Charles Ran

289-834-9382 | charles.ran9@gmail.com | charlesran | polarr | polarity.sh

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

3rd Place, ICPC NA West Division (NAC Qualification) | **Gold Medal**, ICPC British Columbia — 2025
Top 200 Global (Top 10 in Canada), Putnam Mathematics 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 in extremal set theory; attempting to improve bounds using a probabilistic approach with sparse hypergraph constructions.

Webmaster — Jul 2025 – Present
UBC Computer Science Student Society — *Vancouver, BC*

- Designed the events website using **Hugo** and **Bootstrap**, improving styling and mobile responsiveness.
- Re-wrote the main website with **React.js** to support server-side rendering and **Contentful CMS** for news posts.

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 and Interests

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
Interests: Avid runner, competitive Tetris player (top 50 nationally), amateur photographer