Emmett Forrestel

69 Brown St #8161, Providence, RI 02912 | Contact: (716) 420-3890, emmett_forrestel@brown.edu | Portfolio

Brown University, BSC. Electrical Engineering, BA Applied Math, **4.0/4.0 GPA** | **Expected Graduation May 2027**

PROFESSIONAL EXPERIENCE

CERN, *Physics Sensor Systems Research Intern* Geneva, Switzerland | May 2025 – August 2025

- Characterized signal (Z→qq, muon) vs. beam-background clusters in the Future Circular Collider vertex detector, identifying geometry-dependent effects in hit distributions arising from detector design and module overlaps.
- Developed overlap-aware merging and residual filtering algorithms that restored geometric consistency and suppressed low-energy secondaries, improving discrimination of physics signal from background.
- Designed and benchmarked XGBoost-based classifiers under conservative and optimistic sensor readout assumptions, achieving 99% signal retention with up to 91% background rejection for real-time background suppression. Presented at FCC vertex detector R&D workshop at National Institute for Nuclear Physics, Pisa.

PhysicianX, *Machine Learning/Software Engineer* Buffalo, NY | May 2024 – September 2024

- Played an integral role in the go-to-market product team, developing the company platform in JavaScript and SQL, directly aiding in onboarding the first hundred physicians.
- Created web scraping infrastructure in Python utilizing Selenium with OpenAI API calls to create valuable datasets.
- Developed AI-powered Resume and Contract Analyzers in TensorFlow/Pytorch, providing value to graduating residents.

RESEARCH EXPERIENCE

Brown University ACT Lab, *Undergraduate Researcher* Providence, RI | September 2024 – November 2024

- Developing navigation and obstacle avoidance for outdoor flight, eliminating reliance on external localization.
- Integrating with Ultra-Wideband hardware for precise localization and multi-drone formation control.
- Analyzing fluid interactions within coordinated multi-drone systems, improving swarm flight stability.

MIT FCCee Research Program, *Undergraduate Researcher* Boston, MA | January 2025

- Developing existing vertexing algorithms for the Future Circular electron-positron Collider under MIT/CERN faculty.
- Mitigating interference of beam background on hit clustering, and increasing efficiency of particle identification.

RISE Program Boston University, *Researcher* Boston, MA | June 2022 – August 2022

- Developed a machine learning model predicting cancer risk in patients at local Boston hospitals under Dr. Alan Liu.
- Designed and implemented the model using TensorFlow, achieving 90% accurate risk predictions.

PROJECTS

Optimized Stochastic Gradient Descent for Non-convex Systems, C, Python, MatLab | May 2024 – June 2024

- Designed gradient descent algorithm with annealing techniques, optimizing epsilon and temperature parameters for a non-convex optimization problem–mean of 88% and median of 100% success.
- Conducted parameter tuning via a multi-threaded C++ grid search, improving efficiency over MATLAB.

EXTRACURRICULARS

Brown University D1 Track and Field, Providence, RI | August 2023 – May 2025

- Walked onto Brown's Track and Field team beginning in Freshman year. Trained as a hurdler/decathlete.

Brown Debate Society, *Chief Whip* Providence, RI | January 2023 – Present

- Selected debate topics, ensuring a diverse and challenging array of subjects for discussion.

SKILLS & INTERESTS

Technical Skills: Optimization, Kalman Filters, LTSpice, Python, C, Pytorch, Matlab.

Language: Native proficiency in English. Moderate proficiency in Russian, Italian, Latin.

Interests: Classical Piano, Western Canonical Literature, Chess.