Elyssa M. Penson

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EDUCATION

PhD **Boston University** (in progress)
Third-Year PhD Student in Mechanical Engineering

B.S. **Bucknell University** (2017-2021)
Mechanical Engineering with a Minor in Physics
Passed Fundamentals of Engineering Exam (EIT) – Dec. 2022

RESEARCH/WORK EXPERIENCE

Graduate Research Assistant, Boston University, Computational Energy Laboratory (CEL) (January 2024 – present)

- Simulated metal electrodeposition, including ionic transport and kinetics, using the smoothed particle hydrodynamics (SPH) module within LAMMPS (Large-scale Atomic/Molecular Massively Parallel Simulator)
- Studied the effects of operating and material parameters on dendrite growth
- Worked with Dr. Sharon's group at the Hebrew University of Jerusalem to quantitatively analyze dendrite structure to validate computational electrodeposition with experimental results

ENERGIZE NSF Graduate Research Trainee (March 2025 – present)

- Participated in a traineeship focusing on computational, experimental, and data science methods for materials science research related to energy storage and conversion.

247th Electrochemical Society Meeting (May 2025)

- Presented at Whittingham Young Investigator and Student Slam

Oliver Fire Protection and Security: Fire Protection Designer (June 2021 - May 2023)

- Used AutoCAD to design fire protection systems for both residential and commercial buildings
- Performed hydraulic calculations to determine pressure loss
- Regularly participated in meetings for the Society of Fire Protection Engineers (SFPE)

Clare Boothe Luce Undergraduate Research Scholar (2019, 2020)

- Participated in the Clare Boothe Luce program at Bucknell University, which consisted of:
  - Summer research with the mechanical engineering department
  - Research presentations
  - Academic discussions with fellow women in STEM

Bucknell University Mechanics and Modeling of Orthopedic Tissues (MMOT) Lab

- Developed protocol for testing organogel polymers in biaxial tension
- Characterized the mechanical properties of the polymers for comparison to those of biological tissue
- Optimized methods for digital image correlation at high strain rates (+100%)

PUBLICATIONS

- E. Penson, I. Bar-Lev, N. Jacobs, D. Sharon, E.M. Ryan. Quantitative Experimental and Computational Analysis of Dendritic Metal Electrodeposition. (under review)
- M. Morey, E. Penson, E.M. Ryan. Simulating the Complexity of Electrochemistry and Electrodeposition Using Smoothed Particle Hydrodynamics. (under review)

LEADERSHIP AND OTHER EXPERIENCE

Bucknell University American Society of Mechanical Engineers (ASME): President (2020), Vice President (2019), Secretary (2018)

- Met with chapter advisor to discuss goals and plans for the organization
- Organized several events, such as design challenges and faculty/student research presentations

Bucknell University Engineering Makerspace: Student Technician (2017-2020)

- Assisted students in using equipment in an engineering makerspace, such as laser cutters and 3D printers

Bucknell University Senior Design Project (2020-2021)

- Worked on a team with 3 other students to design a hydraulic fluid test system

Bucknell University Design Project: Micro-hydro Energy Conversion System (2021)

- Worked on a team to design a water turbine and housing, which converted kinetic and potential energy to mechanical work in an open channel system (a 1-ft flume)

Bucknell Women's Cross County and Track, NCAA Division 1 (2017-2021)

HONORS AND AWARDS

International Gas Turbine Institute ASME Scholarship (2019, 2020)
John and Elsa Gracik ASME Scholarship (2020)
Bucknell Athletics Leadership Institute (2017-2020)
NCAA Student Athlete Advisory Committee (2017-2019)
National Honor Society