LUSHA WANG

9700 S Cass Ave, Bldg. 362, Lemont, IL 60439, USA
Post-doctoral Appointee, Energy System Division, Argonne National Laboratory
lusha.wang@anl.gov ◇ 509-592-1022 ◇ lusha-wang

EDUCATION

Washington State University, Pullman, WA, USA Aug.2017-Jan.2022
Ph.D. in Electrical Engineering, minor in Computer Science GPA: 4/4
Advisor: Dr. Noel Schulz and Dr. Anamika Dubey
Thesis: Optimal Planning and Operation of Distribution Systems with Massive Electric Vehicles

Wuhan University, Wuhan, China Sept.2012-Jun.2016
B.E in Electrical Engineering GPA: 3.4/4

WORK EXPERIENCE

Argonne National Lab, Illinois, United States Feb.2022-Present
Post-doctoral Appointee

Argonne National Lab, Illinois, United States May-Dec.2019, May-Aug.2020
Research Aide

Washington State University, Pullman, United States Aug.2017-Jan.2022
Graduate Research Assistant

Virtue Intelligent Network Co., Ltd., Wuhan, China Jul.2016-Jul.2017
Software Developer

RESEARCH PROJECTS

DOE OE: US-India Collaborative For Smart Distribution System with Storage 2017-2022

- Conducted statistic analysis of real feeder data from Utility, including finding suitable probability density function for node degree, line length, commercial load and residential load.
- Proposed and implemented a customized synthetic distribution test feeder generation tool using statistic information and ran simulations in OpenDSS and communicating with Mininet for cyber security.
- Proposed a multi-time network clustering algorithm based on Louvain algorithm for distribution systems with PVs and EVs.
- Proposed a MPC-based decentralized voltage control method using PV inverters and EV flexibility.

ANL: Laboratory Directed Research and Development May-Dec.2019, May-Aug.2020

- Proposed an EV charging station planning method to minimize the impact of EV charging on distribution system hosting capacity.
- Modeled power distribution system operation and expansion strategies in a two-stage model considering load and EV demand uncertainty.
- Proposed a two-step TSO-DSO coordination method to evaluate EV flexibility capacity and implemented on IEEE 123 node test feeder with EV demand from POLARIS simulations.
- Conducted sensitivity analysis of different distribution services (congestion management, voltage control, voltage imbalance) and extra flexibility from control devices (voltage regulator, capacitor banks).

DOE VTO: Assessing Vehicle Technologies Office Benefits in a Transportation Energy Ecosystem 2021-2022

- Modeled transmission network in Atlanta-Chattanooga area and generating time-series profiles for load, generation and DER using realistic data.
- Reduced the large-scale transmission model to a 120-node network to improve computation.
- Economic dispatch simulations with different EV penetration levels and compare electricity prices under different scenarios.

DOE VTO: Demonstration of Utility Managed Smart Charging for Multiple Benefit Streams 2022-Present

- Developing Cyme-OpenDSS conversion tool to model real distribution networks in OpenDSS.
- Coordinating with ANL ATEAM to analyze the impact of predicted new EV charging infrastructure on power grid.
- Conducting impact analysis of EV penetration on transmission-distribution co-simulation environment.

DOE OE: Dynamic Security Enhancement Platform of Converter Interfaced Resource Rich Power Grids using a Power Grid and Protection Co-model 2023-Present

- Literature review on ML-based techniques in distribution system protection.

RESEARCH PROPOSALS

DOE VTO: Tackling Fleet Electrification Economic Barriers Utilizing Grid Opportunities (FLEET-GO) Full proposal under review
ANL PI

PUBLICATIONS

Journals

- **Lusha Wang**, Anamika Dubey, Assefaw Gebremedhin, Anurag Srivastava, Noel Schulz,"MPC-Based Decentralized Voltage Control in Power Distribution Systems with EV and PV Coordination." ***IEEE Transactions on Smart Grid,*** 13.4 (2022): 2908-2919.
- **Lusha Wang**, Jonghwan Kwon, Noel Schulz, Zhi Zhou, "Evaluation of Aggregated EV Flexibility With TSO-DSO Coordination." ***IEEE Transactions on Sustainable Energy***, 13.4 (2022): 2304-2315.
- **Lusha Wang**, James Halvorsen, Sanjeev Pannala, Anurag Srivastava, Assefaw Gebremedhin, Noel Schulz, "CPSyNet: A tool for generating customised cyberpower synthetic network for distribution systems with distributed energy resources." ***IET Smart Grid*** (2022).
- Shixin Liu, **Lusha Wang**, Jian Hu, Zhi Zhou, "A Two-Stage Charging Station Allocation Model for EV Taxi Fleet Considering Interdependence Between the Networks of Transportation and Power Distribution" (under second-round review of ***IEEE Transactions on Power Systems***).
- **Lusha Wang**, Bo Chen, Yanzhu Ye, Tianqi Hong, "Distribution System Restoration with the Integration of Crew Dispatch, Renewable Energy and Electric Vehicles" (submitted to ***IEEE Transactions on Smart Grid***).
- Rabia Khan, **Lusha Wang**, Sanjeev Pannala, Anurag K Srivastava, Noel N Schulz, "DER-rich Electric Distribution Feeder Models: Limitations, Challenges, and Path-Forward" (submitted to ***IEEE Access***).
- **Lusha Wang**, Anamika Dubey, "Three-phase Branch Flow Model and Optimization for Mesh Distribution System" (under preparation).

Conferences

- **Lusha Wang**, Jonghwan Kwon, Omer Verbas, Aymeric Rousseau and Zhi Zhou, "Charging Station Planning to Maximize Extra Load Hosting Capacity in Unbalanced Distribution System," ***2020 IEEE Power & Energy Society General Meeting (PESGM)***, 2020, pp. 1-5.

AWARDS

IEEE PES Grid Edge Technologies 3-Minute Ph.D. Dissertation Challenge Finalist

iREDEFINE Professional Development Award
Awarded to 12 PhD students and Post-doc in the US and Canada selected by ECE department chairs

SERVICE

Journal Reviewer

· IEEE Transactions on Power Systems, IEEE Transactions on Smart Grid, Renewable Power Generation

Mentoring

· Mentored an African American female graduate student intern in ANL

COMPUTER SKILLS

· Power distribution system simulation using OpenDSS, GridLAB-D
· Model-based optimization and ML-based algorithms using Python, C++