RILEY LAWSON

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EDUCATION

Massachusetts Institute of Technology, Cambridge August 2025 - Present
PhD in Electrical Engineering and Computer Science
Research Interests: Sustainability; Human Computer Interaction; Understanding interoception; Clinical applications

Massachusetts Institute of Technology, Cambridge August 2023 - May 2025
Masters of Science in Electrical Engineering and Computer Science

Michigan State University, East Lansing August 2019 - May 2023
B.S in Electrical Engineering and B.S. in Advanced Mathematics

TECHNICAL EXPERIENCE

Mitsubishi Electric Research Laboratories May 2025 - August 2025
Technical Intern *Boston, MA*

- Compiled a comprehensive literature review of the state of the art in hybrid AC/DC power systems modeling and power flow computation.
- Created a computationally efficient algorithm to solve for the power flow on a hybrid AC/DC power system in multi-phase systems, accounting for various inverter controllers.
- Presented weekly research work updates to the research team, and coordinate development between team members.

National Renewable Energy Laboratory May 2022 - August 2022
SULI Intern *Golden, CO*

- Developed a mathematical framework to design of a gas distributor in a pressurized fluidized bed.
- Used fluid mechanics principles to ensure the gas distributor would achieve total bed fluidization, while operating within various safety parameters.
- Designed a data acquisition system to perform a practical validation of the gas distributor by gathering various temperature and pressure measurements.

Human Augmentation Technologies (HAT) Laboratory January 2022 - May 2022
Research Assistant *East Lansing, MI*

- Using the Arduino platform, developed a device to measure a user's blink rate, and transmit a reminder signal to the user to blink when their blink rate falls below a healthy level.
- Improved an algorithm for blink detection available in the literature to be able to function in real time on the limited computational resources available in the Arduino.
- Designed, manufactured, and tested a PCB to house the device in a wearable form factor.

GE Aviation May 2021 - August 2021
Technical Intern *Grand Rapids, MI*

- Performed batteries of tests on PCBs using oscilloscopes, multimeters, and digital logic analyzers to do root cause analysis on faulty components.
- Validated the performance of an onboard computational unit under intense temperature conditions and electromagnetic interference.
- Led a team in refurbishing a poorly functioning programming unit through identifying, procuring, and installing replacement parts.

Michigan State Univeristy - College of Natural Science December 2020 - May 2021
Research Assistant *East Lansing, MI*

· Used MATLAB to develop numerical solvers for systems of PDEs which govern compressible tumor cell growth.
· Applied real analysis techniques to determine the method of convergence of solutions to PDE systems under limits of different conditions, developing a link between compressible and incompressible models.
· Created a conference presentation using LaTeX and Beamer with team partners, and presented at local and national conferences.

Michigan State University - College of Engineering August 2019 - May 2021
Professorial Assistant *East Lansing, MI*

· Routinely conducted literature reviews on redox flow battery (RFB) developments to stay current on design and experimental parameters.
· Developed experimental procedures to test cyclic efficiency and material solubility for different proposed organic RFB chemistries.
· Maintained records on research activities, expenses, and results and compiled reports for SBIR compliance.

TEACHING EXPERIENCE

Modeling and Controls of Power Systems TA August 2024 - December 2024

· Gave weekly lectures and recitations covering topics to develop an understanding of modern power system operations, from physics based component modeling to cutting edge power electronics controls.
· Wrote quizzes and homework to test and evaluate student understanding of lecture material, and graded assignments to provide meaningul feedback.

Honors Calculus III TA August 2021 - December 2021

· Led recitation sections for two classes of 20+ students each.
· Generated review problems and solutions, and provided in person feedback through problem solutions and answering questions.
· Graded weekly homework assignments promptly, ensuring students received feedback each week to further develop mathematical skills.

PUBLICATIONS

[1] **R. Lawson**, H. Sun, S. Kawano, A. Raghunathan, and Y. Takaguchi (2026). Multi-Conductor Flexible Universal Branch Model for Efficient Hybrid AC/DC Power System Load Flow Computation. In IEEE PES General Meeting.
[2] M. Ilić and **R. Lawson**, "Energy Dynamics and Control for Interoperability", 2025 57th North American Power Symposium (NAPS), Hartford, CT, USA, 2025.
[3] **R. Lawson** and M. Ilić, "Dissipativity Conditions for Maximum Dynamic Loadability", *arXiv preprint arXiv:2405.05036.*
[4] M. Ilić, **R. Lawson**, and S. Umbereen, "A Method for Monitoring Slow Electromechanical Oscillations in Multi-Area Electrical Power Systems: The case of four areas IEEE 39 bus power system," 2024 15th Mediterranean Conference on Power Generation, Transmission, Distribution and Energy Conversion (MedPower), Athens, Greece, 2024.
[5] **R. Lawson**, S. Umbereen and M. Ilić, "Practical Method for Monitoring Inter-Area Oscillations in Electric Power Systems," 2024 56th North American Power Symposium (NAPS), El Paso, TX, USA, 2024, pp. 1-6, doi: 10.1109/NAPS61145.2024.10741799.
[6] D. Wu, R. Jaddivada, **R. Lawson** and M. Ilic, "Optimality Conditions for Distributed Primary Control in Energy State Space," 2024 10th International Conference on Control, Decision and Information

Technologies (CoDIT), Vallette, Malta, 2024, pp. 2686-2691, doi: 10.1109/CoDIT62066.2024.10708228.
[7] Sinjari, K., Alzahrani, S., **Lawson, R.**, Rabick, S., & Mitra, J. (2023, July). Analysis of Electric Vehicles Interfacing with Three-Phase Four-Wire Distribution System. In 2023 IEEE Power & Energy Society General Meeting (PESGM) (pp. 1-5). IEEE.
[8] Sinjari, K., Alzahrani, S., **Lawson, R.**, & Mitra, J. (2021, November). Reactive Power Compensation in a Microgrid Coupled to Electrical Vehicles. In 2021 North American Power Symposium (NAPS) (pp. 1-6). IEEE.

CONFERENCE PRESENTATIONS

[1] "Design of a gas distributor for a pressurized fluidized bed heat exchanger", **R. Lawson**, K. Cook, National Renewable Energy Laboratory SULI Poster Conference, Golden, CO, 2022.
[2] "Partial Differential Equations that Model Cancer Tumor Cell Growth", **R. Lawson**, S. Yao, Ohio State University Young Mathematician Conference, Columbus, OH, Aug 20-22, 2021.

INVITED TALKS

[1] "Sickening: Understanding Nausea Induction Mechanisms", Universidad del Valle de Guatemala, Guatemala City, Guatemala, Oct 6, 2026.