

RACHAD EL MOUTAOUAFFIQ

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EDUCATION

The University of British Columbia

Sep. 2022 – Jun. 2027

Bachelor of Applied Science - Computer Engineering | Dean's Honour List 2023–2024

Vancouver, BC

Software Construction — Comp. Systems — Digital Sys. Design — VLSI — Comp. Arch. — Operating Sys. — MEMS Lithography

TECHNICAL SKILLS

Software: C/C++, ARM assembly, Unix commands, Git, Multithreading, Python, Java, Visual Basic

Hardware: Verilog, FPGA (DE1-SoC), I2C, SPI, UART, Microcontrollers, Oscilloscopes, Switches, High Voltage

TECHNICAL EXPERIENCE

Firmware & Automation Engineer Co-op

Sep. 2024 – Aug. 2025

Analytic Systems

Delta, BC

- Developed and debugged firmware for I2C, SPI, UART, and **CAN** interfaces, using oscilloscopes for signal validation. Enabled a legacy product line to meet **NMEA 2000** marine compliance.
- Refactored legacy code into modular, reusable components for smooth, synchronized ADC voltage display across multiple 7-segment LEDs, enabling integration across different microcontrollers.
- Built a prototype PCB-based flying-probe test system (6 motors, 2 probes) and developed control software integrating a multimeter and power supply via serial communication, **reducing manual testing by 80%** [Demo](#).
- Developed a software suite for automated and manual PCB testing with test creation, Altium integration, database logging, performance analytics, and PDF report generation—**used daily** by technicians and management.

UBC Orbit — Satellite Design Team

Sep. 2024 – Present

Avionics Lead - Since May 2025

- Lead a 6-member Avionics subteam, overseeing flight software, sensors, actuators, and system-wide integration.
- Built a 3-axis gimbal test setup to emulate magnetic noise and validate sensors, enabling real-world testing of attitude software with live 3D MATLAB visualization.
- Hands-on testing of flight hardware and firmware in a cleanroom lab, with detailed test reports for the team.
- Manage timelines, and cross-team handoffs; present updates and system diagrams to experts and faculty advisors.

Firmware Developer

- Developed magnetometer drivers and supported calibration workflows for satellite flight software integration.
- Implemented hardware abstraction (HAL), configuring MCU interfaces to enable simplified access to serial protocols.
- Developed math functions to convert GPS data into state vectors for satellite attitude determination.

PERSONAL PROJECTS

BilliardBot VisionAI, [Demo](#) | OpenCV, ESP-32 Server, Tkinter(GUI), Circuit, System Integration Oct. 2023 – Jul. 2024

- Built a **pool-playing robot** using OpenCV for ball detection and a high-voltage solenoid for cue striking.
- Designed and debugged robot circuitry, achieving $\pm 0.2^\circ$ / $\pm 0.06\text{mm}$ accuracy with steppers & ESP-32 wireless control.
- Developed OpenCV algorithms for accurate spatial measurement and object detection.
- Developed a Tkinter UI and a physics simulation for real-time control, testing, and fine-tuning of OpenCV parameters.
- Executed complex bank shots with **precision surpassing human accuracy**.

Miscellaneous:

2022 - 2024

- Airbus A320 side stick** [Demo](#) — Reverse-engineered an actual Airbus A320 sidestick to make it computer-compatible
- 384V Multistage Coil Gun** [Demo](#) — 384V coil gun with custom IR speedometer, capable of **piercing metal sheets**.
- Automatic Xylophone** [Demo](#) — Electromagnetic xylophone with DIY solenoids, 24 transistors, and MIDI control.