John R. Theisen

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github | linkedin

Education

PhD - Electrical Engineering & Computer Science — **May 2021 - Jan 2026 (Expected)**

Power System Economics, Power System analysis, Distribution System Modeling, Optimal power flow — *Washington State University*

Bachelor of Science (B.S.) - Electrical Engineering — **Aug 2017 - May 2021**

GPA: 3.9 | focus in power engineering — *Washington State University*

Skills

Programming Languages Python | C++ | C | SPARQL | MATLAB | Simulink | Assembly | Verilog

Technologies GridLAB-D | OpenDSS | PowerWorld | MATPOWER | HELICS | OrCAD PSpice | Cadence Virtuoso

Experience

Washington State University — **May 2021 - Present**

Power Systems Research Assistant — *Pullman, WA*

- Developed a novel modification to a BESS-based optimization algorithm for providing real-time energy market services through a distribution system network introducing a risk-aware approach to energy arbitrage.
- Modeled and simulated utility distribution feeders using SCADA, AMI, and GIS data from Avista Corporation in GridLAB-D and OpenDSS, analyzing performance improvements and potential cost savings.
- Collaborated with industry partners on rate design and policy development, providing insights and recommendations based on extensive data analysis and modeling.

Private Mathematics Tutor — **Aug 2020 - May 2021**

Undergraduate Level Mathematics — *Pullman, WA*

- Tutored 20+ students in problem-solving strategies for 3D-calculus, linear algebra, numerical methods, statistics, computer science, physics, and differential equations.

Notable Projects

Avista's Eco-District — **Jan 2023 - Apr 2024**

Distribution System Modeling and Battery Control — *Spokane, WA*

- Developed a community-based transactive coordination mechanism to enable grid-edge systems to participate in localized energy trading.
- Conducted simulation-based evaluation on a real distribution system in collaboration with a local utility, demonstrating potential cost reductions of 12% for communities with DERs.
- Analyzed economic benefits of community-based coordination compared to existing tariff and rate structures, highlighting improved cost-effectiveness and grid efficiency.
- Designed and maintained a suite of data visualization tools for real-time monitoring and analysis of energy market data, enhancing decision-making processes for stakeholders.

Building Load Forecasting — **Aug 2023 - Dec 2023**

Supervised Machine Learning — *Pullman, WA*

- Collaborated with a team in building an electrical load forecast for a set of buildings with advanced metering for a nearby utility company. The building forecasting methodology would assist the utility towards its urban planning and sustainability goals.
- Implemented a random forest regression algorithm to capture the non-linear correlations between weather data and historical building thermal and electrical loads.

Wind Farm Control Analysis — **Aug 2020 - May 2021**

Control Systems Lead — *Pullman, WA*

- Simulated sub-synchronous control interactions on a series of wind farms modeled in MATLAB Simulink with Schweitzer Engineering Laboratories to study the parameters contributing to the interaction under specific fault conditions.
- Utilized frequency scanning techniques to predict resonant frequency and stability of oscillations and developed an algorithm to be able to accurately and reliably detect unstable control interactions.

Publications

- **J. R. Theisen**, A. Bose, M. Mukherjee, D. Burgess, K. Wilhelm and M. Diedesch, "Community-Based Transactive Coordination Mechanism for Enabling Grid-Edge Systems," *2024 IEEE Texas Power and Energy Conference (TPEC)*, College Station, TX.
- **J. R. Theisen**, A. Bose, M. Mukherjee, M. Diedesch and J. Gibson, "Evaluating the Risk of Enabling Energy Storage Systems to Provide Multiple Services," *2023 IEEE Power Energy Society Innovative Smart Grid Technologies Conference (ISGT)*, Washington, DC.