

EDUCATION AND CERTIFICATIONS

Ph.D. in Electrical Engineering , Washington State University	Pullman, WA
Advisor: Dr. Anjan Bose	In Progress
Engineer-in-Training (EIT) , Washington State	2017
Bachelor Of Science in Engineering , Walla Walla University	Colleg Place, WA
Electrical Engineering with Global Humanitarian Emphasis	June 2017
Magna Cum Laude	

SKILLS

Programming Languages: Python, Matlab, C/C++, C#, Julia
Research Tools: GridLAB-D, OpenDSS, ns-3, HELICS, CVXPY, SciPy, Pandas, Plotly Dash, Git, LaTeX

WORK EXPERIENCE

Washington State University	Pullman, WA
Research Assistant and Ph.D. Student	Aug 2018—Present
<ul style="list-style-type: none">– Developed Cyber-Physical Multi-Agent Co-Simulation Platform with HELICS, GridLAB-D, ns-3, and Python.– Developed a Python package for asymmetric three-phase optimal power flow using the linear branch flow model with support for OpenDSS models.– Modeled and simulated cyber-physical systems.– Studied distributed and decentralized algorithms for distribution system optimization and resiliency under adverse communication conditions.– Tested algorithms for distributed and decentralized control of microgrids to prevent voltage collapse.	

Key Technology	Walla Walla, WA
Electrical Engineer—Hardware and Reliability	Mar 2018—Jul 2018
<ul style="list-style-type: none">– Troubleshoot circuit boards and other problems– Plan for replacement of obsolete parts– Design test fixture– Write test procedures– Work with team of interdisciplinary Engineers	

Key Technology	Walla Walla, WA
Assembly Technician—Testing and troubleshooting new machines before shipping	Aug 2017—Feb 2018

ANR Group Inc (assigned to CHPRC)	Richland, WA
Intern Electrical Engineer in support of 100K Area Facility Engineering	Jun 2016—Sep 2016
<ul style="list-style-type: none">– Completed and submitted CHPRC Engineering Change Request package<ul style="list-style-type: none">* Used AutoCAD to create drawing to fully describe the system* Updated existing engineering documentation for affected systems* Consulted with Electrical and Operations Managers to ensure a practical design* Carefully studied the National Electrical Code and applied it in designs– Analyzed facility electrical system to update SKM model for arc flash energy calculations	

VOLUNTEER EXPERIENCE

Engineers Without Borders WWU Local Project Team

Mentor

College Place, WA

2023—Present

- Provide management and technical advise to student leader.

Engineers Without Borders WSU Project Team

Electrical Engineer

Pullman, WA

2018—2019

- Design for solar-powered water pump system for off-grid community in Panama.
- Construction of solar and electrical systems on site.
- Technical support following installation.

Engineers Without Borders WWU International Project Team

Electrical Engineer/Lead Electrical Engineer

College Place, WA

Sep 2015—Jun 2017

- Used AutoCAD to draft designs for home solar PV systems for a remote community in Peru.
- Trained Community Members to use and maintain their PV systems.
- Research and design for micro-hydro based mini-grid.
- Modeled loads and AC distribution grid characteristics.

RESEARCH PROJECTS

Spokane Connected Communities Project; Edo Energy, Avista, McKinstry, PNNL, Urbanova

Objective: Demonstrate non-wires solutions by creating virtual power plants from existing buildings.

Grid Data Transport Analysis Framework (GDTAF); PNNL, Supported by the Department of Energy (DOE)

Objective: Coordination of power system and communication system planning.

CITADELS; PNNL, Supported by the Department of Energy (DOE)

Objective: Utilize distribution system assets to support grid resiliency.

Clean Energy Fund 2 (CEF2); Avista Utilities, Supported by the Wasington Clean Energy Fund

*Objective*Demonstrate benefits of Avista's shared energy economy model.

Clean Energy and Transactive Campus (CETC); PNNL, Supported by the Department of Energy (DOE) and the Washington Clean Energy Fund (CEF)

Objective: Optimization of building energy loads and renewable energy with energy markets.

PUBLICATIONS

- [1] N. Gray, S. Paul, A. Dubey, A. Bose, Md. Touhiduzzaman, and J. Ogle, “Robustness Assessment of Distributed Optimal Power Flow under Communication Non-idealities”, *IEEE Industry Applications*, In Review.
- [2] N. Gray, R. Sadnan, A. Bose, A. Dubey, T. L. Vu, J. Xie, L. D. Marinovici, K. P. Schneider, C. Klauber, and W. Trinh, “Distributed Coordination of Networked Microgrids for Voltage Support in Bulk Power Grids”, *IEEE Industry Applications*, In Review.
- [3] J. Xie, K. P. Schneider, F. K. Tuffner, X. Chen, R. Sadnan, T. L. Vu, L. D. Marinovici, A. Dubey, A. Bose, N. Gray, and C. Klauber, “Coordinated Self-Assembly of Networked Microgrids Using Irving’s Algorithm”, in *2024 IEEE Power & Energy Society Innovative Smart Grid Technologies Conference (ISGT)*, Washington, DC, USA: IEEE, Feb. 19, 2024, pp. 1–5, ISBN: 9798350313604.
- [4] N. Gray, R. Sadnan, A. Bose, A. Dubey, T. L. Vu, J. Xie, L. D. Marinovici, K. P. Schneider, C. Klauber, and W. Trinh, “Distributed Coordination of Networked Microgrids for Voltage Support in Bulk Power Grids”, in *2023 IEEE Industry Applications Annual Meeting*, IEEE, 2023.
- [5] S. Paul, N. Gray, A. Dubey, A. Bose, M. Touhiduzzaman, and J. Ogle, “Robustness Assessment of Distributed OPF Under Communication Non-Idealities Using Cyber-Physical Co-Simulation Framework”, in *2023 IEEE Industry Applications Society Annual Meeting (IAS)*, Nashville, TN, USA: IEEE, Oct. 29, 2023, pp. 1–8, ISBN: 9798350320169.
- [6] R. Sadnan, N. Gray, A. Bose, and A. Dubey, “Bulk-power Grid Support: Distributed OPF for Voltage and Frequency Regulation”, in *2023 IEEE International Conference on Communications, Control, and Computing Technologies for Smart Grids (SmartGridComm)*, Oct. 2023, pp. 1–7.
- [7] R. Sadnan, N. Gray, A. Bose, and A. Dubey, “Simulation-Integrated Distributed Optimization for Unbalanced Power Distribution Systems”, arXiv:2212.04615 [eess.SY], 2022.
- [8] N. Gray, R. Sadnan, A. Bose, and A. Dubey, “Effects of Communication Network Topology on Distributed Optimal Power Flow for Radial Distribution Networks”, in *2021 North American Power Symposium (NAPS)*, College Station, TX, USA: IEEE, Nov. 14, 2021, pp. 1–6, ISBN: 978-1-66542-081-5.
- [9] R. Sadnan, N. Gray, A. Dubey, and A. Bose, “Distributed Optimization for Power Distribution Systems with Cyber-Physical Co-Simulation”, in *2021 IEEE Power & Energy Society General Meeting (PESGM)*, Washington, DC, USA: IEEE, Jul. 26, 2021, pp. 1–5, ISBN: 978-1-66540-507-2.
- [10] S. Szablya, G. Goldsmith, K. Allen, and N. Gray, “A Water System Using a DC Pump for Remote Solar Installations”, in *2019 IEEE Global Humanitarian Technology Conference (GHTC)*, Seattle, WA, USA: IEEE, Oct. 2019, pp. 1–1, ISBN: 978-1-72811-780-5.