

# Jacob Root

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## EDUCATION

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### University of California - San Diego

San Diego, CA

*Bachelor of Science in Computer Science; Major GPA: 4.0*

*September 2022 – June 2026*

**Coursework:** Systems Programming, Data Structures 1, Software Tools, Introduction to CS

## EXPERIENCE

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### Cloud Networking Developer

October 2023 – Present

*CAIDA*

*San Diego, CA*

- Currently working on creating Reverse Packet Trains in **Rust**

### Cloud Software Engineering-Robotics Application Intern

June 2023 – September 2023

*Braincorp*

*San Diego, CA*

- Implemented and upgraded end to end (cloud to robot) communication layer using **Python**, **gRPC**, and **Golang** to perform actions from the cloud previous possible only in person, saving up to 5 minutes per use for customers
- Revamped Python handling of concurrent threads to increase performance for test suite by over 10 times
- Identified multiple race conditions leading to flaky tests, reduced flake rate from above 33% to under 0.01%
- Integrated **OpenCV** and ML Models with **Bazel** to create image anonymization in Golang with 90% accuracy
- Created test suite and associated CLI to allow evaluation of performance and accuracy of Face Detection models

### Software Engineer Intern

July 2022 – August 2022

*Torpago*

*San Francisco, CA*

- Built Slack bot for Torpago, with features estimated to streamline spend management for 90% of Torpago users
- Wrote login form and **REST API** that bound Slack & Torpago accounts using **PostgreSQL** database and **JWT**
- Developed Golang bindings of Torpago REST API and wrote automated tests for the binding with 80% coverage
- Engineered multiple single-purpose **microservices** which communicated via **CloudEvents**

### Linux Development Intern

June 2021 – August 2021

*IBM*

*Hillsboro, OR*

- Contributed changes in **IBM vnic** driver to **Linux Kernel**
- Coded scripts to isolate, debug, and correct issues with network stability on Virtual Machine
- Merged upstream timeout support for automated tests using **tcpdump** and **Avocado test framework**

### App Development Intern

June 2020 – August 2020

*First Insight EHR*

*Hillsboro, OR*

- Built cross-platform (Android, IOS, Web) video call app that included text chat functionality in **React Native**
- Created extensible components to reduce time required for changes in IOS/Android welcome form app

## PROJECTS

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### MyNewsWire | *NodeJS, MongoDB, OpenAI/GPT3, Google Cloud*

- News aggregator app that uses **GPT3** to concisely summarize news articles fetched from newscatcher API
- Decreased request latency using asynchronous concurrency to parallelize API calls, achieving 4x speedup
- Used **MongoDB** as cache to reduce API calls and costs, and improve performance for cached items by over 2500x
- Managed DevOps; allocating a **VPS**, configuring **nginx** SSL, and implementing best practice secrets management
- Used MongoDB to store API keys for automatic API key rotation, allowing 6x more API calls on free plan

### Operating System | *Rust, QEMU*

- Designed **USTAR file-system** implementation, allowing easy file-transfer between host and guest
- Implemented basic Tetris with levels, score, score saving, and pseudo-random piece generation
- Improved **VGA graphics** rendering by up to 10x by reducing redundant re-draws of pixels
- Collaborated with three other people using Agile methodology to exceed mentor expectations

## AWARDS

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**MHacks 15:** **3rd** out of 62 teams (381 participants) in Hackathon run by UMich. Won award for best use of **MongoDB**

**WIC BPC 2023:** Placed **2nd** out of 60 teams in Programming Competition. Now I am a volunteer problemwriter

## TECHNICAL SKILLS

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**Languages:** Python, Golang, Rust, C++, C, ARM Assembly, Java, Protobuf, Bash

**Frameworks and Libraries:** Pytest, OpenCV, gRPC, Connect-go, React, React Native, Echo, discord.py, JUnit

**Developer Tools:** Bazel, Git, Docker, Systemd, Linux, VS Code, JetBrains IDEs