

RACHAD EL MOUTAOUAFFIQ

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EDUCATION

The University of British Columbia

Sep. 2022 – Aug. 2027

Bachelor of Applied Science - Computer Engineering | Dean's Honors List 2023-24-25

Vancouver, BC

Software Construction — Computing Systems — Digital Systems — VLSI — Computer Architecture — Operating Systems

TECHNICAL SKILLS

Software: C/C++, ARM assembly, Linux, Git, GDB, FreeRTOS, Multithreading & Synchronization, Python, VB.Net.

Embedded & Hardware: Verilog, FPGA, I²C, SPI, UART, CAN, Microcontrollers (Texas Instruments, Microchip, STM32).

Tools: HALcoGen, Code Composer Studio, MPLAB X, SignalTap, MATLAB, Onshape, Altium, Oscilloscopes, Soldering.

TECHNICAL EXPERIENCE

Embedded Software Engineer Intern

Jan. 2026 – Sep. 2026

Atomic Semi — Fab2

San Francisco, CA

- Developed bare-metal C and RTOS firmware using HAL drivers (ADC, DMA, I²C, CAN) and Protocol Buffers, alongside extensive PCB rework and electrical troubleshooting.
- Engineered the full software stack for a wafer and mask storage/cleaning tool, implementing custom motion profiles, synchronized actuation, and state machines.
- Implemented PID control of piezo actuators using capacitive feedback for nano-precise mask alignment and writing.
- Owned software for a pressure gauge calibration station, working across hardware, electronics, and test. Analyzed research papers to drive hardware and calibration fixes, improving accuracy in molecular flow regimes.

Firmware & Automation Engineer Co-op

Sep. 2024 – Aug. 2025

Analytic Systems

Delta, BC

- Shipped a full-stack PCB test app (GUI, serial DMM/PSU control, DB analytics, PDF reports), adopted for daily use.
- Identified a test bottleneck, pitched an ROI-backed automation plan, and delivered a dual-probe flying-probe system with six I²C-controlled steppers; achieved 0.4 mm-pitch probing and **cut manual testing by 80%** [Demo](#).
- Modernized legacy products by implementing **CAN** firmware mapped to the **NMEA-2000** marine standard.
- Built ADC firmware for multiplexed 7-segment displays with tuned ISRs and digital averaging to yield stable telemetry.

Avionics Lead & Firmware Developer

Sep. 2024 – Jan. 2026

UBC Orbit — University Satellite Engineering Design Team

Vancouver, BC

- Led a 6-member subteam to drive satellite design, hardware verification, and system integration.
- Built a 3-axis gimbal HIL testbed for magnetic noise emulation, enabling real-time sensor fusion validation in MATLAB.
- Developed TI MCU firmware using HALcoGen and FreeRTOS; wrote I²C/SPI sensor drivers with tuned ISRs and priorities.

PERSONAL PROJECTS

BilliardBot VisionAI, [Demo](#) | ESP32, Server, WiFi, Thinter, OpenCV, High Voltages

Oct. 2023 – Jul. 2024

- Built a **pool-playing robot** using OpenCV + high-voltage solenoid, achieving **90% accuracy** on complex bank shots.
- Built an OpenCV vision pipeline for ball/table localization, glare suppression, fisheye correction & camera re-zeroing.
- Implemented spatial calibration: corrected fisheye distortion and used pocket fiducials to re-zero the camera.
- Developed a physics-based shot planner with polar/Cartesian kinematics and vision-in-loop trajectory corrections.
- Implemented a tunable high-voltage striker and control electronics with a 14 V→200 V boost and opto-isolation.

Miscellaneous:

2022 - 2024

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