ETHAN HERSCH

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An innovative problem solver and researcher driven to apply a unique blend of analytical thinking and creative problem-solving to deliver software solutions for emerging challenges. Skilled in full-stack development, machine learning research, team collaboration, and teaching.

EDUCATION

Cornell University, *B.A. in Mathematics and Computer Science (Double Major)* | GPA: 3.92 May 2026

- Coursework: Data Structures, Functional Programming, Computer Systems Programming, Machine Learning, Algorithms, Linear Algebra, Multivariable Calculus, Discrete Math, Real Analysis, Probability Theory, Applicable Algebra.

RESEARCH & TEACHING

Cornell University Scientific Computing Group, *Machine Learning Researcher* September 2023 - Present

- Explore Bayesian optimization, an accelerated metric to optimize expensive functions, with Professor David Bindel.
- Identify multi-fidelity Bayesian optimization and find its applications to stellarator optimization in nuclear fusion.
- Engineer an optimization framework from scratch employing numerical methods for fast and stable modeling predictions.
- Engage in literature review and derivation of mathematical foundations; prepare for co-authorship of paper.

Cornell Bowers CIS, *Teaching Assistant (CS 3410 Computer System Programming)* August 2023 - Present

- Facilitate a course in digital logic, operating systems, C programming, and computer architecture for 300 students.
- Conduct office hours, teach weekly recitation section, create and lead exam review sessions, and design projects.
- Nominated for Cornell Outstanding Computing & Information Science Teaching Assistant Award.

PROFESSIONAL EXPERIENCE

McDonald's Corporation, *Software Development Engineering Intern* | Chicago, IL June 2024 - August 2024

- Design distributed storage, index, and query systems that are scalable, fault-tolerant, low cost, and easy to manage.
- Create solutions to run predictions on distributed systems with exposure to technologies at large scale and high speed.
- Build full-stack technology (with front-end, API, database development) for 63M+ customers daily across 40K+ stores.

Accenture, *Elevate to Innovate Extern* | Remote May 2024

- Invited to attend Accenture's professional development program focused on leadership in technology solutions.
- Participated in workshops on leveraging data analytics and generative AI to address real-world business challenges.

Cornell Trading Competition | Cornell Tech October 2023

- Selected from 800 applicants to compete in a quantitative trading hackathon sponsored by the Cornell Quant Fund.
- Leveraged Python (Pandas) to allocate a market-neutral portfolio utilizing a momentum model weighted by mean reversion over the past week.
- Tested on a $100,000 portfolio of 25 stocks over a random period. Yielded $140,000 profit after 8 years; placed 4th of 40.

PROJECTS

Kaggle Heart Disease Classification | Python (NumPy, Sklearn) May 2024

- Developed a logistic regression model to predict heart disease given patients' age, sex, blood pressure, cholesterol, etc.
- Selected and normalized features, encoded variables, and identified significant predictors to enhance interpretability.
- Split data into training and testing sets to avoid overfitting; leveraged Sklearn to achieve a 96% testing accuracy, highlighting the model's effectiveness in confidently identifying patients at risk and surpassing a 92% competition benchmark.

Bayesian Optimization Framework | Julia January 2024 - March 2024

- Engineered an advanced framework efficiently approximating maxima and minima of complex functions within seconds.
- Implemented (EI, POI, UCB, LCB) acquisition functions and kernels (SE, Periodic, Exponential, Matern) from scratch.
- Leveraged Cholesky decomposition and Schur complement updates for efficient and numerically stable computations.

RISC-V Interpreter & Processor | C, Logisim (circuit designer and simulator) November 2023

- Programmed a RISC-V interpreter in C, executing RISC-V assembly. Simulated a single-cycle processor in Logisim.

Simulated Brokerage | OCaml February 2023 - May 2023

- Built a stock order management system and portfolio viewing tool using the Black-Scholes model to price options.
- Integrated the polygon.io API to ensure real-time stock data, resulting in 100% data accuracy with under 200ms response.
- Developed a randomized OUnit test suit with QCheck and Bisect to ensure 100% testing coverage.

Cornell Solar Boat Dashboard | JavaScript, Python (Matplotlib), MongoDB January 2023 - February 2023

- Pioneered team's data visualization using JavaScript to parse JSON files with motor's current and voltage readings.
- Accessed live data from MongoDB and Postman backend using HttpGet request; graphed data with Python Matplotlib.

LANGUAGES/FRAMEWORKS & TOOLS

Fluent Java, Python, OCaml. **Familiar** Julia, C, JavaScript (React.js).

Tools Git/GitHub, Unix, VS Code, JupyterLab.