

Colin Zhang

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Education

University of California, San Diego
Master of Science in Computer Science

San Diego, CA
September 2023 – March 2025

University of Science and Technology of China
Bachelor of Science in Computer Science

Hefei, Anhui, China
September 2019 – June 2023

Work Experience

TikTok

San Jose, CA

C++ Performance Optimization Intern

June 2024 – September 2024

- Implemented custom **Protobuf** parsers for versions 3.21 and 4.26, integrating **Profile-guided Optimization (PGO)** and **unknown field optimizations** to enhance deserialization performance by 20% compared to the legacy parser.
- Designed and developed profile data collection mechanisms, utilizing **Linux perf** and **Google Bloaty** to monitor branch miss rates and identify performance bottlenecks, facilitating targeted optimizations.
- Constructed a comprehensive testing framework with **Google Test** and **Benchmark**, automating test execution and performance analysis to ensure parser reliability and optimized performance.
- Integrated the optimized parsers into multiple core TikTok projects, enabling the efficient utilization of tens of thousands of **CPU cores** and increasing service performance by 5% across large-scale production environments, saving the company significant computational resources.

Suger.io (YC-backed SaaS Startup)

San Francisco, CA (Remote)

Backend Development Intern

December 2022 – March 2023

- Integrated **AWS** account data into the backend database using **Go**, enabling regular synchronizations and data transformations aligned with business logic, thereby enhancing data accuracy for the company's core services.
- Developed an automated **AWS** report parsing tool to extract and import report data into the internal database, facilitating the generation of client-facing reports and addressing diverse client requirements.
- Engineered a comprehensive usage tracking and billing system that handles intricate billing scenarios across diverse **cloud platforms**. Designed data synchronization and transformation processes to maintain billing accuracy and system consistency, addressing multi-platform data challenges.

Bytedance

Shenzhen, China

C++ Software Development Intern

June 2022 – September 2022

- Developed a cross-platform screenshot tool for **Lark** with annotation capabilities and multi-monitor support.
- Decoupled the screenshot process from the main **Lark** application using **C++** and **Chromium's Mojo IPC**, which prevented critical crashes, reduced system lag, and improved overall responsiveness.
- Provided on-call support, resolving over 10 critical bugs related to screenshot functionalities, addressing **cross-platform** compatibility and operating system API issues, thereby enhancing system stability.
- Developed an automated testing framework enabling seamless interaction between **JavaScript** and **C++** codebases using **Google V8**. Designed the framework architecture to streamline test case development and execution, simplifying integration and enhancing testing efficiency for the team.

Selected Development Experience

Mogan (GNU TeXmacs) | [GitHub](#)

Remote

Open Source Contributor

June 2023 – May 2024

- Enhanced drawing functionalities using **C++**, **Scheme**, and **Qt**, fixing over 30 bugs and introducing 15+ new features to improve software functionality and user experience. Most contributions have been merged into the main **GNU TeXmacs** project, benefiting tens of thousands of active users.
- Developed the **Mogan Draw** graphics tool, releasing versions for **Linux** and **WebAssembly (wasm)**. Managed all aspects of UI and feature development, ensuring high usability and performance for hundreds of users.

Technical Skills

Programming Languages: Modern **C++** (14, 17, 20), **C**, **Python**, **Rust**, **Go**, **Java**, **JavaScript**, **HTML5** & **CSS3**, **SQL**

Tools: **Linux**, **Git**, **CMake**, **Bazel**, **PostgreSQL**, **Docker**, **Kubernetes**, **Kafka**, **Redis**, **CI/CD**, **GraphQL**, **NixOS**

Web Technologies: **Node.js**, **Vue**, **React**, **Django**, **Flask**, **Microservices**, **Spring Boot**, **Ruby on Rails**, **MongoDB**

Expertise: **Linux Kernel**, **Computer Architecture**, **Assembly**, **Compiler Design**, **Operating Systems**, **Data Structures**