

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, 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.
- Resolved 10+ specification misalignments across three EV programs by managing a technical audit of 50+ hardware requirements 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 an open-source, automated RF matching network for \$636, eliminating manual tuning for thin-film depositions and achieving an 80%+ cost reduction over commercial alternatives.
- Sustained stable plasma for 60+ minutes and achieved a 1.2 VSWR by implementing a real-time gradient descent impedance control algorithm on a Teensy 4.1 to drive air-variable capacitors.
- Designed a custom control PCB with shielding to suppress RF interference in the feedback loop, maintaining reliable 95W forward power delivery throughout deposition cycles.

Embedded Systems Teaching Assistant | *RTOS, Firmware, ARM Architecture* Jan 2026 – Present
CMU 18-349: Introduction to Embedded Systems *Pittsburgh, PA*

- Guided 60+ students in debugging preemptive RTOS kernels, utilizing GDB and OpenOCD over JTAG to resolve complex PendSV context-switch faults, RMS bugs, and HLP priority inversions.
- Facilitated STM32 Cortex-M4 firmware development, instructing students on MMIO register configuration, interrupt-driven serial protocols, and hardware PWM for sensor/actuator integration.
- Directed full-cycle development of embedded vehicles by conducting 2-layer PCB design reviews and advising on PID motor control tuning, RMS scheduling, and hardware-software integration.

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, 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, scheduling it concurrently with UART telemetry and I2C LCD updates under RMS without deadline misses.
- Authored a custom bootloader and bare-metal C drivers (I2C, UART, EXTI) to integrate an STM32 with motors and an LCD on a custom 2-layer PCB designed in Autodesk Fusion.

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.