

Vivaan Singhvi

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EDUCATION

University of Michigan | Ann Arbor, MI

August 2024 – May 2026

- Bachelor of Science in Engineering (Computer Science), 4.0/4.0 GPA
- Relevant Coursework: Foundations of LLMs, Introduction to Machine Learning, Applied Parallel Programming with GPUs, Introduction to Operating Systems, Introduction to Computer Organization
- Peer Advisor for Michigan Research and Discovery Scholars, Instructional Aide for EECS 482: Introduction to Operating Systems, member of the software team of Michigan RoboSub

SELECT EXPERIENCE

Robust Adversarial Patch Generation | Oak Ridge National Laboratory

May 2025 – August 2025

- Researched dozens of 3D reconstruction algorithms, including variations on NeRFs and Gaussian Splatting, running tests on several to select the most optimal method
- Built an automated mesh processing pipeline using 2D Gaussian Splatting, PyMeshLab, and neural mesh parameterization, handling meshes with over 5 million vertices
- Created an attack algorithm in PyTorch against YOLO object detection models using automatically generated 3D models, achieving a 75% attack success rate for physically printed adversarial patches

Phylogenetic Reconstruction Optimization | University of Michigan

Sept. 2024 – Sept. 2025

- Applied algorithm design and optimization techniques to phylogenetic reconstruction for digital evolution, achieving over a 100-fold speedup and significantly better asymptotic complexity
- Rigorously benchmarked the algorithm, quantifying performance and ensuring fair comparisons
- Published and presented a paper on the work at the ALIFE 2025 conference in Kyoto, Japan

Adversarial Image Detection | Oak Ridge National Laboratory

June 2024 – July 2024

- Applied knowledge of signal processing and deep learning to create an adversarial image detector, able to detect basic adversarial images against computer vision models with over 99% accuracy
- Prototyped a novel digital attack completely invisible to the human eye, robust to transformation
- Presented work in front of about 30 people in a 5-minute lightning talk format

SELECT PROJECTS

CUDA CNN Optimization | Course: Applied GPU Programming | CUDA, C++

2025

- Created a novel 2D convolution algorithm and implemented it in CUDA using Tensor Cores and other GPU features, beating the previous class record's performance by 25%

LLM Interpretability | Course: Foundations of LLMs | Python, PyTorch

2025

- Implemented dictionary learning algorithms with Sparse Autoencoders on Large Language Models
- Collaborated with two group members to deliver a written report and a poster presentation

Bluetooth Wearable Mouse | Self-Guided | C, nRF5 SDK

Present

- Programmed bare-metal firmware utilizing the nRF5 BLE stack to make a low-latency bluetooth mouse
- Utilized 4 gyroscopes from BMI270 and LSM6DS-family IMUs to support a dozen unique gestures
- Integrating deep learning algorithms on-chip for real-time air-writing recognition

SKILLS

Programming Languages: Python, C, C++, CUDA, JavaScript/TypeScript, HTML/CSS, SQL

Libraries: PyTorch, Tensorflow, OpenCV, Scikit-Learn, NumPy, Pandas, React, WebSockets