Donovan Sproule

das2313@columbia.edu | +1 562-673-2654 | Github: dsproule

EDUCATION

Columbia University, The Fu Foundation School of Engineering and Applied Science.

Masters of Science – Computer Engineering Sep 2025 – May 2026

Bachelor of Science – Computer Engineering Sep 2023 – May 2025

Relevant Coursework: Operating Systems, Circuit Analysis, Data Structures & Algorithms, Python Abstractions, Embedded Systems, Electronic Circuit Design, Object Oriented Programming, Computational Theory, Introduction to Databases, System on Chip Platforms, Neural Networks & Deep Learning, GPU Heterogeneous Computing, Computer Architecture, Computer Networks, Embedded Scalable Platforms, **TA for Embedded Systems (**Prof. Stephen Edwards)

ENGINEERING EXPERIENCE

Hardware Technologies Intern – Applied ML/ASIC May 2025 – Aug 2025

Apple, San Diego California

- Analyze VLSI schematics to construct machine learning models that predict circuit behavior for engineers

Undergraduate Researcher – Software Engineer May 2024 – May 2025

Robotics and Rehabilitation Lab (ROAR Lab), Columbia University

- Developed and designed Augmented Reality (AR) experiments used to gather postural data for machine learning models training robotic postural assistance to wheelchair-disabled patients. Experiments are used across the lab.
- Constructed new networking based methodology to synchronize within existing, robotics application
- Presented to, mentored and trained PhD colleagues on applications of AR systems in their lines of research.
- Reported weekly on findings to the principal investigator. Designed independent workplan and research goals.

Publication scheduled for submission in August 2025

Undergraduate Research Assistant – Kernel Developer May 2024 – Aug 2024

Systems Lab, Columbia University

- Updated existing custom hypervisor framework to conform to linux kernel 6.1 from the previous 5.15 version, facilitating security of virtual machine/host data from a compromising attacker.
- Independently reconciled changes made to original 5.15 kernel for the implementation of specifications detailed in HypSec 2019 paper with the documented changes in the official 6.x kernel release changelogs.

PERSONAL PROJECTS

GPU Dense, Large-Scale Pathfinder Algorithm

- Created GPU acceleration algorithm to beat serial shortest pathfinding algorithms in large, interconnected graphs
- Incorporated mixture of tiling, synchronization techniques and GPU memory hierarchy to maximize performance
- Tools used: CUDA, Python, Numpy, Nsight

hls4ml Surrogate Graph Model Randomized Quantizable Neural Network Dataset Generator (Open Source)

- Designed python framework to automate configurable, dataset generation for hls4ml graph-neural network
- Held weekly meetings with mentor at Fermi Labs to contribute within larger paper submitted to conference
- Tools used: Python, Qkeras, Keras, multithreading

Manuscript submitted for publication

Priority Based Low Latency Process Scheduler

- Developed a custom process scheduling class beating the Linux default by optimizing resource usage for estimated task completion time of processes.
- Tools used: Linux, C, Scheduler Design, Multiprocessing Synchronization Techniques

Residual Attention Network Image Classifier

- Researched and implemented architecture of custom state-of-the-art CNN based on research paper
- Leveraged existing architectures to create deeper model achieving test accuracy of about 80%
- Tools used: Tensorflow, Python, ResNeXt architecture, Inception Architecture

Networking Blockchain Implementation

- Created simplified bitcoin implementation of distributed blockchain facilitated by python-networking
- Tools used: Python, Sockets, TCP

Full-Stack Stock-based Trading Application

- Created a stock trading application to simulate user trading. Allowed for visualization and analysis of profits
- Utilized real data using an API for the markets. Automated the generation of user data for testing.
- Tools used: Flask, HTML, Python, CSS, PostgreSQL