Timothy J. DeMaro

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EDUCATION

Worcester Polytechnic Institute, M.S. R.B.E. | Worcester, MA — December 2024
Master of Science in Robotics Engineering
Cumulative GPA: 4.0

University of Notre Dame, B.S. M.E. | Notre Dame, IN — May 2023
Bachelor of Science in Mechanical Engineering with Concentration in Control and Mechanical Systems

Regis High School (Full Scholarship, First Honors) | New York, NY — May 2019

SKILLS

Software: SOLIDWORKS CAD/CAM, MATLAB, Python, ROS / ROS2, Arduino C++, elementary TensorFlow/PyTorch
Hardware: Additive Manufacturing, Subtractive Manufacturing; Mechanical Design, Rapid Prototyping, Fabrication; Microcontrollers; Robotic Hardware & Automation; 3D Printers
Competencies/Interests: Oral & Written Communication; Critical Thinking and Analysis; Work on Teams; Classical Piano; Fantasy/Sci-Fi Literature

POSITIONS

Graduate Research Assistant for Continuum Robotics (COMETLab) | Worcester Polytechnic Institute, MA — Fall 2024
- I conducted research into redesigning an endoscope to incorporate surgical tools on a continuum robot. Additionally, I mentored an undergraduate capstone in the design of a user-accessible continuum robot teleoperative interface.

Ultraflex Power Technologies, Product Automation Intern | Ronkonkoma, NY — Summer 2024
- I worked with a company engineer to begin an ML-based line of automation solutions. I curated datasets, trained computer-vision ML models with TensorFlow and PyTorch, and created additional scripts for model deployment.

Graduate Research Assistant for Robotic Swarms (NEST Lab) | WPI, MA — Spring 2024
- I investigated self-diagnosis for root causes of error in distributed robot swarms running lost-cost algorithms.

Undergraduate Research in Everting Toroidal Soft Robotics (IRIS Lab) | Notre Dame, IN — Fall 2022, Spring 2023
- I investigated the adaptation of vine robot tip mount methods to design and fabricate sensor mounts for visual feedback for the lab's novel everting toroidal robot.

NeuroLux, Inc., Visiting Research Intern | Northfield, IL — Summer 2022
- I led a team of fellow interns and worked closely with company executives and engineers to design, code, and begin the construction of a miniaturized cyclic fatigue testing apparatus with sensory feedback for product durability testing.

Undergraduate Research in 3D Printing Biomimetic Mechanisms (Plecnik Lab) | Notre Dame, IN — Fall 2021
- I developed close familiarity with FDM dual-extrusion 3D-printers in work optimizing their precision in fabricating robotic finger prostheses using mixed-material mechanisms to reduce motor dependence and lower cost.

EXPERIENCE

Motion Planning, Legged Robotics, Continuum Robotics | WPI, MA — 2024

Graduate Robot Control, Intermediate Controls; Automation & Controls Lab | Notre Dame, IN; WPI, MA — 2024, 2023
- Applied principles of state-space control with manual PID tuning and LQR-derived feedback gains to control multiple SISO and MIMO systems in simulation, and physically with Arduinos, N.I. DAQs, and LabView

Graduate Robot Kinematics, Dynamics | WPI, MA — Fall 2023
- Developed Python control code in ROS2 for a physical 3R robotic arm to move between desired positions using LSPB trajectories, avoid an obstacle, move an object, and estimate an applied wrench with teams of peers

Senior Design (Capstone) | Notre Dame, IN — Spring 2023
- Iteratively designed, constructed, and programmed a non-filament-based 3D printer hot-end extruder with peer team based upon extensive mechanical and thermal analysis
- Presented and defended product design and performance with prior analysis and testing to a faculty committee

AWARDS/CERTIFICATIONS

***Tau Beta Pi* Engineering Honor Society** — Winter 2024

Engineer in Training (FE Examination Certification) — Summer 2023

Seed Stage Investment Award | Notre Dame, IN — Winter 2020
- Monetary prize for exceptional analysis and communicative skill in start-up investment opportunity evaluation course

Eagle Scout, Scouts of America | Garden City, NY — 2007 – 2019
- Formed a FIRST® LEGO® League Robotics Team for 6-8th grade students historically underserved in STEM
- Lectured for coaches and students in fundamentals of robot design and programming, and research development