Paula Contreras

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SUMMARY

Fulbright Scholar and Master of Computer Science student (Dec 2026) with an **Electronic Engineering** background. I build software for real robots, from **microcontroller firmware** and **ROS 2 control** to **AI perception on NVIDIA Jetson**, plus **LLM-in-the-loop systems** that write and refine their own policies. Seeking full-time robotics software roles from January 2027 (J-1 Academic Training, no sponsorship needed).

EDUCATION

North Carolina State University, Raleigh, NC — ***Expected Dec 2026***
Master of Computer Science — ***GPA – 3.83/4.0***
Fulbright Scholar, Martín Egas Endowment – Highly competitive national merit award for graduate study in the U.S.

Universidad del Azuay, Cuenca, Ecuador — ***Graduated July 2023***
Bachelor of Science, Electronic Engineering — ***GPA – 46.82/50***
Ranked 1st in graduating class (Honorato Vasquez Award) – Embedded Systems, Microcontrollers, Control Theory, Robotics

ROBOTICS PROJECTS

Assistive Pepper Robot on NVIDIA Jetson | Python, PyTorch, YOLOv8, ROS2 — ***2026***
- Built an end-to-end assistive robot system on a **Jetson**: a **live video pipeline** from the robot's camera, **YOLOv8** object detection, local **face recognition** (SCRFD + AuraFace), and a bridge from Pepper's native navigation to **ROS2/Nav2**.
- **Root-caused** corrupted video frames (YUV422 decoding) and a **torchvision::nms crash** from a missing CUDA kernel on aarch64; fixed doorway-crossing failures through systematic testing (**8/8 crossings**).
- Designed a two-layer test suite (**automated pytest + hardware-in-the-loop checklist**) with structured JSON logging for full traceability.

Assistive Cart Robot (Gazebo sim) | UR5 + Robotiq 2F-85, ROS2, MoveIt, Docker | GitHub — ***2026***
- Designed a **5-state reactive grasp controller** that decides from **tactile/contact feedback alone** (no vision).
- Built a **3-level LiDAR safety filter** for **teleoperation** and a **PyQt5 operator GUI**; containerized the stack as **7 Docker services** with dependency-ordered startup (Gazebo, MoveIt, control nodes).

Voice-Guided Social Robot | TurtleBot 3, OpenCR, Mic Array, ROS | GitHub | Published, IEEE ETCM 2025 — ***2025***
- Built a robot that turns toward and approaches a speaker using **sound source localization** (VAD + GCC-PHAT, **<5° error**) driving a **PID heading controller**.
- Wrote **custom C++ firmware for the OpenCR microcontroller** that triggers **cliff-sensor emergency stops on the board itself**, before ROS receives the message, so a software hang can't drive the robot off an edge.

IoT Embedded System | ESP32, Bare-Metal C, Custom PCBs — ***2022***
- Designed **2 custom PCBs** and wrote **bare-metal C firmware** for an ESP32 (TRIAC control, DC motor PWM, multi-sensor acquisition); debugged hardware faults with an **oscilloscope**.

LLM-Driven C/C++ Generation Loop, BrainSpec Lab | C/C++, LLMs, ChampSim — ***2025***
- Closed-loop pipeline where an LLM writes C/C++ policies, benchmarks them in simulation, and refines them from feedback: **+10.41%** (cache replacement, 5 workloads), **+3.3% IPC** (L1-I prefetcher).

WORK EXPERIENCE

ARoS Lab, NC State University — **Raleigh, NC**
Graduate Research Assistant — ***May 2026 – Aug 2026***
- Designed and built **sensor-driven data collection infrastructure** for imaging-based robotics experiments, used across the lab's active projects to speed up iterative testing.

Hospital Vicente Corral Moscoso — **Cuenca, Ecuador**
Biomedical Engineering Intern — ***May 2022 – Jul 2022***
- Debugged **safety-critical medical equipment** (ventilators, X-ray machines) in a working hospital with **oscilloscopes** and systematic fault isolation.

Universidad del Azuay — **Cuenca, Ecuador**
Adjunct Lecturer / Laboratory Assistant — ***Sep 2023 – Aug 2025***
- Taught and ran electronics labs; built **automated Python tools serving 150+ users**. Earlier, as **Robotics Club President** (2020–2023), ran regional contests and AI courses for 100+ students.

SKILLS

- **Embedded & Hardware** – Microcontroller firmware in C/C++ (OpenCR, ESP32), I2C/UART/SPI, PWM, PCB design, Raspberry Pi, oscilloscopes & logic analyzers
- **Robotics** – ROS2 / ROS 1, Nav2, MoveIt, URDF, OctoMap, Gazebo, Omniverse, Foxglove, teleoperation, PID & state-machine control, safety interlocks
- **Software & AI** – C++, C, Python, Bash, SQL; Linux, Docker, Git, pytest, PyQt5; PyTorch, YOLOv8, CUDA, NVIDIA Jetson