ELI BROCK

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EDUCATION

University of Pittsburgh   2018-Present
B.S. in Electrical Engineering (expected graduation May 2022)
- Concentration in Electric Power
- Minors: Mathematics, Economics
- GPA: 3.993/4.000, Class Rank: 1/86

RESEARCH EXPERIENCE

Power Systems Research Group   Fall 2020-Present
University of Pittsburgh, Advised by Dr. Robert Kerestes and Dr. Mai Abdelhakim
- Implemented and evaluated a reinforcement learning-based demand response algorithm for distributed energy storage subject to real-time electricity pricing.
- Simulated impact of distributed energy storage (i.e. electric vehicles) on a distribution grid using OpenDSS (in progress).

Science Undergraduate Laboratory Internship (SULI)   Summer 2020
Pacific Northwest National Laboratory, Advised by Dr. Jian Zhang
- Developed a parallel computing infrastructure and post-processing framework for urban-scale building simulations.

Summer Research Internship   Summer 2019
University of Pittsburgh, Advised by Dr. Robert Kerestes and Dr. Katrina Kelly
- Ranked campus buildings based on solar generation efficiency and visualized the analysis using ArcGIS.
- Evaluated rooftop solar as a campus decarbonization solution relative to alternative strategies by studying electricity markets and policies.

PUBLICATIONS AND PRESENTATIONS

Papers Published/Accepted
E. Brock, L. Bruckstein, P. Connor, S. Nguyen, R. Kerestes, and M. Abdelhakim, "An application of reinforcement learning to residential energy storage under real-time pricing," *2021 IEEE PES Innovative Smart Grid Technologies Asia (ISGT-Asia)*, 2021. Available online here.

J. Zhang, E. Brock, Y. Ye, and J. Zhang, "A Parallel Computing Infrastructure for Building Energy Simulation," Pacific Northwest National Laboratory, 2020. Available online here.

E. Brock, S. Nguyen, K. Kelly, and R. Kerestes, "Evaluating carbon reduction strategies for the University of Pittsburgh," *Ingenium: Undergraduate Research at the Swanson School of Engineering*, 2020. Available online here.

Papers Under Review/in Progress
Yunyang Ye, Wooyoung Jung, Jian Zhang, Eli Brock, "A New Database of Building-Space-Specific Internal Loads and Load Profiles for Performance Based Code Compliance Modeling," Target journal: *Journal of Building Performance Simulation* (under review).

S. Nguyen, E. Brock, P. Connor, R. Kerestes, and M. Abdelhakim, "Integrating Distributed Devices into Rural Circuits," Target Conference: *2022 IEEE Rural Electric Power Conference (REPC)* (in progress).

<u>Presentations</u>

An application of reinforcement learning to residential energy storage under real-time pricing, *IEEE PES Innovative Smart Grid Technologies Asia (ISGT-Asia)*, Oral Presentation, Dec. 2021. Available online [here](#).

A parallel computing infrastructure for building energy simulation, *PNNL Summer SULI Symposium*, Oral Presentation, July 2020.

Evaluating carbon reduction strategies for the University of Pittsburgh, *IEEE Green Technologies Conference*, Poster (canceled – pandemic), April 2020.

HONORS AND AWARDS

National Science Foundation Graduate Research Fellow	2022
[John W. Estey Outstanding PES Scholar](#)	2021
[IEEE PES Scholarship](#) (x3)	2019, 2020, 2021
Tau Beta Pi *(top 1/8 of junior engineering class)*	2021
Department of Energy Science Undergraduate Laboratory Internship (SULI)	2020
Eta Kappa Nu *(top 1/5 of sophomore electrical engineering class)*	2019
University of Pittsburgh Full Tuition Scholarship	2018
National Merit Scholar	2018
Oklahoma Academic All-State	2018

WORK EXPERIENCE

Tech Intern, Pacific Northwest National Laboratory   Fall 2020-Present
Simulation II Team, Buildings and Connected Systems Group
Advised by Dr. Jian Zhang
- Analyzed and tested new modeling strategies for building occupancy, infiltration, and load scheduling.
- Designed and implemented a new input data structure to enhance simulation workflows.

Teaching Assistant, University of Pittsburgh   Spring 2020, Fall 2020, Spring 2021
- Analytical Methods (Linear Algebra & Differential Equations)
- Signals, Systems, and Probability
- Held 5-10 office hours per week
- Reviewed/validated homework and test questions

TECHNICAL SKILLS

Programming: Python (primary), MATLAB, C++, R, Wolfram, Perl, Ruby
Machine Learning Frameworks: MATLAB, Python (TensorFlow, PyTorch, Gym)
Other: Git, OpenDSS, EnergyPlus, Bash, LaTeX, ArcGIS, Make, Docker
Graduate-Level Coursework: Advanced Power Systems Analysis, Stochastic Processes, Microgrids & Distributed Generation Technologies

ACTIVITIES

Mascaro Center for Sustainable Innovation Summer Research Program - Mentor	Summer 2021
US DOE Solar District Cup – University of Toledo – Technical Advisor	Spring 2021
IEEE Power and Energy Society Club, University of Pittsburgh	2019-Present
IEEE Student Branch, University of Pittsburgh	2019-Present
Engineers Without Borders, University of Pittsburgh – Project Sub-Lead	2019-2020