

Charles Ran

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EDUCATION

University of British Columbia

Vancouver, BC

*Combined Bachelor in Computer Science and Mathematics (Co-op),
Master in Business Management (Concurrent Dual Degree)*

Sep 2024 – May 2028 (Anticipated)

- 3rd Year Standing; 88% Cumulative Average; Dean's List.

AWARDS

Top 200 Global (Top 10 in Canada) , Putnam Mathematics Competition	2025
Bronze Medal , ICPC British Columbia Collegiate Programming Competition	2024
Champion (1/7000) , Canadian Open Mathematics Competition	2023
Top 1% Global , LeetCode 🏆 Master (Top 1% Global) , Codeforces 🏆	

EXPERIENCE

Director of Technology

Sep 2024 – Present

UBC Competitive Programming Club

Vancouver, BC

- Developed new club website `icpc.cs.ubc.ca` in **SvelteKit** with professional design practices using **ShadCN UI**, **Figma** assets, and **TailwindCSS**. Leveraged **Cloudflare** for hosting, DNS services, and security.
- Self-hosted backend infrastructure with **Docker** on a Linux server and populated dynamic content in an **SQLite** database with **S3 cron** backups by scraping historical data with **Playwright** and **Cheerio**.

Undergraduate Research in Combinatorics

Sep 2025 – Present

UBC; Supervised by Dr. Gabriel Currier

Vancouver, BC

- Exploring the Manickam–Miklós–Singhi conjecture; attempting to improve bounds using a probabilistic approach with sparse hypergraph constructions.

Webmaster

Jul 2025 – Present

UBC Computer Science Student Society

Vancouver, BC

- Re-designed and updated the main website and events website using **Hugo** and **Bootstrap**.
- Served as the main liaison for CS department infrastructure, developed internal tooling, and automated workflows.

PROJECTS

Virtual Olympiad | TypeScript, SvelteKit, React.js, WebSocket, PostgreSQL, Docker

Sep 2022 – Present

- Innovated an educational collection of platforms, databases, and tools for **Science Competitions**.
- Developed responsive, accessible frontends and **REST APIs** using **SvelteKit**, **React.js**, **Express.js** and applied **IBM Carbon** and **ShadCN** design systems with **TailwindCSS**, **SASS/SCSS** and **Figma**.
- Built a **dynamic web scraper** and **parser** for online math with **Cheerio** and a **LaTeX abstraction layer** optimized for **full-text search** to populate a **PostgreSQL** database with **10,000+** competition problems.
- Developed a real-time multiplayer math competition game server through **Websocket** using **TypeScript** and **Node.js**, integrated with a self-hosted **Supabase** for **Google OAuth** with **PKCE flow**.
- Self-hosted backend infrastructure using **Hetzner Linux** servers and **Docker** for scalability and redundancy.

CERXA 3D Engine 🏆, Sap 3D Engine 🏆 | WebGL, GLSL, Java, JUnit, Swing

Aug 2020 – Present

- Created 3D graphics engines written mathematically-from-scratch, applying Linear Algebra and Calculus.
- Developed CERXA Engine in **GLSL** as a **WebGL application** capable of **volumetric raytracing** with Phong shading, hard shadows and 3D fractals.
- Built Sap, a **pathtracing** engine as a highly-modular OOP **Java Swing application** with support for custom geometry, lighting, and a dynamic camera system with extensive **JUnit** tests.

TECHNICAL SKILLS

Languages: JavaScript, TypeScript, C, C++, Java, Python, Julia, Assembly, Bash, GLSL, SQL

Web Development: HTML, CSS, SvelteKit, React.js, Next.js, TailwindCSS, PostgreSQL, MongoDB, Node.js, Express.js, WebSocket, Docker, Cloudflare, Figma, Git, Linux, OpenGL/WebGL, AWS, Supabase, Firebase

Data Science, Machine Learning: OpenCV, Jupyter, NumPy, Pandas, Matplotlib, PyTorch, TensorFlow