

## EDUCATION

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### MASSACHUSETTS INSTITUTE OF TECHNOLOGY (MIT) B.S. MAY 2022, M.ENG JUNE 2023

Electrical Engineering and Computer Science, Concentration in Computer Systems. Minor in Urban Studies. (5.0/5.0 GPA)

- Thesis research with MIT PDOS spanned embedded OSES and formal verification before settling on privilege separation.
- Developed new lab assignments, wrote a draft course reader, and assisted students in programming and cryptography theory concepts as the sole TA for the new 6.1600 Fundamentals of Computer Security.
- Also TA'd for 6.5660/6.858 Computer Systems Security (grad-level) and 6.08 Interconnected Embedded Systems.
- Recognized by department leadership with the Frederick C. Hennie III Award for Excellence in Teaching.
- Exciting coursework includes a Raft-based sharded key/value store in Go (6.5840/6.824 Distributed Systems), an optimizing compiler in Rust (6.035 Computer Language Eng.), implementation and comparison of CPU branch predictor designs (6.823 Computer System Architecture), and a hardware password manager (6.115 Microcomputer Project Lab.).

## EXPERIENCE

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### SEMGREP - SENIOR SOFTWARE ENGINEER AUG. 2023-PRESENT

- Owned majority of backend work in a new fine-grained authorization system based on Google Zanzibar and led the 5-engineer team through a month-long milestone. The system is now on the critical path of every backend request.
- Led an app-wide refactor to transition from implicit database transactions to autocommit, including designing and implementing an API for explicit transaction usage and building monitoring infrastructure for database transactions.
- Inherited a project implementation plan that seemed difficult to maintain, gathered context from previous planners, and proposed an alternative. After documenting the new design and its motivation, re-scoped the project with EMs/PMs.
- Repeatedly attacked unfamiliar problems, becoming a go-to expert on topics from type checkers to database concurrency.

### R2C - SOFTWARE ENGINEERING INTERN, SEMGREP APP JUNE-AUG. 2022

- After working across Semgrep's code, scoped, threat modeled, built, and shipped an automatic SSO registration flow.

### APPLE, INC. - CELLULAR FIRMWARE ENGINEERING INTERN JUNE-AUG. 2021

- Prototyped Python & C software and hardware test framework to improve interdepartmental integration testing.
- Published extensive documentation internally and held training sessions to transition development to full-time engineers.

### KEOLIS COMMUTER SERVICES - FULL STACK ENGINEERING INTERN JUNE-AUG. 2020

- Built a distributed sensing and analysis system to monitor MBTA Commuter Rail locomotives & prevent delays.
- Performed onboard data processing on each locomotive, analyzing engine data and transmitting 10 packets per second via an unreliable network connection. Presented live and historical data in a custom React-based analysis dashboard.

## PROJECTS

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I work on projects that make me happy. See more, like paperback books of my iMessages or a photo shuffler, at benkettle.xyz.

### LITTLEFIXES.XYZ (PERSONAL) WINTER 2024

- Inspired by oversights I noticed in my cities, built a map-based forum to foster discussion of potential improvements.
- Experimented with new tech, with Rust and Axum for the backend and SvelteKit, Leaflet, and Tailwind for the frontend.

### PLAT FIDO2 SECURITY KEY (MASTER'S THESIS) JANUARY 2022-MAY 2023

- Designed a new C- and WebAssembly-based toolchain for privilege separation and used it to implement a security key.
- System includes three privilege domains to isolate complex and bug-prone code from sensitive cryptographic secrets.

## LEADERSHIP

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- **Global Teaching Labs, Ancona, IT:** developed & taught course materials in physics, math, and computer science.
- **Gordon-MIT Engineering Leadership Program:** Improved communication, leadership, and teamwork skills.

## SKILLS

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- **Languages & Technologies:** Python, TypeScript (React, Svelte), Rust, C, Go, OCaml, Verilog
- **Infrastructure:** Kubernetes, AWS (S3, Lambda, EC2, SES), Supabase, Docker Compose, Github Actions, Git