

ELI BROCK

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EDUCATION

University of California, Berkeley 2022-Present

PhD in Electrical Engineering

- Advised by Dr. Javad Lavaei and Dr. Somayeh Sojoudi

University of Pittsburgh 2018-2022

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](#).

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).

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).

Presentations

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 (<i>top 1/8 of junior engineering class</i>)	2021
Department of Energy Science Undergraduate Laboratory Internship (SULI)	2020
Eta Kappa Nu (<i>top 1/5 of sophomore electrical engineering class</i>)	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