Timothy J. DeMaro

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EDUCATION

Worcester Polytechnic Institute, M.S. R. | Worcester, MA   May 2025
Master of Science in Robotics Engineering
Cumulative GPA: 4.0

University of Notre Dame, **B.S. M.E.**| Notre Dame, IN   May 2023
Major in Mechanical Engineering with Concentration in Control and Mechanical Systems
Cumulative GPA 3.31; *Excluding Semester with Protracted COVID-19:* GPA 3.54
GRE Verbal: 166, Quantitative: 166, Writing: 5.0

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

SKILLS

Software: SOLIDWORKS CAD/CAM, MATLAB, Arduino C++, ROS2
Hardware: Additive/Subtractive Manufacturing; Rapid Design, Prototyping, and Fabrication; Microcontrollers
Competencies: Critical Thinking and Analysis; Classical Piano; Fantasy/Sci-Fi Literature

POSITIONS

Graduate Research Assistant in Robotic Swarms (NEST Lab) | Worcester Polytechnic Institute, MA   Spring 2024
- I am working with Prof. Carlo Pinciroli to develop and test methods of self-diagnosing root causes of error in disturbed swarms of robots where a fault has been detected.

Undergraduate Research in Everting Toroidal Soft Robotics (IRIS Lab) | Notre Dame, IN   Fall 2022, Spring 2023
- I worked with Prof. Margaret Coad to increase the capabilities of the ND IRIS Lab's novel everting toroidal robot. Specifically, I investigated the adaptation of vine tip mount methods to add visual feedback to the robot.

NeuroLux, Inc., Visiting Research Internship | 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 Biomimetic Mechanism Fabrication (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

Robot Control, Motion Planning, Swarm Intelligence | Worcester Polytechnic Institute, MA   Spring 2024
Graduate Research Assistance in Self-Righting SEA Quadruped Robot Design | WPI, MA   Fall 2023-Ongoing
- Designing and integrating robot quadruped legs using torsional springs in a serial elastic actuation structure to minimize torque transmitted to motors at impact during drop trials

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 continuous-operation, non-filament-based 3D-printer hot-end extruder with a team of peers using extensive mechanical and thermal engineering analysis
- Presented and defended product design and performance based upon prior analysis and testing to a faculty committee

Intermediate Controls; Automation & Controls Laboratory | Notre Dame, IN   Spring 2023
- Applied principles of state-space control with manual PID tuning and LQR-derived feedback gains to control multiple physical and simulated SISO and MIMO systems using Arduino microcontrollers, N.I. DAQs, and LabView

Study Abroad, Notre Dame London Global Gateway| London, England   Spring 2022
Design Tools and Methodology | Notre Dame, IN   Fall 2020, '21, '22
- Honed skills in SOLIDWORKS CAD/CAM and product development research/analysis to create a series of devices

Independent Robotic Projects   Summers 2020, '18, '17
- Iterated 3D-printing and fabrication of quadruped SpotMicroAI robot
- Designed and 3D-printed Arduino gesture-controlled rover controlled by a glove fit with XBee radios, flex sensors

AWARDS/CERTIFICATIONS

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