Thomas Zhang

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Education

University of Waterloo Waterloo, ON

Bachelor of Software Engineering

- Colonel Hugh Heasley Engineering Scholarship **($10,000)**

Technical Skills

Languages: C/C++, Python, Java, C#, SQL, JavaScript/TypeScript, HTML/CSS
Frameworks: FastAPI, Flask, PyTorch, OpenCV, NumPy, Matplotlib, React.js, React Native, Next.js, Node.js, Express.js, TailwindCSS
Tools: Git, GitLab CI/CD, GitHub Actions, Docker, AWS, Celery, Redis, Apache Kafka, Google ADK, Gemini API, Supabase, TimescaleDB, PostgreSQL, SQLite

Experience

Software Developer Jan. 2026 – Present

Watonomous *Waterloo, ON*

- Engineering autonomous rover navigation for a student Mars Rover with A* pathfinding and costmap integration, reducing path computation time by **40%**
- Fine-tuning **YOLOv8** object detection using **ONNX Runtime** with real-time inference for obstacle classification

Software Developer Intern Jun. 2025 – Aug. 2025

Triple J Canada Consulting Inc. *Mississauga, ON*

- Engineered a multi-repo full-stack tax filing platform serving **2,000+** clients and **5,000+** tax returns
- Delivered production **Flask** backend to streamline client data collection, reducing staff preparation work by **>30%**
- Owned database migrations for a live **SQLite** database, transforming existing data with **zero loss or downtime**
- Automated user verification and admin access control, eliminating **20+ hrs/week** of manual onboarding

Projects

TradeStream | *C++, Python, TypeScript, FastAPI, Next.js, Apache Kafka, Redis, TimescaleDB, Docker*

- Architected a real-time market data platform processing **1M+ daily ticks**, delivering **50K+ updates/sec** via **WebSockets** to a user dashboard
- Ran a **C++** analytics microservice with **<100ms** latency at **10K events/sec** using **sliding-windows**
- Designed **Kafka** streaming pipeline for distributed event processing with **fault-tolerant** message delivery
- Implemented hybrid storage with **TimescaleDB** for persistent retention and **Redis** for recent data access

JobFlow | *Next.js, TypeScript, FastAPI, Celery, Redis, Scrapy, Selenium, PostgreSQL, Supabase*

- Engineered a scalable job search and tracking platform with **FastAPI** serving **150+ concurrent users**, leveraging asynchronous processing and real-time updates to centralize career listings
- Implemented web-scraping pipeline with **70%+** hit rate using **Scrapy** with **Playwright** and **rotating proxies**
- Designed **distributed task queue** with **Celery workers**, **Redis pub/sub**, and **WebSocket** broadcasting
- Implemented **JWT**-based authentication and deployed via **Docker Compose** on **Railway**

Study Planner | *Python, Google ADK, Pinecone, Gemini API, Pydantic, PyMuPDF*

- Designed an AI study planner with 6-agent **RAG** architecture using **Google ADK** and **Gemini API** to generate personalized study plans and guides from course textbooks and syllabi
- Implemented generator-critic validation loop, achieving **75%+** retrieval accuracy across curriculum topics
- Utilized parent-child chunking for semantic search via **Pinecone**, optimizing retrieval precision and context
- Optimized performance with embeddings cache and exponential backoff, reducing API calls by **>60%**

Karaoke Generator | *FastAPI, React, Demucs, FFmpeg, yt-dlp, LRClib*

- Built an automated system with **FastAPI** to convert YouTube songs into karaoke videos with a **95%** success rate
- Optimized **FFmpeg** video rendering pipelines, reducing processing latency by **40%** (**<5 min** per song)
- Implemented **Demucs AI** vocals separation and **LRCLib** lyrics synchronization, validating stability via **100+** execution benchmarks
- Delivered within 4 sprints using **Agile methodology** and **GitLab CI/CD**, maintaining **>70%** test coverage