

Education

- **Massachusetts Institute of Technology** Cambridge, MA
Master of Engineering, Computer Science & Cognitive Science Feb 2024 – May 2025
 - Trying to understand how and why deep neural nets work.
- **Massachusetts Institute of Technology** Cambridge, MA
Bachelor of Science, Computer Science & Cognitive Science Sep 2021 – Dec 2023
 - Coursework: Algorithms I & II, Machine Learning, Deep Learning, Linear Algebra, Programming, Neural Computation, Probability & Random Variables, Computational Cogsci, AI Ethics, Game Theory
 - GPA: 4.9/5.0

Experience

- **Cleanlab** San Francisco, CA
Incoming Machine Learning Engineering Intern Jan 2024 – Feb 2024
 - Working on the data-centric side of ML and its impact on LLM & transformer performance.
- **Numenta** Redwood City, CA
Software/Machine Learning Engineering Intern May 2023 – Aug 2023
 - Led research and implementation of novel parameter efficient fine-tuning methods for Large Language Models to meet strict customer and hardware constraints while maintaining high performance.
 - Wrote code to support efficient sparse neural networks, including finding bugs in previously written and widely distributed third party code. Resulted in improved speed and memory usage.
 - Rigorously reviewed transformer literature to ensure alignment with SOTA methods and best practices.
- **MIT Computer Science and AI Laboratory** Cambridge, MA
Research Scientist Dec 2021 – May 2023
 - **LLMs & Planning (NeurIPS FMDM '22)**: Studied the planning capabilities of LLMs. Established a benchmark and designed a codebase with which to test and improve the planning performance of LLMs. Wrote high performance code with strict testing and formatting standards. Published peer-reviewed paper.
 - **Problem Solving with ML (PNAS '22)**: Designed a state-of-the-art math question answering system using LLMs, embeddings, and KNN. Optimized results with prompt engineering and clustering techniques. Wrote code that significantly reduced manual labor costs. Published peer-reviewed paper.

Selected Work

- **Sparsity in Transformers** (github.com/reeceshuttle/958)
 - Measured the sparsity of weights and attention scores across several SOTA LLMs.
 - Initial findings indicate transformers are very sparse. Final conclusions TBD.
- **Bias in BERT Models** (github.com/reeceshuttle/63950)
 - Examined bias in BERT models and used finetuning with a novel loss function to try to reduce bias.
- **MIT Pokerbots** (github.com/reeceshuttle/poker-bot)
 - Placed in the top 10% of entries in 2023 MIT Pokerbots competition and awarded a cash prize.
 - Approach used a combination of game theory, simulations, and learned heuristics.
- **Gabor filter-constrained CNNs** (github.com/samacqua/gabor-constrained-nns)
 - Trained unique Convolutional Neural Networks by seeking inspiration from the human brain.
- **PyTorch, but in NumPy** (github.com/reeceshuttle/numpytorch)
 - Implemented basic PyTorch functionality from scratch using only NumPy arrays. Neural networks converge and perform well on non-trivial problems.

Technical Skills

- **Languages**: Python, JavaScript, C, C++, HTML/CSS, Julia, LaTeX, PDDL, RISC-V
- **Tools**: PyTorch, TensorFlow, Git, Docker, Adobe XD, WandB, OpenAI API, PyTorch Lightning
- **Concepts**: Transformer/LLM architecture, GPU training, Hyperparameter tuning

Activities & Interests

- **Varsity Cross Country and Track & Field**: NCAA DIII National Champions, Academic All-Conference
- **Interests**: AI, neuroscience, reading, hiking, aviation, space flight, history