# Shane So

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## EDUCATION

**Simon Fraser University** • BSc. Data Science — Expected Graduation June 2028
- Schulich Leader Scholarship Nominee
- Horatio Alger Canadian Scholar

## EXPERIENCE

**Research Assistant** • SFU Autonomous Intelligence and Robotics Lab — November 2025 – Present
- Engineered a distributed UAV software architecture spanning embedded UART subsystems, IP-networked telemetry paths, and **ROS** middleware.
- Configured MLink-ESP Wi-Fi modules via low-level AT-command protocols and refactored **C++** bridging layers (protected network) to restore deterministic command/telemetry flow.
- Developed a containerized **ROS Noetic** toolchain using **Docker** (host networking + X11/Qt forwarding).
- Debugged **Linux** graphics firmware and runtime renders by redirecting **Mesa** and **OpenGL** to compatible kernel subsystems.

**Software Engineer** • Simon Fraser University Rocketry — November 2025 – Present
- Designing an MPC architecture in **MATLAB** for trajectory optimization using an augmented Lagrangian iLQR.

**Software Engineer Intern** • National Research Council Canada — June 2025 – August 2025
- Developed a **C++** control system that manages system load timing and serial buffer control for fine-tuned data processing.
- Reduced program size by 51% and flash writes by 44% under less than 33 KB memory constraints.
- Developed firmware for Renesas RA4M1 and ATmega328P MCUs, interfacing sensor arrays over I²C to operate differential analog sensors on ADS1X15 units.
- Designed a **C** library suite with tools for data store, regression, unit testing, and state management.
- Engineered a full-stack application with **C++** and **QML** using **Qt Creator** to interface serial control with user feedback on a GUI.
- Collaborated within a multidisciplinary engineering team in an access-controlled R&D environment, delivering production-quality software under strict reliability requirements.

**Research Intern** • Advanced Materials and Process Engineering Laboratory — July 2025
- Optimized and corrected emission spectroscopy software over 15 test iterations to achieve <10% error in data acquisition.

## PROJECTS

**Prism 01 – Photonic Diffractometer** — September 2025 – Present
- Building a Bragg diffraction analyzer to probe the structure and periodicity of optical computing substrates.
- Automated build workflows using a CI/CD (**GitHub Actions**) pipeline to verify Arduino Uno core compile tests are completed on a simulated AVR RISC MCU.

**Juggle Buddy – CV Kinematics Trainer** — January 2026
- Engineered a real-time **OpenCV** + **YOLO** (v8) inference pipeline integrating HSV color-space calibration for robust object segmentation under variable lighting and camera conditions; built at nwHacks 2026.
- Developed deterministic unit and integration tests with **PyTest** covering vision transforms and scaling invariants.
- Extracted and normalized reference points from live webcam feed, videos, and images for inference training with **pickle** (Python object serialization) over .pkl model states.

**Lux – Biomedical Compute Engine** — January 2025 – May 2025
- Developed a cross-platform application in **TypeScript** with a custom-routed **React Native** interface to model and augment tumor data for simulating growth patterns.
- Architected a compute workflow and exposed the engine over a **RESTful API** with **JSON**-based configuration to allow users + network clients to request execution logs and algorithm + VCS metadata.
- Deployed iterative builds via **Expo**/**EAS** with external beta testing, achieving optimized rollout times by 5%.

**Omni – Cryptographic Medical Ledger** — May 2024 – October 2024
- Engineered a **C++** cryptographic ledger system using SHA3-256 hashing and node-address abstractions to ensure secure, tamper-resistant data storage and retrieval.
- Developed modular encapsulated components to enforce data integrity, immutability, and low-latency access under constrained memory and system-level performance limits.

**UrbanX – Refugee Social Network** — February 2021 – May 2021
- Developed an **Android** application in **Java** and **XML** to support Canadian refugee communities; awarded Best Designed App for navigational and visual design.
- Optimized **Gradle** build pipelines for accelerated compile-time performance and implemented a custom UI/UX stack via **Figma**-to-**XML** conversion workflows.

**Other projects**: Alpha, IntCom, Collatzcheme, OdysseyNvim, Portfolio, CS Resources

## TECHNICAL SKILLS

**Languages**: C++, C, Python, Java, JavaScript, TypeScript, SQL, Go, Bash, Verilog, Fortran, Matlab, Scheme, Lua
**Frameworks**: PyTorch, NumPy, SciPy, Pandas, OpenCV, YOLO, JUnit, Pytest, React, Node.js, Next.js, Express, Tailwind, ROS
**Tools**: Linux, AWS (EC2, S3, Lambda, CloudWatch), Docker, Kubernetes, Git, GitHub Actions, Jenkins, GCP, Firebase, Grafana, CMake, Vercel, GNU toolchain (GCC, GDB), VSCode, Neovim, tmux
**Technologies**: PostgreSQL, JSON, YAML, XML, QML, Figma, Blender, Qt Creator, Arduino, Fusion360, STM32Cube, Agile, Scrum, Jira, BitBucket, GitHub, GitLab