Jinshun Su

Olsson Hall, Charlottesville, VA 22904, USA
Email: jex2sg@virginia.edu
Tel: +1-832-314-6313
LinkedIn Profile | Google Scholar Profile | ResearchGate Profile

APPOINTMENT

Postdoctoral Research Associate ***July 2025-Present***
Department of Civil & Environmental Engineering, University of Virginia *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 Engineer*ing

- *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 ***Mar. 2024-Aug. 2024***
Exelon Corporation *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) ***Aug. 2023-Dec. 2023***
Pacific Northwest National Laboratory (PNNL) *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 **21** technical peer-reviewed papers including **8** journal articles (7 published & 1 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)
- 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

- **Teaching Assistant** for *ECE 2115: Engineering Electronics*, ***Instructor:*** Prof. Shahrokh Ahmadi, The George Washington University — ***Jan. 2025-May 2025***
- **Teaching Assistant** for *ECE 2210: Circuits, Signals, and Systems*, ***Instructor:*** Prof. Amir Aslani, The George Washington University — ***Jan. 2025-May 2025***

INVITED TALKS & CONFERENCE PRESENTATIONS

- **[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

- 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

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

SERVICES & ACTIVITIES

Referee Services

- **Reviewer** for Journals: *IEEE Transactions on Smart Grid* ***2019-Present***
  IEEE Transactions on Power Systems
  IEEE Transactions on Sustainable Energy
  IEEE Transactions on Industry Applications
  IEEE Transactions on Transportation Electrification
  IEEE Power Engineering Letters
  IEEE Internet of Things Journal
  IEEE Access
  IET Generation, Transmission & Distribution
  Scientific Reports
  Reliability Engineering & System Safety
  Sustainable Energy, Grids and Networks
  Journal of Modern Power System and Clear Energy

- **Reviewer** for Conferences: *2025 IEEE PES General Meeting*
  2025 IEEE Texas Power and Energy Conference ***2021-Present***
  2021 IEEE Green Technologies Conference

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***