power deployment, reducing wildfire risk and outage impact using quasi-second-order stochastic dominance measure
- Constructed an optimization model for price-based unit commitment that incorporates decision-dependent uncertainty in the elastic portion of demand, addressing the uncertainty in customer willingness to pay based on the selling price set by power generation companies

Power System Intern – Data Science Consultant*Exelon Corporation***Mar. 2024-Aug. 2024***Washington, DC*

- Built and validated a machine learning model to predict power outages across Exelon's service region, improving forecast accuracy using statistical metrics
- Created Power BI dashboards and ArcGIS maps to visualize outage trends and severity, enabling data-driven decisions in resource allocation and utility operations
- Developed a geospatial path tracing model to classify underground residential distribution circuits as looped or unlooped, supporting targeted maintenance planning across all service regions

Visiting Researcher (supported by NSF)*Pacific Northwest National Laboratory (PNNL)***Aug. 2023-Dec. 2023***Richland, WA*

- Developed an innovative service restoration strategy for interdependent infrastructure systems—power distribution, communication, and transportation networks—under decision-dependent uncertainty in demand response. Incorporated AC optimal power flow analysis and applied Benders Decomposition to enhance computational efficiency of the optimization model

PUBLICATIONS

This list includes a total of **22** technical peer-reviewed papers including **9** journal articles (7 published & 2 under review) and **13** conference papers (12 published & 1 under review). The total number of citations according to Google Scholar is currently **165** (h-index: 7)

Published Peer-Reviewed Journal Articles (J)

- [J7] R. Zhang, **J. Su**, P. Dehghanian, M. Alhazmi, and X. Fan, "Deep Reinforcement Learning-Based Allocation of Mobile Wind Turbines for Enhancing Resilience in Power Distribution Systems," *IEEE Transactions on Sustainable Energy*, 2025 (Early Access)
- [J6] **J. Su**, R. Zhang, P. Dehghanian, M. H. Kapourchali, S. Choi, and Z. Ding, "Renewable-Dominated Mobility-As-A-Service Framework for Resilience Delivery in Hydrogen-Accommodated Microgrids," *International Journal of Electrical Power and Energy Systems*, vol. 159, pp. 110047, Aug. 2024
- [J5] **J. Su**, S. Mehrani, P. Dehghanian, and M. A. Lejeune, "Quasi Second-Order Stochastic Dominance Model for Balancing Wildfire Risks and Power Outages due to Proactive Public Safety De-Energizations," *IEEE Transactions on Power Systems*, vol. 39, no. 2, pp. 2528-2542, Mar. 2024
- [J4] M. Nazemi, P. Dehghanian, Y. Darestani, and **J. Su**, "Parameterized Wildfire Fragility Functions for Overhead Power Line Conductors," *IEEE Transactions on Power Systems*, vol. 39, no. 2, pp. 2517-2527, Mar. 2024
- [J3] **J. Su**, D. Anokhin, P. Dehghanian, and M. A. Lejeune, "On the Use of Mobile Power Sources in Distribution Networks under Endogenous Uncertainty," *IEEE Transactions on Control of Network Systems*, vol. 10, no. 4, pp. 1937-1949, Dec. 2023
- [J2] **J. Su**, P. Dehghanian, and M. A. Lejeune, "Price-based unit commitment with decision-dependent uncertainty in hourly demand," *IET Smart Grid*, vol. 5, no.1, pp.12-24, Feb. 2022
- [J1] D. Anokhin, P. Dehghanian, M. A. Lejeune, and **J. Su**, "Mobility-As-A-Service for Resilience Delivery in Power Distribution Systems," *Production and Operations Management*, vol. 30, no. 8, pp. 2492-2521, Aug. 2021

Conference Proceedings (C)

- [C12] Y. Li, P. Dehghanian, X. Zhang, **J. Su**, R. Zhang, "Exploring the Capabilities and Limitations of Recommender System Models in the Electric Power Sector," *2025 IEEE Texas Power and Energy Conference (TPEC)*, Feb. 2025, College Station, Texas, USA
- [C11] B. Zargar, M. Ferdowsi, **J. Su**, Y. Li, P. Dehghanian, and R. Hibberts-Caswell, "Linear Distribution System State Estimation with Synchrophasor Measurements and Voltage-Dependent Load Model," *2025 IEEE Texas Power and Energy Conference (TPEC)*, Feb. 2025, College Station, Texas, USA
- [C10] H. Wang, **J. Su**, and P. Dehghanian, "Operation and DC Protection of Hybrid DRU-MMC HVDC System for Offshore Wind Integration," *2024 IEEE Industry Applications Society (IAS) Annual Meeting*, Oct. 2024, Phoenix, Arizona, USA
- [C9] R. Zhang, **J. Su**, P. Dehghanian, and M. Alhazmi, "Deep Reinforcement Learning-Aided Pre-Positioning of Mobile Wind Turbines to Enhance Power Distribution System Resilience," *2024 North American Power Symposium (NAPS)*, Oct. 2024, El Paso, Texas, USA

