

Matthew (Zekun) Liu

vyknight.github.io | mz.liu@mail.utoronto.ca | (780) 267-2588 | github.com/vyknight | linkedin.com/in/matthewzekunliu

Education

University of Toronto – BSc in Computer Science

Expected Graduation January 2026

Artificial Intelligence Specialist Program, Arts and Science Internship Program, Dean's List Scholar

Key Competencies

JavaScript: (2 YOE) TypeScript, React, Next.js, Express, Prisma, BullMQ, Tailwind, Bootstrap, Chakra, HTML, CSS

Python: (4 YOE) Flask, Django, FastAPI, LangChain, NumPy, Pandas, Matplotlib

Java: (2 YOE) **C/C++:** (1 YOE) **Databases:** Postgres, SQLite, MySQL, redis **Authentication:** JWT, OAuth

DevOps: Docker, Kubernetes, Helm Charts, IBMCloud, LogDNA/Mezmo, NATS, Git, GitHub Actions

Work Experiences

IBM – Full Stack Software Development Intern

Jan 2024 – Aug 2024

- Enhanced and maintained the backend of IBM's educational labs system which sees over 2500 **Kubernetes** environments created everyday, serving over 7 million learners and 150 companies
- Upgraded the **TypeScript NATS** messaging library to improve type safety between microservices and simplify error reporting
- Improved CI/CD processes by engineering a method to build oversized **docker** images on **GitHub Actions** runners, saving the team thousands of dollars by averting the need to self host runners
- Redesigning the **Kubernetes** and **IBMCloud** environment provisioner to improve stability, error handling, and developer experience through modular, type safe design centered around a **BullMQ** job queue and a **redis** cache
- Enhanced IBM's Cloud IDE by linking its integrated databases to an external database manager, reducing database start up failure rate by 90% and start up delay by 70%
- Repaired broken courses that used serverless functions and maintained **IBMCloud** services during significant API changes
- Improved UI/UX for lab applications and tools built using **React**, **Tailwind**, Handlebars.js, **HTML/CSS**, and Jinja2 templates

UNICEF – Project Intern

Sept 2023 – Dec 2023

- Built a reach application to facilitate the assessment and selection of open-source data, models, software, and content collections for UNICEF employees worldwide
- Linked the **React** frontend with a **Django** REST Framework backend, and contributed to database and API design
- Implemented the form feature on the frontend with **Tailwind** and polished UI/UX

Onova – Full Stack Software Development Intern

May 2023 – Dec 2023

- Built an enterprise hackathon management software with **React**, **Next.js**, and **TypeScript**, which was adopted by Capgemini to host an internal Gen AI hackathon with over 1000 participants from around the world
- Built major frontend features such as the judging interface, the user directory, the team interface, and the search bar
- Optimized app performance by implementing pagination, connection pooling, and other improvements
- Owned API and **PostgreSQL** database design for the entire app and migrated the application to use **Prisma** ORM.
- Built a ChatGPT powered poker coach using **React**, **Next.js**, **TypeScript**, and Radix-UI on the frontend; while using **Python**, **FastAPI**, **LangChain**, and OpenAI Functions on the backend
- Conducted independent research and experimentation on AI technologies such as RAG with Pinecone DB, **LangChain**, OpenAI Functions, and OpenAI Threads to improve speed, accuracy, and cost

Projects

ParallelMake

Mar 2023 – Apr 2023

- Programmed a clone of Make in **C** which parallelizes the workload into sub-processes to achieve 30% faster compile times
- Programmed a socket listener to allow commands to be sent remotely from another computer on the same network
- Extended the project by implementing optional GitHub integration for automatically cloning and compiling repositories