Varun Vejalla

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Education

University of Virginia, Charlottesville, VA **August 2021 – December 2025**
Combined Masters and Bachelor of Arts
MS in Computer Science · BA in Computer Science and Math with a minor in Philosophy

- **GPA:** 4.0/4.0 (MS), 3.8/4.0 (BA)
- **Relevant coursework:** Software Analysis, Signal Processing, Economics of Distributed Systems, Graph Machine Learning, Manifold Learning, Learning in Robotics, Multi-Robot Navigation, Cryptography, Stochastic Processes
- **Awards:** 2022 and 2025 Putnam Prizes (top 500 in the Putnam Mathematical Competitions), 7th place in the 2024-25 regional International Collegiate Programming Contest, Dean's List

Technical Skills

Languages/Tools Python, TypeScript, Java, C/C++, SQL, React, PyTorch, Git, Linux/Bash, JUnit, Docker, MATLAB
Concepts Machine Learning, Optimization, Distributed Systems, Signal Processing, Software Engineering

Experience

Researcher in Cryptoeconomics · UVA **January 2025 – December 2025**

- Researched economic mechanisms in decentralized systems, focusing on selfish mining attacks in Bitcoin
- Used techniques from stochastic processes and game theory to identify vulnerabilities

Teaching Assistant for Advanced Algorithms and Discrete Math and Theory II · UVA **August 2022 – December 2025**

- Work closely with instructors and other TAs to develop lesson plans aligning with course objectives
- Lead class lectures for over 100 students when needed

Information Security Intern · Q2 Software **May 2024 – August 2024**

- Created an internal chatbot for security and compliance using TypeScript, Python, and the GPT-4 model
- Developed script to automatically parse and integrate internal security policies into the chatbot's knowledge base
- Used tools like Splunk and Tenable to identify and remediate vulnerabilities across the organization

Researcher in Theoretical Computer Science · UVA **May 2024 – December 2024**

- Independently led research on the number of noisy comparisons needed to sort a list with given error probability
- Conducted literature reviews and developed models to analyze bounds on sorting with noise

Research Assistant in the Security and Research Group · UVA **May 2023 – January 2024**

- Audited large language models for biases in their responses to queries regarding demographic stereotypes
- Verified robustness of results by using logically equivalent queries to check if they elicited similar biases

Machine Learning Research Assistant · UVA **January 2022 – June 2022**

- Researched neural variations of algorithms for solving the bandit problem, a key topic in recommendation systems
- Designed experiments to evaluate and tune the performance of the neural algorithms using Python and PyTorch

Projects

Topological Polyhedron Editor **Work in Progress**

- Building an interactive tool for creating and editing polyhedral structures using TypeScript, React, Three.js
- Implemented a topology and geometry pipeline to project edits onto feasible geometric configurations
- Supports a variety of cost functions and constraints
- Meant mainly to be a tool to identify simpler polyhedra that are "monostable" (stable on only one face)

Battlecode 2025 and 2026

- Created autonomous player strategies in Java and Python for MIT's international AI battle programming competition
- Qualified for finals and placed 7th (2026) and 13th (2025) overall, outperforming hundreds of teams around the world

Dynamic Cost Learning

- Built inverse reinforcement learning framework to learn private cost functions of bounded-rational agents in multi-agent dynamic games
- Jointly trained policy, cost, and dynamics neural networks in PyTorch to capture stochastic agent behavior
- Demonstrated effectiveness on model of multi-agent collision avoidance, showing accurate recovery of cost functions