- [C8] J. Su, and P. Dehghanian, "Post-Disaster Dispatch of Transportable Wind Turbines for Enhancing Resilience of Power Distribution Systems," *2024 IEEE Texas Power and Energy Conference (TPEC)*, Feb. 2024, College Station, Texas, USA
- [C7] J. Su, R. Zhang, P. Dehghanian, and M. H. Kapourchali, "Pre-Disaster Allocation of Mobile Renewable-Powered Resilience-Delivery Sources in Power Distribution Networks," *2023 North American Power Symposium (NAPS)*, Oct. 2023, Asheville, North Carolina, USA
- [C6] C. Xie, J. Su, and P. Dehghanian, "Optimal Energy Scheduling in Seaport Integrated Energy Systems," *2023 IEEE PES GTD International Conference and Exposition (GTD)*, May 2023, Istanbul, Turkey
- [C5] J. Su, C. Xie, P. Dehghanian, and S. Mehrani, "Optimal Defense Strategy Against Load Redistribution Attacks under Attacker's Resource Uncertainty: A Trilevel Optimization Approach," *2023 IEEE PES Grid Edge Technologies Conference & Exposition*, Apr. 2023, San Diego, California, USA
- [C4] R. Zhang, Y. Li, M. Hijazi, J. Su, and P. Dehghanian, "Machine Learning-Aided Enhancement of Power Grid Resilience to Electromagnetic Pulse Strikes," *2022 North American Power Symposium (NAPS)*, Oct. 2022, Salt Lake City, Utah, USA
- [C3] J. Su, P. Dehghanian, B. Vergara, and M. H. Kapourchali, "An Energy Management System for Joint Operation of Small-Scale Wind Turbines and Electric Thermal Storage in Isolated Microgrids," *2021 North American Power Symposium (NAPS)*, Nov. 2021, College Station, Texas, USA
- [C2] J. Su, P. Dehghanian, M. Nazemi, and B. Wang, "Distributed Wind Power Resources for Enhanced Power Grid Resilience," *2019 North American Power Symposium (NAPS)*, Oct. 2019, Wichita, Kansas, USA
- [C1] S. Wang, P. Dehghanian, M. Alhazmi, J. Su and B. Shinde, "Resilience-Assured Protective Control of DC/AC Inverters Under Unbalanced and Fault Scenarios," *2019 IEEE Power and Energy Society (PES) Conference on Innovative Smart Grid Technologies-North America (ISGT-NA)*, 18-21 Feb. 2019, Washington DC, USA

Working Papers

- R. Zhang, P. Dehghanian, J. Su, M. Alhazmi, and D. Celeita, "Enhancing Bulk Electric Grid Resilience against Electromagnetic Pulse (EMP) Events: A Frequency Control-based Mitigation Approach," *IEEE Transactions on System, Man and Cybernetics*, (Under Review)
- P. Dehghanian, M. Lejeune, J. Su, and Z. Wang, "Resilience Enhancement in Power Distribution Systems: Chance-Constrained Model with Decision-Dependent Atoms," *Computers and Operations Research*, (Under Review)
- D. Okpo, C. Zhao, and J. Su, "Coulomb Counting-Based SOC Estimation from Real EV Data via LSTM and Transformer Models," *2025 North American Power Symposium (NAPS)*, (Under Review)

TEACHING EXPERIENCE

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| • Teaching Assistant for <i>ECE 2115: Engineering Electronics</i> , Instructor: Prof. Shahrokh Ahmadi, The George Washington University | Jan. 2025-May 2025 |
| • Teaching Assistant for <i>ECE 2210: Circuits, Signals, and Systems</i> , Instructor: Prof. Amir Aslani, The George Washington University | Jan. 2025-May 2025 |
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INVITED TALKS & CONFERENCE PRESENTATIONS

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- [T10] "Proactive and Reactive Strategies for Enhancing Power Distribution System Resilience Against Wildfires," Department of Electrical and Computer Engineering, The University of Texas Rio Grande Valley, Edinburg, TX, Mar. 2025
 - [T9] "Linear Distribution System State Estimation with Synchrophasor Measurements and Voltage-Dependent Load Model," *2025 IEEE Texas Power and Energy Conference (TPEC)*, College Station, TX, Feb. 2025
 - [T8] "Enhancing Electrical Safety Measures in Wildfire Mitigation through Strategic Public Safety Power Shutoff Actions," *2024 IEEE Industry Applications Society (IAS) Electrical Safety Workshop*, Tucson, AZ, Mar. 2024
 - [T7] "Post-Disaster Dispatch of Transportable Wind Turbines for Enhancing Resilience of Power Distribution Systems," *2024 IEEE Texas Power and Energy Conference (TPEC)*, College Station, TX, Feb. 2024
 - [T6] "Pre-Disaster Allocation of Mobile Renewable-Powered Resilience-Delivery Sources in Power Distribution Networks," *2023 North American Power Symposium (NAPS)*, Asheville, NC, Oct. 2023
 - [T5] "Transitions Toward Green Hydrogen and Implications for Electrical Safety," *2023 IEEE Industry Applications Society (IAS) Electrical Safety Workshop*, Reno, NV, Mar. 2023

