Matthew (Zekun) Liu

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Education

❖ **University of Toronto**, Bachelor of Science in Computer Science   January 2026
   Artificial Intelligence Specialist, **Arts and Science Internship Program, Dean's List Scholar**

Key Competencies

➢ **JavaScript:** 2 YOE, TypeScript, React, NextJS, Express, Prisma, Tailwind, Bootstrap, BullMQ

➢ **Python:** 4 YOE, Flask, Django, FastAPI, LangChain, Numpy, pandas **Java:** 2 YOE **C:** 1 YOE

➢ **SQL:** Postgres, SQLite **REDIS, HTML, CSS, Unix, Bash, NATS, Docker, Kubernetes, Helm, OAuth**

➢ **Cloud:** IBMCloud **Language Proficiencies**: French, Chinese.

Work Experiences

IBM – *Full Stack Software Development Intern*   January – August 2024

- Maintained and enhanced the backend of our educational labs system which sees approximately **2500 Kubernetes** environments created everyday. Serving over **7 million** learners and **150** companies.
- Upgraded our **TypeScript NATS** messaging library to improve type compliance between microservices.
- Improved **CI/DI** by creating a method to build oversized **docker** images on Github Actions runners.
- Redesigned our **Kubernetes** and **IBMCloud** environment provisioner to improve stability, error handling, and developer experience through modular, type safe design centered around a **BullMQ** job queue.
- Enhanced our browser IDE product by connecting it to a **Kubernetes** deployed external database manager, reducing database start up failures by **~90%** and start up delay by **~70%**.
- Maintained labs' support of **IBMCloud serverless functions** during significant API changes.
- Improved **UI/UX** for labs applications and tools built using **React**, **Handlebars.js**, **HTML/CSS**, and **Jinja2**.

UNICEF – *Project Intern*   September – December 2023

- Built a web app to facilitate the assessment and selection of open-source data, models, software, and content collections for UNICEF employees worldwide. Focused on the product catalogue feature.
- Worked alongside UNICEF engineers to disambiguate, plan, develop, and deploy the application.
- Software stack consists of **React**, **Tailwind**, **Django**, and a **PostgreSQL** database. Deployed on UNICEF's **Azure** instance. The webapp will be **containerized** and deployed using a **Kubernetes** cluster.

Onova – *Full Stack Software Development Intern*   May – December 2023

- Built an enterprise hackathon management software with **React**, **NextJS**, and **TypeScript**. Adopted by Capgemini to host an internal Gen AI hackathon with **1062 participants** from around the world.
- Improved app performance by implementing **pagination** and **connection pooling.** Built major features such as the judging interface and user directory. Held responsibility for **data fetching**, **API routes**, and **database management** for the entire app. Refined and repaired UI/UX. Ameliorated database schema.
- Built a **ChatGPT** powered poker coach using **NextJS**, **TypeScript**, **React**, and Radix-UI on the frontend, while using **Python**, **FastAPI**, and **OpenAI Functions** on the backend.
- Conducted **independent research and experimentation** on relevant AI technologies such as Vector DBs, LangChain, OpenAI functions, and OpenAI threads to optimize speed, accuracy, and cost.

Projects

Rachel AI - *Capgemini x Google Cloud GenAI Hackathon*   July 2023

- Used Stable Diffusion, DreamBooth, D-ID, and ElevenLabs to create a fully AI generated personal assistant.
- Inserted coworker into a stable diffusion model as an entity using DreamBooth, synthesized their speech using ElevenLabs' speech synthesizer, and then animated the generated avatar using D-ID.