



Nicolas G. Morales

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EDUCATION

Northwestern University , Evanston, IL	December 2023
Master of Science in Robotics	
Purdue University , West Lafayette, IN	May 2019
Bachelor of Science in Mechanical Engineering, Purdue Honors College	
Minors: Electrical and Computer Engineering, Spanish	
University of Canterbury , Christchurch, New Zealand	February 2018 – June 2018
Certificate of Proficiency with a focus on electrical and mechanical engineering	

WORK EXPERIENCE

Nauticus Robotics, Inc: Software Engineering Intern (<i>Houston, TX</i>)	June 2023 – September 2023
<ul style="list-style-type: none"> Developed visibility graph planning for guidance, navigation, and control (GN&C) of an AUV in a 3D underwater environment Implemented the novel algorithm using ROS 2, C++, octrees, multithreading, custom hash/heap structures, and behavior trees 	
DMC, Inc: Systems Engineer II (<i>Chicago, IL</i>)	August 2019 – August 2022
<u>Selected Specific Projects</u>	
<ul style="list-style-type: none"> Technical lead for onsite team providing launch support of a leading electric car company’s new battery production lines Technical lead/co-project manager for automated safety-critical loading system at a high-speed transportation R&D company 	
<u>General Responsibilities</u>	
<ul style="list-style-type: none"> Developed customized automation and SCADA solutions for machine/process control and data collection in multiple industries Interfaced with clients to coordinate efforts, better meet customer needs, and communicate project status regularly Troubleshoot automation systems developed by DMC, clients, and 3rd parties to prevent disruption of production facilities 	
Northrop Grumman (Orbital ATK): Mechanical Engineering Intern (<i>Dayton, OH</i>)	Summer 2016; Winter 2017; Summer 2018
<ul style="list-style-type: none"> Employed several CAD packages to design and additively manufacture novel structures for aerospace research and development 	
Herrick Laboratories: Undergraduate Research Assistant (<i>West Lafayette, IN</i>)	June 2017 – May 2019
<ul style="list-style-type: none"> Published a paper on the effects of interlayer wait time on the mechanical strength of additively manufactured parts 	

ENGINEERING PROJECTS

Omnid Mocobot Learning Pipeline for Collaborative Tasks:	March 2023 – Present
<ul style="list-style-type: none"> Converted Northwestern’s omnidirectional mobile cobot research platform from ROS 1 Noetic to ROS 2 Iron Developed and released an open-source C++ unit/integration testing package for using Catch2 v3 with ROS 2 (catch_ros2) Implementing a vision-based pipeline for action chunking with transformers to teach the cobots assistive collaborative tasks 	
Unitree Go1 Quadruped Autonomous Inspection:	January 2023 – March 2023
<ul style="list-style-type: none"> Upgraded onboard Jetson Nanos to ROS 2 Humble and wrote base C++ nodes for Go1 motion control and camera interfacing Integrated Go1 control package and LiDAR with Nav2 stack for SLAM, autonomous navigation, and obstacle avoidance Utilized EAST text detection and CRNN text recognition machine learning models to interpret text data in the Go1’s environment 	
Attack of the Franka 7-DoF Robotic Arm Control:	November 2022 – December 2022
<ul style="list-style-type: none"> Created a ROS 2 system to control a Franka Emika Panda arm to knock over “enemy” targets while protecting “allies” Architected an API to allow non-blocking usage of the ROS 2 MoveIt Motion Planning Framework in Python Designed a computer vision node that employed a RealSense D435i, OpenCV, and AprilTags to detect the workspace and targets 	
Differential Drive EKF SLAM Package:	January 2023 – March 2023
<ul style="list-style-type: none"> Implemented Extended Kalman Filter SLAM from scratch in ROS 2 with C++ for localization of a TurtleBot3 with LiDAR data Employed odometry, supervised and unsupervised learning, and a custom simulation to create and evaluate the SLAM algorithm 	
Gesture Controlled Robotic Arm (IMUnipulator):	November 2022 – December 2022
<ul style="list-style-type: none"> Wrote I2C, PWM, and other drivers in C for an nRF52 microcontroller to move a robotic arm based on input signals from an IMU 	
SimpleStrings Assistive Guitar Device for Music Therapy:	January 2019 – May 2019
<ul style="list-style-type: none"> Designed and assembled PCB/electronics to control IO and motors for an Arduino-based programmable chord playing device 	
Purdue Lunabotics: Excavation/Deposition Team Lead	September 2015 – May 2017
<ul style="list-style-type: none"> Directed a subteam tasked with designing, prototyping, and testing excavation/deposition systems intended to mine lunar soil 	

SKILLS

Software: C++, C, CMake, Python, Robot Operating System (ROS 2/ROS), Linux, Git, SVN, SQL, VBScript, MATLAB
Automation: Beckhoff TwinCAT, Ignition, Siemens TIA Portal, Rockwell Studio 5000, WinCC 7
Design: Inventor, NX, SolidWorks, CATIA, Creo, KiCad, Simplify3D, Cura
Language: Spanish (9.5 years education)

HONORS AND AWARDS

Purdue 2015 Stamps Leadership Scholar	March 2015 – May 2019
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