

GURMUKH KHAROD

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EDUCATION

Simon Fraser University

B.Sc., Computer Science - Software Systems

Burnaby, BC, Canada

May 2022 - May 2028

Douglas College

A.S., Computer Science and Information Systems

New Westminster, BC, Canada

Sep. 2018 - Sep. 2021

EXPERIENCE

Student Software Engineer

BlackBerry QNX - Acoustics Engineering Services

Jan. 2026 - Present

Burnaby, BC, Canada

- Developed **embedded acoustics tooling** in **C/C++** across **6 audio API modules**, including **Automotive Sound Design signal generation** and **A2B vehicle audio measurement**, streamlining customer testing.
- Created an **Android Automotive validation workflow** using **Bash**, **ADB**, **QEMU**, and **Android Emulator**, executing **1,500+ C/C++ unit tests across 4 suites**, to replace manual testing with reproducible validation.
- Implemented and validated **DSP algorithms** including **FFT**, **CPSD**, filtering, and transfer-function estimation by prototyping in **Python**, porting to **C**, and developing unit tests to verify numerical equivalence.
- Constructed a **voice recognition and evaluation pipeline** using **Whisper** and **OpenWakeWord** to process and evaluate **Google** and **Siri** interactions across **linear and residual echo cancellation**, **beamforming**, **audio filtering**, and **FFT-based processing**, reducing errors by over **90%** under **extreme echo** and **road noise** while meeting **Google speech recognition performance targets** for both **WER** and **FRR**.

Lead Programmer

FIRST Robotics - FRC Team

May 2017 - Jan. 2020

Vancouver, BC, Canada

- Served as **Lead Programmer** for a **60-member team**, building **autonomous C++ routines** and tuning **encoder feedback** with firmware-hardware integration to meet **FRC specifications** and improve autonomous reliability.
- Collaborated with a **cross-functional team** during a **6-week sprint** to deliver the software of a competition-ready robot for **regional** and **world championship** events across **North America**, leading to a **1st Place finish at the Victoria Regional** and the **FIRST Chairman's Award**, while executing **rapid triage**, mentoring junior developers, and supporting outreach.

PROJECTS

JamSync   - TypeScript, React, Express.js, PostgreSQL, Socket.IO, Google Cloud

May 2026 - Aug. 2026

- Engineered a **real-time music collaboration platform** using **React**, **Express.js**, **Socket.IO**, and **PostgreSQL**, integrating **Spotify** and **YouTube** APIs with OAuth authentication and unlimited multi-user sessions.
- Architected the real-time session system featuring live voice chat, host moderation, QR and room-code joining, synchronized WebSocket communication, and **34 automated backend tests** with **GitHub Actions CI**.

Decaf Compiler  - C++, Flex, Bison/Yacc, LLVM IR, Linux, Git

May 2025 - Dec. 2025

- Built a **C++ compiler** for a C-like language, implementing lexical and syntactic analysis, **symbol tables**, semantic checks, and **LLVM IR**, achieving **100%** coverage on ~1,200 tests with strict invariants and clear diagnostics.

Gesture Tower   - C, C++, OpenCV, Bazel, Node.js, Embedded Linux, Git

Sep. 2024 - Aug. 2025

- Co-developed a real-time multiplayer embedded-vision system on **BeagleY-AI** (Linux), implementing capture and inference pipelines in **C/C++** with **OpenCV** for **live embedded gesture recognition**.
- Bridged diagnostics to a React frontend via **TCP**, **UDP**, **HTTP**, and **WebSockets** through a **Node.js** server, using data structures and **observer/visitor** patterns to deliver a synchronized service.

LEADERSHIP

Hackathons and Mentorship - SFU CSSS and UBC CSSS

Sep. 2023 - Oct. 2025

- **System Hacks 2024 (Winner)**: Built *Chaos Keys* in React with a live REST API; won Best Startup.
- **NW Hacks 2025 (Best UI Finalist)**: Co-built *GROC*, implemented Python APIs and SQL. Best UI finalist.

TECHNICAL SKILLS

Languages: C, C++, C#, Java, Python, JavaScript, TypeScript, Haskell, Bash, Rust, SQL, NoSQL, HTML5, CSS3

Frameworks and Build: React.js, React Native, Node.js, Express.js, Next.js, FastAPI, Spring Boot, GoogleTest

Data, ML, and CV: PyTorch, TensorFlow, scikit-learn, NumPy, Pandas, OpenCV, LSTM, MediaPipe, Whisper

Embedded and Systems: RTOS, I²C, SPI, UART, GPIO, PWM, FFT, A2B, DSP, MCU R5, LLVM IR, Flex, Bison

Tooling and Platforms: Git, GitHub, GitLab, SVN, CI/CD, Docker, GCP, APIs, VMs, Linux, QNX, ARM, x86-64