Alexander Li

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Education

University of Wisconsin – Madison Madison, WI

Bachelor of Science in Computer Science & History *September 2023 - May 2027*

- Relevant Coursework: Algorithms, Data Structures, Linear Algebra, Computer Architecture, Computer Systems

Experience

Software Engineer Co-op June 2025 – Present

MKS Instruments *Rochester, NY*

- Designing a high-performance **embedded** communication gateway on **ARM/Linux** (Raspberry Pi) with dual Ethernet interfaces, consolidating data exchange from 10+ peripheral devices into a single low-latency pipeline and targeting an estimated reduction in command latency from **50 ms to 5 ms.**
- Developing low-level **C/C++** modules for on-device configuration and real-time data handling, moving control logic from host PCs to the embedded gateway to cut setup time by **70%** and eliminate **2,000** lines of code.
- Engineered and deployed a full-stack hardware defect tracking platform (**React, .NET, PostgreSQL, Docker**) that replaced fragmented Excel workflows across multiple sites, centralizing data and improving reliability.
- Developed scalable, **RESTful backend APIs** with **JWT-based security** and **Active Directory** integration, enabling unified access control and reducing manual account management for **5,000 users**.
- Replaced large, lag-prone Excel sheets with a dynamic web form and automated data pipelines, cutting manual entry and page load times by approximately **60%** while improving data accuracy.

Software Engineer Intern June 2024 – Aug. 2024

Wisconsin Athletics *Madison, WI*

- Redesigned and optimized high-traffic pages for *UWBadgers.com* using **jQuery** and **Bootstrap**, cutting average load times by **25%** and improving accessibility for over **100K monthly users**.
- Developed, tested, and deployed secure **REST APIs** in **.NET**, enabling scalable data exchange between frontend applications and multiple third-party services, reducing response latency by **30%**.
- Collaborated in an **Agile** environment, conducting **code reviews**, leading **sprint planning**, and authoring clear **technical documentation**, resulting in smoother onboarding of new developers and faster feature delivery.

Projects

AI Finance Platform | ***Node.js, React, MongoDB, Gemini AI, Stripe***

- Built a full-stack **SaaS** finance app with the **MERN** stack, offering users real-time budget tracking, receipt uploads, and automated financial summaries.
- Implemented secure user authentication with **Passport** and **JWT**, **bcrypt**-hashed credentials, **CORS/Helmet** hardening, and **Zod** validation for input safety.
- Integrated **Gemini AI** via @google/genai to parse receipts and deliver intelligent spending insights using MongoDB aggregations and scheduled tasks with **Node-Cron**.
- Handled file uploads and cloud storage using **Multer** and **Cloudinary** for scalable receipt/image management.
- Visualized income and expense trends with **D3**-powered charts and enabled monetization through **Stripe** subscription billing and Resend for email notifications.

SQLite Clone | ***C***

- Developed a lightweight relational database in C, emulating SQLite's with a custom **B-tree** storage engine.
- Implemented SQL operations like `INSERT`/`SELECT`, cursor traversal, and **node splitting** with **root promotion**.
- Used low-level **POSIX I/O** with **custom pager system** for persistent storage and **4KB** page-based memory.
- Built internal tools (`.btree`, `.constants`) for visual debugging of internal memory structures.

Technical Skills

Languages/Databases/Tools: Java, Python, C, C++, C#, JavaScript, HTML, CSS, PostgreSQL, Git, Docker
Frameworks/Libraries: React, Node.js, Express.js, Bootstrap, TailwindCSS, .NET, jQuery