

Maneet Bhatt

236-996-9215 | bhattmaneet6@gmail.com | [linkedin.com/in/maneetbhatt/](https://www.linkedin.com/in/maneetbhatt/) | github.com/arraystartat0

EDUCATION

University of British Columbia

Expected Graduation: 2029

Bachelor of Applied Science – Computer Engineering

EXPERIENCE

Vehicle Controls Firmware Developer

Sep 2025 – Present

UBC Formula Electric (FSAE)

Vancouver, BC

- Built an active electronic differential for the team's 4WD platform, adapting 2WD kinematic literature and closing wheel-speed loops with a **PID** controller against motor-inverter feedback.
- Designed the differential as the **IMU**-free tier of the team's torque-vectoring system, keeping assist available on wheel-speed and steering alone; validated the model in **Simulink** and verified generated C via **SIL/PIL** on an **STM32 Nucleo-F302R8**.
- Wrote a driver for the **STM32H7** hardware **Filter Math Accelerator (FMAC)** in C++ under **FreeRTOS**, offloading 100 Hz **CAN** sensor filtering to free CPU time for safety-critical control.
- Shipped a configurable low-pass filter library (EMA, Butterworth, biquad DF1 **IIR**) behind one **C++** API, giving BMS and vehicle dynamics reliable filtering across multiple ECUs from a single validated implementation.
- Cut **IMU** noise power by 93% on average through the filter library across 20 controlled bench runs, while holding group delay to 20 ms typical and 80 ms worst case.
- Completed bring-up of an SBG Ellipse-D **GNSS/INS**, verifying its **CAN** output feeds both telemetry logging and downstream vehicle-dynamics control inputs.
- Wrote **GoogleTest** unit and integration tests for the embedded DSP and control modules.

Full Stack Developer (Part-time)

Jul 2024 – Present

Blitz Packaging Limited Uganda

Hybrid

- Architected a **PHP/MySQL** data-management platform end-to-end, replacing manual internal processes with tooling non-technical staff run unaided.
- Built a multi-language test pyramid with static analysis, unit tests, DB-backed integration, and E2E API smoke across five parallel **GitHub Actions** jobs.

PROJECTS

Preemptive RTOS Kernel | **C**, **ARMv7-M Assembly**, **Cortex-M4**, **Schedulers**

- Wrote a preemptive priority-scheduling kernel from scratch for **Cortex-M4 (STM32F302R8)** with no vendor RTOS: task control blocks, per-priority ready lists, blocked and delayed states with tick-based wakeup, and a lowest-priority idle task.
- Switched context in the **PendSV** handler with hand-written ARMv7-M assembly stacking of r4–r11, fabricating initial task frames for clean first launch via **SVC** and running tasks on **PSP** with the kernel on **MSP**.
- Implemented counting semaphores and mutexes with **priority inheritance**, demonstrating bounded priority inversion on an instrumented three-task test case.
- Built fault infrastructure ahead of the scheduler: a **HardFault** handler decoding CFSR/HFSR and recovering the stacked exception frame, plus stack paint patterns giving overflow detection and per-task high-water marks within a 16 KB SRAM budget.

Autonomous Retrieval Claw | **Embedded C++**, **Arduino**, **DSP Filtering**

- Built a sonar-guided servo claw for a first-year team design course, driving pick-and-place through a four-state **state machine** on distance thresholds.
- Suppressed sonar dropouts with a 1st-order Butterworth DF1 **IIR** low-pass filter, stopping false state transitions from invalid readings.
- Wrote modular firmware, splitting into config, sonar, filter, and claw modules with thresholds tunable from a single header for faster and simpler testing by non-technical members.

TECHNICAL SKILLS

Programming: **C/C++**, **Python**, Java, JavaScript, PHP, SQL (MySQL)

Embedded & Controls: **STM32H5/H7**, **FreeRTOS**, **CAN**, **DSP filtering**, **PID**, **GNSS/INS**

Test & Tools: **SIL/PIL**, **GoogleTest**, **Vector CANoe**, **MATLAB/Simulink**, CI/CD, Git, J-Link, CMake

Spoken Languages: English, French (B2), Hindi