Samir Rashid

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Hardcore software engineer experienced in building observable, safe operating systems.

Education

University of California San Diego — *San Diego, CA*

M.S. in CS | Double B.S. Math and Computer Science, Classical Studies Minor | GPA 3.9 — *Sept 2020 - June 2025*

- **M.S. Computer Science** Wireless Embedded & Operating Systems TA, mentor FIRST Robotics team 812
- **Relevant Coursework:** Graduate-Level Operating Systems, Compilers, Virtualization, Networking, Cryptography, Algebra, Analysis

Publications

Thesis (in progress): **Formally Verified Timer Subsystem in Embedded OS**

Tabula Rasa: Starting Safe Stays Safe @ SPICES 2024 (*Best Paper, second author)

Talk: **Provable Security in Embedded Systems: Verification Work in Tock OS** @ OSFC 2024

Talk: **The case for Nix on the home server** @ SCaLE 2024 **5,000 views!**

Inferring Mental Burnout Discourse Across Reddit Communities @ NLP for Positive Impact 2024

Experience

SpaceX — *Sunnyvale, CA*

Software Engineer — *2025 - Current*

Tock Operating System — *San Diego, CA*

Research Software Engineer — *June 2023 - Current*

- Working on **formally verifying** a Rust-based OS to prove memory isolation guarantee can never be violated
- Contributed to networking stack in **Rust** by adding syscalls and designing interfaces to securely run OpenThread on Tock

Viasat — *Carlsbad, CA*

Software Engineering Intern — *June - September 2023*

- Ported **Linux drivers** to latest kernel for software router. Researched kernel changes to update deprecated function calls
- Did bringup of drivers on OpenWRT based OS and debugged issues across the OS and networking stack by using strace and gdb
- Maintain backwards compatibility of new OS by containerizing code with **LXC containers**

Twitter — *Remote*

Quality Engineering Intern — *September - December 2021*

- Designed fault tolerant integration with testing framework that catalogues automated test results for manual testers
- Used Java stream processing to aggregate test results in real time, enabling analytics on historical test results
- Spoke with key stakeholders to design a solution. Worked with multiple teams to ensure solution can be adopted company-wide

Projects

Triton Unmanned Aerial Systems — *C++, Python*

- Collaborated with team to design, build, and fly an unmanned aerial vehicle (UAV). **Placed 5th place internationally** — *Dec 2020 - June 2024*
- Built a 3D real time dynamic path planning system using RRT*. Created model to detect and avoid unknown obstacles
- Developed robust testing framework to simulate and visualize generated paths

Binary Translator RISC-V to ARM — *Rust, Assembly*

- Statically translate arbitrary binaries from subset of the riscv64 to aarch64 ISA, supporting control flow and system calls — *March 2025*

IDE Profiler Visualizer — *Python, Typescript*

- Made VSCode extension which inserts novel performance profiling visualizations into IDE — *November 2023*

Snek Compiler — *Rust, x86*

- Created compiler in Rust from Python subset to x86 assembly with garbage collector and ptrace breakpoint debugger — *June 2023*

IP Networking Stack — *C*

- Implemented IPv4 compatible router in C that can send/receive/forward ARP, ICMP, and IP packets — *April 2023*

Deep Neural Networks from Scratch — *NumPy, PyTorch*

- Wrote IBM machine translation; deep neural network (MLP) **from scratch with no libraries** for CIFAR-10 — *September 2022*
- Used **PyTorch** to implement image captioner (LSTM+CNN) on CoCo; Fine tuned BERT for Alexa intent classification

ACM Attendance Visualizer — *React*

- Created online dashboard for analyzing the organization's event attendance data using **D3, Express, React, PostgreSQL** — *Sept-Dec 2020*

Triton Schedule Scraper — *Python, Tkinter, Selenium WebDriver*

- Created native GUI for Python script that scrapes course schedule with WebDriver to create iCal file — *October 2020*

DIY projects

- Built: Homelab, PCB for wearable, pinball machine, headphones, mechanical keyboard, FPV quadcopter, home lab, analog turntable, trackball (WIP) — design CAD and electronics for ergonomic mouse, air filter — 3D printed and CADed to combat indoor wildfire smoke
- Latin poetry reader (prosody) — Python script uses Text-to-Speech API and morphs audio to match dactylic hexameter rhythm
- Ancient Greek keyboard firmware mod — Custom QMK firmware that natively supports Ancient Greek and its accents

Skills

Languages Python, Java, C, C++, Rust, JavaScript, TypeScript, SystemVerilog, Bash, LaTeX, MATLAB, R, Nix, Haskell, Google Apps Script

Software PyTorch, React, SQL, AWS, Docker, NixOS, Linux, Unity, Onshape, Blender, KiCad, JUnit, Flask, pytest, Jest, GDB, cProfile