GEORGE ORTIZ

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EDUCATION

Carnegie Mellon University — Pittsburgh, PA
Master of Science in Mechanical Engineering – Research — Expected May 2027

Stevens Institute of Technology — Hoboken, NJ
Bachelor of Engineering – Mechanical Engineering: Robotics Concentration, GPA: 3.75 — May 2025

RESEARCH EXPERIENCE

Robotics Research Engineer, PROtotype Object Fabrication Lab (PROOF Lab) — Feb 2023 – May 2025

- Implemented **object detection** for the **Doosan H2515** collaborative robot using **YOLOv8** and **OpenCV** to classify and identify the location of objects in the workspace.
- Developed an **isoparametric mapping** algorithm in **Python** to automate pick-and-place tasks with **millimeter** precision, implementing functions for **pick-and-place planning** and accelerating robotics research in the lab.
- Developed Python-based **client-server architecture** using **sockets** in an **IoT** setup, emulating **TCP protocol** to ensure reliable command delivery and execution.

Materials Processing Research — May – October 2023

- Directed gold nanoparticles and localized surface plasmon research, utilizing **Scanning Electron Microscopy** to characterize nanoparticles, document research findings, and verify relationship between size and wavelength using **spectrophotometry**. Findings implemented in Fall 2023 E311 labs at a cost of **one dollar** per student.
- Received nomination for best research poster at the **2023 ASEE conference** at The College of New Jersey.

ENGINEERING PROJECTS

LeRobot Arm Hackathon NYC - Winner of "Most Innovative Use of Data" ($1000 Prize) — April 2025

- Separated **mechanical and electrical noise** using leader and follower paths and ran **low pass filter** through electrical noise to smooth trajectory, significantly accelerating tasks with a **200% increase** in speed.
- Trained a 6 DoF robot arm to autonomously pick up a pen from anywhere within the workspace, draw on a piece of paper, and place the pen down using **Action Chunking Transformer (ACT) Policy**.

Soft Exosuit for Spinal Muscular Atrophy (SESMA 3.0), ME Capstone Project — August 2024 - May 2025

- Addressed muscle weakness caused by Spinal Muscular Atrophy, improving mobility for affected users by **10%**.
- Programmed microcontroller and integrated **PID compensation** to monitor sit-to-stand transitions for real-time **feedback** and **control**.
- Collected and analyzed data in MATLAB, using **3D splines** for **curve fitting** to calculate changes in cable length, optimizing clutch release for **maximum** knee torque assistance.

Hand Squeezing Rehabilitation Device — January – May 2024

- Programmed **PIC16F88 microcontroller** to integrate sensors, actuators, and an LCD display; **debugged** and **wired** the system for seamless functionality.
- Designed and implemented a **four-bar linkage** system to tension a band with adjustable force, controlled through a **potentiometer** for precise tuning.

WORK EXPERIENCE

Manufacturing Engineer Intern, Zimmer Biomet Holdings — May – August 2024

- Identified safety concern with manual cutting operation, designed a fixture in **Siemens NX** applying **GD&T** principles to maximize safety.
- Investigated and managed large datasets in scrap data and developed a dashboard in **Power BI,** enabling management to analyze scrap data with **real-time analysis** and reduced manual reporting time by **40%.**
- Assisted in scrap data management by investigating and removing outliers in large datasets and developing a dashboard in **Power BI**, enabling the management team to analyze data efficiently.

Quality Engineer Co-op, Zimmer Biomet Holdings — September – December 2023

- Conducted time studies and **Quality Standard Reference (QSR)** updates for an inspection reduction project, resulting in **$40,000** in annual cost savings**.**
- Owned and completed an **A3 project** for cases containing excessive errors made by operators, checking to ensure the rate of errors was within a reasonable margin.

SKILLS

Robotics: DH Parameters, Forward/Inverse Kinematics, Resolved Rates, Redundancy Resolution, SLAM, RRT, Kalman Filters, Object Detection
Mechanical: SolidWorks, Siemens NX, Creo, ANSYS, GD&T, CNC Machining, 3D Printing, Mill/Lathe, Tensile Test
Programming: MATLAB, C, C++, Python, PICBasic Pro