Jeronimo Ruiz Fernandez *he/him*

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EDUCATION

Worcester Polytechnic Institute (Double Major) Exp. Graduation May 2027

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

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

WORK EXPERIENCE

Efficient Learning and Planning for Intelligent Systems Lab September 2024 – Present

Undergraduate Research Assistant WPI

- **Built** an end-to-end placement selection pipeline that consumes an **instance segmentation mask and RealSense-aligned depth frame** and returns a **collision-free (x, y, z) placement** via a ROS2 service
- **Performed scene understanding and feasibility filtering** using depth normalization, **HDBSCAN clustering in (x, y, z)**, and **kernel convolution of the object mask**, including an optional stacking mode

Horizon Surgical Systems October 2025

Apprenticeship Santa Monica, CA

- **Teleoperated** a robotic cataract-surgery system using precision control interfaces and real-time vision feedback
- **Analyzed** automated surgical workflows and contributed to system improvement discussions spanning software, hardware, and AI
- **Assisted with system testing and debugging** during autonomous cataract extraction trials, supporting observation and validation of robot behavior

PROJECTS

Pick and Place with Dynamixel X-Series Robotic Arm Spring 2025

- **Implemented forward and inverse kinematics** for a multi-DOF Dynamixel X-Series arm using **DH parameters, Jacobians, and homogeneous transforms**
- **Developed numerical IK solvers and singularity detection**, validating solutions via trajectory execution and velocity analysis
- **Integrated vision-based object detection** using color segmentation to support perception-guided manipulation

Trash Collecting Romi Fall 2025

- **Designed a modular embedded robotics software stack** in C/C++ using PlatformIO, integrating motors and multiple sensor subsystems
- **Implemented modular hardware abstractions** and **closed-loop differential-drive control**, enabling repeatable motion on a resource-constrained microcontroller
- **Integrated real-time sensor feedback** (IMU, rangefinders, line sensors) for navigation and obstacle detection

SKILLS

Programming: Python, C++, C, MATLAB | **Robotics:** ROS2, RViz | **Perception:** Depth Sensing (Intel RealSense)
Embedded Systems: Microcontrollers, Arduino IDE | **CAD:** SolidWorks, Autodesk Fusion 360