Sean Kim

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Education

University of Toronto **Sep 2021 – Present**
Bachelor of Applied Science in Computer Engineering *Toronto, ON*

- **cGPA: 3.84** / 4.0
- **Awards:** NSERC Undergraduate Student Research Award (2023), Dean's Honour List in All Semesters
- **Relevant Coursework:** Computer Fundamentals (C), Programming Fundamentals (C++, OOP), Digital Systems (FPGA, Verilog), Computer Organization (ARM Assembly, Processor Design), Software Design and Communication (C++ GIS Design), Linear Algebra, Signals and Systems (MATLAB)

Experience

Undergraduate Research Intern **May 2023 - Sep 2023**
University of Toronto - iQua Group *Toronto, ON*

- Extended test functions in **Rust** to evaluate the functionality of **Strato**, an overlay network that provides an inter-cloud private environment for ML pipelines, encompassing the **TCP** connection and metric transmission to the controller
- Architected a **WebSocket** server using **Node.js** that facilitated real-time data collection from various sources, and integrated this server with a **Rust**-based dataplane to enhance data processing speed and transmission efficiency.
- Engineered an analytics dashboard in both web (**React.js**, **Next.js**, and **TailWindCSS**) and command line (**Python**), offering real-time tracking of critical metrics. Implemented backend integration with a **PostgreSQL** database to manage and query data, and connected to the dashboard
- Devised a Max-min fairness re-router algorithm for optimizing data flow using **Python**'s linear programming features and the **NetworkX** library, optimizing lowest flow bandwidth upto **300%**
- Employed **Docker** for containerization to streamline **Strato**'s deployment process, ensuring seamless integration with cloud infrastructure and facilitating a scalable and efficient system setup that reduced deployment time by **25%**

Full-stack Developer **Jul 2022 – Present**
UofTHacks *Toronto, ON (Remote)*

- Contributed to the website and dashboard for the **Canada's first student-run** hackathon, UofTHacks X, serving over **600+** hackathon participants accessing the site
- Implemented an Atomic Design approach utilizing **React.js**, **Next.js**, and **stitches.dev**, resulting in a **20%** reduction in file size and improved organization of unnecessary components

Projects

Aazami | *Qualcomm Tiny ML Kit, Arduino Nano 33 BLE Sense, Edge Impulse, Neo Pixels*

- **MakeUofT 2023 Winner of Most Innovative Power Efficient Hack using Qualcomm Tiny ML Kit**
- Created an innovative voice recording device, utilizing **Qualcomm Tiny ML Kit**, **Arduino Nano 33 BLE Sense**, and **Neo Pixels**, to aid individuals with dementia, which captures and replays the last **10 seconds** of audio upon recognizing the voice command, "I forgot," using a Machine Learning voice recognition system
- Conducted extensive Machine Learning training on the voice recognition system, resulting in a **98.7%** accuracy rate

OTFMap | *C++, GTK, Glade, EZGL, OpenStreetMap API*

- Developed a functional map (GIS) application with **C++** (STL) and **OSM API**, along with a customized database
- Implemented **Djikstra**, **Parallel Djikstra**, and **A*** algorithms for fully optimized path-finding in **20** different cities and Travelling Courier Problem, surpassing all TA algorithms in travel time and ranking within the **top 10%** of the class

TrackTC | *React.js, styled-components, Node.js, Express.js, MongoDB, TTC API*

- Developed a responsive web app that alerts commuters of potential TTC and bus delays via email reminders and real–time transit information to users, built with **MERN** stack and **TTC API**

Technical Skills

Languages: C, C++, Python, Rust, HTML5, CSS3/SCSS, JavaScript (ES6+), ARM v7 Assembly, SQL, MATLAB
Technologies: React.js, Redux, Next.js, Node.js, Express.js, Git/GitHub, Docker, tmux, Valgrind, GTK/Glade, WebSocket, TCP/IP Networking
Hardware and Electrical: Verilog (HDL), ModelSim, NI MultiSim, FPGA/Intel Quartus Prime, DE1-SoC Boards

Leadership

DEEP Summer Program Counsellor **Jun 2022 – Jul 2022**
University of Toronto Engineering Outreach Office *Toronto, ON*

- Cooperated with graduate students to mentor **20+** high school students in STEM fields in a total of **106 hours** of class