Brendan H. Royals

bhr53@cornell.edu | (804) 402-7955 | linkedin.com/in/brendan-royals | New York, NY

Education

Cornell University College of Engineering — Ithaca, NY

Bachelor of Science in Computer Science, Minor in Applied Mathematics — *Aug 2021 – May 2025*

Relevant Coursework: Analysis, Discrete Structures, Statistics, Optimization, Stochastic I, Diff Eq, Lin Alg, Calc II/III, Phys. I/II, Game Theory, OO Prog & Data Structures, Funct Prog, Sys Org, Algorithms, Artif Intelligence, Lang & Info

Honors: Dean's List

Experience

Software Engineer Intern — Jun 2024 – Present

Millennium Management — *New York, NY*

- Built an internal data engine with 17 different endpoints, integrated into existing equity research & trading tools
- Implemented fast data searching with a finite state transducer & inverted index, reducing searching speeds by $40x$
- Utilized K-Dimensional Trees (k-d) for hyper scalable multi dimensional range queries on numerical security fields
- Developed custom modular query allowing for portfolio managers to dynamically query data in avg $< .01$ seconds
- Consolidated existing applications caches into single cache & pipeline, simplifying future modificaitons to datasets
- Awarded 1st place in 2-day trading competition, achieving the highest performance among 60+ interns

Undergraduate Research Assistant — Aug 2024 – Present

Cornell University — *Ithaca, NY*

- Fault-tolerant, scalable, distributed systems in central banking (Bundesbank problem) under *Dr. Ken Birman*

Undergraduate Teaching Assistant — Aug 2022 – Present

Cornell University — *Ithaca, NY*

- Taught CS 4300 (Language and Information) - Spring 2025 under *Dr. Danescu-Niculescu-Mizil*
- Taught CS 3110 (Data Structures and Functional Programming) - Fall 2024 & Spring 2024 under *Dr. Clarkson*
- Taught CS 1998 (Intro to Blockchain) - Fall 2022 under *Dr. Stephens-Davidowitz*
- Developed course material, held office hours, graded exams, and lectured over 600+ students at Cornell University

Machine Learning Engineer Intern — Jun 2023 – Aug 2023

Babylon Micro-Farms — *Richmond, VA*

- Utilized machine learning to achieve image classification to identify whether plants were present in any given image
- Deployed model with 96%+ accuracy in a real world environment, leading to a 25% reduction in energy costs
- Developed visualizer software to streamline creating, modifying and viewing datasets from S3 Buckets
- Built dynamic CLI-based engine to interact with the AWS API to deploy, update, and retrain models real-time
- Created multithreaded algorithm to form testsets by paging & filtering 1.2 million objects over 150 S3 Buckets

Quantitative Trader — Mar 2022 – Jun 2023

Cornell Blockchain — *Ithaca, NY*

- Researched and developed algorithmic trading models, such as Uniswap arbitrage and pairs trading in Python
- Spearheaded engineering effort to optimize current backend infrastructure while allowing for future expansion
- Proposed multithreaded backtesting model in C++ that allowed for virtualization and increased performance
- Built Python script to scrape [chain, address] data from 3,000+ pools to create our teams' initial data pipeline
- Made smart contract optimizations to on-chain trading infrastructure to save 50% on fees while remaining efficient
- Competed in IMC Prosperity 10-day global trading competition with a team of four and placed in the top 5%

Projects

RML OCaml Interpreter | *Node.js, Socket.IO, OCaml, Named pipes* — May 2023

- Implemented interpreter for non-trivial programming language (RML) implemented in OCaml (semantics.pdf)
- Developed a front-end console that allows for direct evaluation and feedback of RML expressions in real time
- Utilized named pipes to establish communication channel between the backend and independent OCaml interpreter

TCP-Lite | *C++, Linux Sockets* — Feb 2021

- Developed scalable server and client solution to securely process users' requests using sockets, threading, and SSL
- Provided modular foundation allowing developers to easily hook client events (connect, disconnect, security packet)
- Provided robust client interface & implemented authenticated client class with example authentication