

MIGUEL SALVACION

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EDUCATION

Carnegie Mellon University

Pittsburgh, PA

B.S. and M.S. in Electrical and Computer Engineering — GPA: 3.81/4.00 — Dean's List

May 2027

Leadership: Filipino Student Association Treasurer – managed \$9,000 budget for 150+ member organization

TECHNICAL SKILLS

Languages: C/C++, ARM Assembly (ARMv7-M Thumb-2), Python, SystemVerilog, MATLAB, SML

Protocols & Peripherals: CAN, I2C, SPI, UART, PWM, ADC, DMA, EXTI, GPIO, NVIC, SysTick

Tools: Git, Linux, GDB, OpenOCD, Make, Cadence, Vivado, KiCad, Solidworks, Fusion, Oscilloscope, Logic Analyzer

Hardware: STM32 (Cortex-M4), FPGA, Teensy 4.1, Raspberry Pi, Arduino, PCB Design, Schematic Capture

WORK EXPERIENCE

Hardware Systems Engineering Intern | *EV Underbody Systems*

Summer 2025 & May 2026 - Present

Ford Motor Company

Detroit, MI

- Resolved a 5.8V drop across an EV control unit through schematic review, tracing root causes to elevated temperatures and undersized wire cross-section, and proposed corrective hardware modifications.
- Managed a technical audit of 50+ hardware requirements for three EV programs, identifying and resolving 10+ misalignments between systems engineering specifications and fabrication constraints.
- Delivered a 5% cost reduction on key underbody components by building a cost-optimization strategy based on technical design specifications and supplier performance data.

Embedded Systems Researcher | *Semiconductor Fabrication, RF Hardware*

Jan 2026 – Present

CMU Hacker Fab

Pittsburgh, PA

- Designed and open-sourced an automated RF matching network for \$636, achieving an 80%+ cost reduction compared to \$3,000+ commercial alternatives while eliminating manual tuning for thin-film depositions.
- Achieved a VSWR of 1.2 and sustained a stable plasma for 60+ minutes by integrating a Teensy 4.1 with 0.9° stepper motors driving air-variable capacitors and implementing a real-time gradient descent impedance control algorithm.
- Designed a custom control PCB in KiCad and verified SWR sensing and power-protection circuits in ngspice, confirming ADC inputs stayed below 3.3 V across component-tolerance and PCB-parasitic models.

Embedded Systems Teaching Assistant | *RTOS, Firmware, ARM Architecture*

Jan 2026 – Present

CMU 18-349: Introduction to Embedded Systems

Pittsburgh, PA

- Mentored 60+ students debugging custom preemptive RTOS kernels, resolving PendSV context-switch faults, RMS bugs, and HLP priority-inversion edge cases using GDB and OpenOCD over JTAG.
- Guided firmware driver development on STM32 Cortex-M4, including MMIO register configuration, interrupt-driven serial protocols, and hardware PWM to integrate sensors and actuators.
- Conducted design reviews for student 2-layer PCBs and oversaw full-cycle development of embedded vehicles, including PID motor control tuning, RMS thread selection, and hardware-software integration testing.

PROJECTS

Real-Time Embedded Vehicle | *Embedded Systems, RTOS, PCB Design, C, Assembly*

Aug 2025 – Dec 2025

- Built a preemptive multithreaded RTOS kernel in C and ARMv7-M Assembly on STM32 (Cortex-M4), implementing PendSV context switching, Rate-Monotonic Scheduler, SVC system calls with newlib, and mutexes with HLP.
- Achieved <10% steady-state error by tuning a closed-loop PID system using encoder feedback and hardware PWM, concurrently scheduling it alongside UART telemetry and I2C LCD updates under RMS without deadline misses.
- Designed a 2-layer PCB in Autodesk Fusion and authored the bootloader and bare-metal C drivers (I2C, interrupt-driven UART, EXTI quadrature encoder decoding) to integrate an STM32 with motors, servos, and LCD.

Trash Collection Robot | *Robotics, Electro-Mechanical Systems, Serial Communication*

Oct 2024 – Jan 2025

- Engineered a 9V quad-motor drive system using H-bridge drivers and optimized power distribution to support high-torque movement during heavy load collection.
- Achieved 90% navigation accuracy by implementing UART serial communication to enable bidirectional communication between a Raspberry Pi handling computer vision and an Arduino Uno controlling motor actuation.