Daniel E. Martinez, Ph.D.

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EDUCATION

Georgia Institute of Technology, *Ph.D. in Robotics & M.S. in Mechanical Engineering* — August 2024
- Thesis: Image Guided High Precision Robotic Positioning in MRI for Medical Applications — **GPA:** 3.32/4.0
- NSF Graduate Research Fellowship Program (GRFP) Fellow

Florida International University, *B.S. in Mechanical Engineering* — May 2019
- Ronald E. McNair Scholar — **GPA:** 3.63/4.0

TECHNICAL SKILLS

- **Programming:** MATLAB, Python, C++, ROS, PyTorch, OpenCV
- **Fabrication:** CNC, 3D printing, Laser Cutter, Lathe, Carpentry
- **Languages:** English & Spanish (native), Japanese (advanced)
- **CAD:** SolidWorks, AutoCAD, Fusion 360

PROFESSIONAL EXPERIENCE

MRI Guided Medical Injection Robot — Atlanta, GA
Graduate Researcher, *Biorobotics and Human Modeling Lab* — Aug 2019 - Present
- Designed piezoelectrically actuated parallel-plane robot with sub-millimeter positioning accuracy
- Developed novel method of improving MRI resolution through application of super resolution algorithms enabled by sub-pixel shifts induced by the MRI compatible surgical robot, achieving 0.4mm precision
- Established data-based control method to compensate for internal friction and fluid resistance when navigating through complex fluid medium, achieving open-loop positioning accuracy of 0.96mm

Physiological State Estimation using ML for Social Robot Interaction — Wako, Japan
R&D Engineer Intern, *Honda Research Institute Japan* — Oct 2022 – Jul 2023
- Integrated a non-invasive wearable device and its proprietary software with Python, ROS, and Git to enable data streaming to other physical devices and subsystems in the project's code repository.
- Trained an SVM classifier on 24-hour physiological data of the user's physiological state to classify stress level as feedback for social robot interactions

Robotic Pipe Crawler for Power Plant Inspection — Miami, FL
R&D Engineer, *Florida International University Applied Research Center* — Sep 2018 – Aug 2019
- Designed peristaltic robotic pipe crawler to inspect integrity of 2-inch diameter pipes in coal power plants
- Led mechanical design, fabrication and hardware integration of sensors, microcontrollers, and motors to deploy functional prototype meeting the client's specifications.
- Achieved a pulling force of 108N, overcoming the friction on the tether cable across several 180-degree bends

Development of Multi-Agent Swarm Robotics Platform — East Lansing, MI
R&D Engineer Intern, *Michigan State University D-Cypher Lab* — May 2018 – Jul 2018
- Developed hardware for a differential drive swarm robot test-bed to study multi-agent control algorithms
- Interfaced ESP8266 Wi-Fi module with Arduino using TCP and serial communication to wirelessly transmit path-finding commands from central master system processing data from overhead cameras in MATLAB

Deployment and Optimization of Crankshaft Production Line — Detroit, MI
Systems Engineer Intern, *Fiat Chrysler Automobiles* — May 2017 – Aug 2017
- Assisted deployment of FANUC robots for the new crankshaft production line at the Trenton Engine Plant
- Analyzed cycle time data of crankshaft line over several months to identify bottleneck operation and redesigned robot automation movement pattern to reduce cycle time and increase crankshaft production

SELECTED PROGRAMMING PROJECTS

Multi-modal Sensing and Navigation Robot
- Trained robot to classify street signs from images through integration of OpenCV and K-nearest neighbors algorithm
- Integrated LIDAR and camera data in ROS to navigate differential drive robot through a walled course while following directions from street signs and avoiding obstacles using PID controller and SLAM

LEADERSHIP AND MENTORING

Over six years in leadership roles across multiple organizations, focusing on community engagement and member support. Key positions include President, Professional Development Chair, and STEM Outreach Chair of Theta Tau Professional Engineering Fraternity, Cultural Chair and Graduate Mentor for LOGRAS, and Events Coordinator for RoboGrads.

SELECTED PUBLICATIONS

- **D. E. Martinez**, et al. "Super Resolution for Improved Positioning of an MRI-Guided Spinal Cellular Injection Robot", Journal of Medical Robotics Research, May 2021
- **D.E. Martinez**, et al. "MRI Compatible Robotic Dosimeter System for Safety Assessment of Medical Implants", 2024 IEEE/SICE International Symposium on System Integration (SII) (pp. 25-29). IEEE. January 2024