Nathan Abebe

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Education

Yale University — New Haven, CT
B.S. Computer Science, B.S. Electrical Engineering (ABET) | 3.84/4.00 — May 2028
- Computer Architecture, Computer Networks, Game Engines, Algorithms, Computer Systems, Data Structures

Experience

Computer Graphics Group (Yale University) — Jul 2025 – Present
Performance Engineering Researcher | Advisor: Dr. Mike Shah — Part-time, New Haven, CT
- Implemented multithreaded Wavefront parser with SIMD, outperforming industry-standard parser speeds by 9x.
- Delivered 500× speedup over baseline by profiling and optimizing critical code paths over semester-long sprint.
- **Publication:** Coming soon.

Yale School of Engineering and Applied Science — Aug 2025 – Present
Teaching Assistant | Computer Systems — Part-time, New Haven, CT
- Supported 120+ undergraduate students by holding weekly office hours on systems programming fundamentals.

Efficient Computing Lab (Yale University) — Jun 2025 – Aug 2025
Systems Engineering Researcher | Advisor: Prof. Lin Zhong — Full-time, New Haven, CT
- Accomplished 80% reduction in development time by engineering a virtual file system for multi-FPGA control, validated by DECONET/HELIOS, a production-grade distributed quantum error code decoder.
- Developed distributed network for server-FPGA communication with custom UDP/TCP protocols, achieving 100% critical packet delivery and less than 1 minute end-to-end time for remote FPGA configuration.

Student Technology Collaborative (Yale University) — Oct 2024 – May 2025
Hardware Specialist — Part-time, New Haven, CT
- Diagnosed and repaired 40+ Windows, MacOS, and Linux-based laptops for students on campus.

Projects

Rocket Flight Computer – Yale Project Liquid | *Rust, Real-Time Systems, Radio Comm.* — Jul 2025 – Present
- Developed time-division multiplexed radio protocol with CRCs & ACKs achieving sub-100ms end-to-end latency.

Quark – 2D Game Engine | *Dlang, ECS Architecture, SDL, GTK* — Oct 2025 – Dec 2025
- Architected a 10k+ LoC parallelized 2D game engine with an entity-component system and event handlers.
- Implemented an interpreter for QScript: a specialized scripting language for use within the engine.
- Created applications on top of the engine, including a tilemap editor and various demo games.

Rocket EGSE – Yale Project Liquid | *C++, Altium Designer, LTspice, HIL Testing* — Oct 2024 – Dec 2025
- Designed, simulated, fabricated, and tested PCBs for liquid rocket fuel control with Altium Designer and LTspice.

ntraycer – Path-Based Ray Tracer | *Dlang, Path-Based Ray Tracing, Physics, Rendering* — Mar 2025 – Jul 2025
- Engineered a path-based ray tracer entirely from scratch (no library imports) for generating photorealistic images.

nnes – NES Emulator | *Rust, Computer Architecture, Debugging* — Mar 2025 – Jul 2025
- Built 5K+ LoC NES emulator in Rust, down to the various graphical glitches in the NES (plays Donkey Kong!).

TD-QAP – MIT iQuHack D-Wave 1st Place Prize | *Python, Quantum Annealing* — Jan 2025
- Solved the time-dependent quadratic assignment problem for dynamic facility layout optimization.

Technical Skills

Languages: Rust, C, C++, Dlang, Python, Golang, x86 Assembly, TypeScript, JavaScript, C#, SystemVerilog
Tools & Libraries: Git, GDB, Valgrind, Altium Designer, LTspice, SDL, GTK, OpenGL
Embedded: STM32, RTOS, Linux, Yocto, bare-metal, PCB design, FPGA design
Protocols: UDP, TCP, UART, SPI, I^2C, TDMA, CSMA, CRC