Cyril Sharma

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Education

Purdue University – Double Major in Computer Science and Mathematics *Expected 2025*
- Reinforcement Learning Researcher, **Dean's List Scholar** | **GPA: 3.97** | **SAT: 1590**
- **Courses:** Data Structures and Algorithms, Computer Architecture, C Programming, Object Oriented Programming, Discrete Math

Thomas Jefferson High School for Science and Technology *Aug 2018 - May 2022*
- Software engineer for Aviation, Rocketry, and Satellite engineering teams
- **Courses:** Concrete Mathematics, Quantum Physics, Differential Equations, Multi-variable Calculus, AP Physics, AP BC Calculus, AP Computer Science, Object Oriented Programming

Technical Skills

Languages   Rust, Python (PyTorch, Tensorflow, NumPy, Scikit-learn...), C/C++, Web (JavaScript, Typescript, React), Java, Matlab/Simulink

Miscellaneous   Linux, Shell (Bash/Zsh), Git, High Performance Computing, Quantum Computing, CAD, 3D Printing, PCB Design

Certifications

Coursera Discrete Optimization, **Coursera Reinforcement Learning Specialization**, **CS50 AI: Artificial Intelligence w/ Python (EDX)**, **CS50: Introduction to Computer Science**, **MATLAB Associate Certification (Mathworks)**

Experience

National Institute of Health – Software Engineering Intern *June 2023 - August 2023*
- Automated testing for NIH's Recruitment Management Software using Studio and Orchestrator to improve the software's resiliency, while also accelerating the development cycle.
- Wrote a library for automated testing of different categories of users and usecases.

Purdue University – Cloud Computing Researcher *Sept 2022 - Dec 2022*
- Cloud computing revolves around deciding which servers should service which jobs, based on resource demands, latency, reliability, and many other metrics. My group's work focused on applying multi-agent reinforcement learning to the task to improve on the algorithms in place today.
- I built a cloud computing simulator in python, and used python-mips to implement a current state of the art solution: Meta's MIPS solver.

Dartmouth Health – Machine Learning Engineer *June 2022 - Dec 2022*
- Diagnosing tumors, risk of metastasis, and other diseases can be difficult with just image data. RNA expression data is better, but more costly. My group used machine learning to bridge this gap, by inferring RNA expression from image data.
- I used Mask-RCNNs to do cell location and classification. The cells were placed into a radius graph, which was processed with Graph Neural Networks using the pytorch-geometric library. I employed High-Performance Computing to run training jobs efficiently. I published one of the first papers in the field of RNA imputation.
- **Publication: Inferring Spatially Resolved Transcriptomics from Whole Slide Images**

Projects and Awards

Compilers *July 2023 - August 2023*
- **Github**. A C Compiler I wrote to teach myself how compilers work. It uses Lalrpop for Parsing. I implemented Typechecking, IR-Translation, IR-Lowering, Optimal Tree-Tiling Instruction Selection, and Graph-Coloring based Register Allocation to bring it all the way down to ASM. Built in Rust.
- **Github**. A Compiler which generates Lexers. I implemented a lexer, recursive descent parser, and an NFA to DFA conversion algorithm to transform a Flex-like Regex specification into an efficient DFA-based Lexer. Built in Rust.

MIT Battlecode – **Ranked 5th place overall out of 500 teams** *Jan 2023 - Feb 2023*
- **MIT's premier AI competition**. Contestants must compete against hundreds of teams internationally to win.
- I used optimized pathfinding, communication, and swarming algorithms to achieve a top position.

Classiq Quantum Computing Competition – **Ranked 1st place for the under 18 category** *May 2022 - June 2022*
- **The Classiq Quantum Computing Competition** challenges participants to implement efficient quantum algorithms to a set of problems. Participants are ranked on the efficiency of their solutions.
- I used IBM Quantum notebooks to implement Grover's algorithm and to simulate Hamiltonian's.
- **Ranked 1st place for the under 18 category, and third place overall and an honorable mention for two problems.**

TJ Hackathon – **Won best website overall.** *April 2022*
- This Hackathon challenges participants to build a functional piece of software within just one day.
- I used React, Express.js, Typescript, and MongoDB to create a **website** which converts Github repositories into publicly accessible courses, complete with questions, quizzes, markdown support, etc.

Kaggle Connect X – **Ranked within the top 40 submissions.** *May 2021 - July 2021*
- This competition challenges participants to create competitive Connect 4 AI using reinforcement learning.
- I used TensorFlow and C++ to implement the **Alphazero Algorithm** - a novel reinforcement learning technique which uses self-play and a Monte-Carlo Tree search to achieve super human performance.

Physics Visualizer *Oct 2021 - Nov 2021*
- Created a website that provides intuition for physics in an animated and interactive way.
- I used React, JavaScript, P5.js, and Matter.js. **Physics Visualizer**.