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/**CAN** ; validated signals on scope; enabled a legacy product line to meet **NMEA-2000** 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 (flight software, sensors, actuators) and drive cross-team 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 ±0.2° / ±0.06mm 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 sidesitck** *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.