- [T4] “Electric Power Grid Resilience to Load Redistribution Cyber Attacks Under Attacker’s Behavioral Uncertainty,” 2022 *INFORMS Conference on Security*, Arlington, VA, Aug. 2022
- [T3] “Navigating the IEEE Power and Energy Society (PES) & Industry Applications Society (IAS) Student Branch Chapter at the George Washington University,” 2022 *IEEE PES General Meeting*, Denver, CO, July 2022
- [T2] “An Energy Management System for Joint Operation of Small-Scale Wind Turbines and Electric Thermal Storage in Isolated Microgrids,” 2021 *North American Power Symposium (NAPS)*, College Station, TX, Nov. 2021
- [T1] “Distributed Wind Power Resources for Enhanced Power Grid Resilience,” *ECE Research Blitz*, George Washington University, Washington, DC, Nov. 2019

HONORS & AWARDS

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| • 2025 GWU ECE Best Dissertation Award | 2025 |
| • IEEE Industry Application Society (IAS) Electrical Safety through Design Student Education Initiative Award | 2024 |
| • NSF INTERN Award: Non-Academic Research Internships for Graduate Students | 2023 |
| • IEEE Industry Application Society (IAS) Electrical Safety through Design Student Education Initiative Award | 2023 |

FUNDED PROJECT EXPERIENCE

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| • Served as student lead on the project entitled “ <i>Collaborative Research: NNA Research: Collaborative Research: Foundations for Improving Resilience in the Energy Sector against Wildfires on Alaskan Lands (FIREWALL)</i> ,” National Science Foundation (NSF), Navigating the New Arctic (NAA) Program, PI: Prof. Payman Dehghanian | 2022-2025 |
| • Served as student lead on the project entitled “ <i>Mobility-As-A-Service for Resilience Delivery in Power Grids: Stochastic Programming Advancements under Decision-Dependent Uncertainties</i> ,” NSF, Energy, Power, Control, and Networks (EPCN) Program, PI: Prof. Payman Dehghanian | 2021-2025 |
| • Served as student lead on the project entitled “ <i>Collaborative Research: NNA Track 2: Foundations for Improving Resilience in the Energy Sector against Wildfires on Alaskan Lands (FIREWALL)</i> ,” NSF, NAA Program, PI: Prof. Payman Dehghanian | 2020-2022 |
| • Served as student lead on the project entitled “ <i>Effective Management of Endogenous Uncertainties in Large-Scale Power Grids</i> ,” Cross-Disciplinary Research Fund (CDRF), George Washington University, PI: Prof. Miguel Lejeune, Co-PI: Prof. Payman Dehghanian | 2019-2020 |

SERVICES & ACTIVITIES

Referee Services

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| • Reviewer for Journals: <i>IEEE Transactions on Smart Grid</i>
<i>IEEE Transactions on Power Systems</i>
<i>IEEE Transactions on Sustainable Energy</i>
<i>IEEE Transactions on Industry Applications</i>
<i>IEEE Transactions on Transportation Electrification</i>
<i>IEEE Power Engineering Letters</i>
<i>IEEE Internet of Things Journal</i>
<i>IEEE Access</i>
<i>IET Generation, Transmission & Distribution</i>
<i>Scientific Reports</i>
<i>Reliability Engineering & System Safety</i>
<i>Sustainable Energy, Grids and Networks</i>
<i>Journal of Modern Power System and Clear Energy</i> | 2019-Present |
| • Reviewer for Conferences: 2025 <i>IEEE PES General Meeting</i>
2025 <i>IEEE Texas Power and Energy Conference</i>
2021 <i>IEEE Green Technologies Conference</i> | 2021-Present |

Conference Services

- **Session Chair** for 2022 *INFORMS Conference on Security*, Arlington, VA *Aug. 2022*
- **Organizing Committee Member** for *FIREWALL workshop 2021*, Online *Sep. 2021*
- **Volunteer** for 2024 *International Conference on Smart Grid Synchronized Measurements & Analytics*, Washington, DC *May 2024*
- **Volunteer** for 2019/2020/2022/2023/2024 *IEEE PES Conference on Innovative Smart Grid Technologies-North America (ISGT-NA)*, Washington, DC *2019-2024*
- **Volunteer** for 2022 *IEEE PES General Meeting*, Denver, CO *July 2022*

Student Organization Services

- **Chair (2022-2024)/Vice chair (2020-2022)/Secretary (2018-2020)** for IEEE Power and Energy Society (PES) & Industry Applications Society (IAS) Joint Student Branch at George Washington University *2018-2024*