Jeronimo Ruiz Fernandez *he/him*

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EDUCATION

Worcester Polytechnic Institute (Double Major) Expected Graduation May 2027

B.S. in Robotics Engineering and B.S. in Computer Science GPA: 3.5/4.0

Coursework: Sensing and Perception in Robotics; Control Engineering; Embedded Computing; Algorithms

WORK EXPERIENCE

Efficient Learning and Planning for Intelligent Systems Lab ROS2, Python, Intel RealSense, HDBSCAN, GitHub, UR10 September 2024 – Present

Undergraduate Research Assistant WPI

- **Built an end-to-end placement selection pipeline for a UR10 robotic arm** and Intel RealSense setup **for the ManipulationNet 'Text to Placement Task' competition**. It consumes an instance segmentation mask and an aligned depth frame and returns a collision-free (x, y, z) placement via a ROS2 service interface.
- **Enabled arm functionality in complex object-scattered environments** by performing scene understanding, depth normalization, HDBSCAN clustering in (x, y, z), and kernel convolution of the obstacle mask.

Horizon Surgical Systems October 2025

Apprenticeship Santa Monica, CA

- **Teleoperated** a **cataract-surgery AI-enabled Polaris™ robotic platform** using precision control interfaces and real-time vision feedback to upskill in automated surgical workflows.
- **Enhanced the Polaris™ robotic system reliability** by investigating & reproducing flaws found in cataract extraction trials and contributing to the hardware fix proposal.
- **Improved the robotic platform's surgical precision** with unimpeded trajectory following and generation by debugging and fixing trajectory regressions in multiple automated surgical steps.

PROJECTS

Pick and Place with Dynamixel X-Series Robotic Arm (Matlab and GitHub) Spring 2025

- **Implemented forward and inverse kinematics** for a multi-DOF Dynamixel X-Series arm using DH parameters, Jacobians, and homogeneous transforms to enable the robotic arm to pick/place balls in targets.
- **Developed numerical IK solvers and singularity detection**, validating solutions via trajectory execution and velocity analysis so that the robotic arm could operate in its range limit after losing a degree of freedom.
- **Integrated vision-based object detection** using color segmentation to support perception-guided manipulation, identifying, picking, and placing balls regardless of color.

Trash Collecting Romi (Romi, C, C++, PlatformIO, IMU, Ultrasonic/load sensors) Fall 2025

- **Designed a modular & abstracted embedded robotics software stack** in C/C++ using PlatformIO, integrating the motors and sensor subsystem interfaces, enabling fast, extensible, and version-controlled team iteration.
- **Implemented encoders, closed-loop differential-drive control, and real-time sensor feedback,** enabling path following and pose tracking so that the robot can traverse and trace back its steps to empty multiple bins efficiently.

SKILLS

Programming: Python, C++, C, MATLAB, Java | **Robotics:** ROS2, RViz | **Perception:** Depth Sensing (Intel RealSense) **Embedded Systems:** Microcontrollers, Arduino IDE | **CAD:** SolidWorks, FEA Analysis