# Gavin Vasandani

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## Education

**Imperial College London, Master of Engineering, Computer Engineering** **Oct 2021 - Jun 2025**

- Combined degree in Department of Electrical Engineering and Department of Computing.
- Achieved First-Class Honours (equivalent to 4.0 GPA) in 1st and 2nd year.
- Relevant Modules: Discrete Math, Instruction Architectures and Compilers, System Performance Engineering

## Professional & Research Experience

**AMD (Advanced Micro Devices) Inc.**, *Software and Hardware Engineering Intern* **Jun 2023 – Sept 2023**

- Intern in the Platform IP team within AMD's Adaptive and Embedded Computing Group.
- *Project 1*: Created SystemVerilog and C++ testbenches to verify CMS Subsystem IP, responsible for monitoring AMD Xilinx's Alveo acceleration card performance.
- Verified IP on 5 major simulators (XSim, VSA, Riviera) and committed on Vivado 2023.2.
- *Project 2:* Developed a 16-bit CRC, an error-detecting program, on C++ to implement on the CMS Subsystem.
- *Project 3:* Developed and deployed a script to generate randomized hardware configuration files from a YAML parameter file for the CMS Subsystem, accelerating time to reach complete functional coverage.

**Provise Cybersecurity Firm,** *Software Engineering Intern* **Jun 2022 – Oct 2022**

- *Project 1:* Built inhouse tools using Bash to automate build processes. Summarized status of builds and created pipeline to notify engineers involved.
- *Project 2:* Created custom memory allocator and profiler in C++ to analyze suspicious memory changes due to malware.
- Tools helped evaluate cybersecurity threats for major telecom, banking, and energy firms.

**Jane Street IN FOCUS**, *Software Engineering Track* **Apr 2022 – May 2022**

- *Project 1:* Learned functional programming using OCaml and developed backend for a snake game.
- *Project 2:* Created a trading bot in C++ that exploits discrepancies in the price of an ADR pair. Determined ADR's fair value through moving average. Achieved 6th in Jane Street's Electronic Trading Competition.

**Institute of Photonic Sciences, Quantum Computing and Engineering**, *Student Research Intern* **Jun 2019 – Aug 2019**

- Selected as a student researcher from the Middle East for the Barcelona International Youth Science Competition.
- *Project 1:* Conducted an experiment to validate the BB84 quantum key distribution protocol. Directed a laser through polarizers with confidential orientations shared only between the sender and receiver and created a decryption program in C to decrypt the incoming light signals.

**NASA Wallops Flight Center, Satellite Projects,** *Student Research Intern* **Jun 2018 – Sept 2018**

- Synthesized a nitrogen-doped double-walled carbon nanotube epoxy resin for radiation shielding in manned spaceflight.
- Project was selected by Cubes in Space & NASA and launched on their RB-4 research satellite from NASA Wallops Flight Center, Virginia, USA to higher Earth Orbit.

## Projects

**RISC-V Processor (SystemVerilog, C++)**

- Designed a RISC-V processor with its complete instruction set architecture and improved processor efficiency by implementing 5-stage pipelining and 2-way associative cache with LRU replacement.

**C90 to RISCV Assembly Compiler (C, Assembly)**

- Developed C90 to RISCV compiler with support for arrays, recursion, and floating-point arithmetic.
- Improved memory allocation with static memory analysis and added a stack simulator for RISC-V memory emulation.
- Created scripts for automated testing and an AST visualizer for debugging.
- Passed 90% of testcases.

**C++ Trading Platform (C++, Asio, Bash)**

- Developed a multi-client, server trading platform using Asio Networking Library with custom memory management.
- Created and hosted price-time priority orderbook with pro-rata matching.
- Simulated market liquidity by creating market maker bots to provide buy and sell orders.

**Self-balancing 2-Wheeled Autonomous Rover (C, JavaScript w/ Node.js)**

- Developed multithreaded C++ program on ESP32 dual-core microcontroller to retrieve sensor data and predict motor movement in parallel.
- Implemented software interrupts and ISR's for immediate motor movements in response to sensor readings, enabling real-time self-balancing.
- Developed a 'mission control' web app using Node.js and hosted on AWS with real-time updating of rover movements.

## Programming Languages

**Advanced in** C++, SystemVerilog, Bash, MATLAB, Swift. **Intermediate in** OCaml, Python, SQL.
**Tools:** GDB, Valgrind, Cppcheck, Viper
**Technologies:** Git, Docker, Perforce, JIRA, Confluence, Swarm, AWS