



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	Cumulative GPA: 4.00 / 4.00
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

DMC, Inc: Systems Engineer II (<i>Chicago, IL</i>)	August 2019 – August 2022
<u>Selected Specific Projects</u>	
<ul style="list-style-type: none">Onsite technical project lead for new battery production line projects at leading electric car companyCo-project manager for automated safe loading system project at high-speed transportation research and development companyPrimary developer of data collection and storage application for cartridge production data at healthcare diagnostics 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 industriesInterfaced with clients to coordinate efforts, better meet customer needs, and communicate project status regularlyTroubleshoot automation systems developed by DMC, clients, and 3rd parties to prevent disruption of production facilitiesEstimated project costs, wrote proposals, and successfully sold projects up to \$300K to new and existing clients	
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 research and development effortsModified open source FFF machine hardware and electronics to improve performance and work with new materials	
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 partsDesigned, laid out, and manufactured PCBs to assist with research efforts across the research group	

ENGINEERING PROJECTS

Unitree Go1 Robot Dog Autonomous Inspection:	January 2023 – March 2023
<ul style="list-style-type: none">Upgraded onboard Jetson Nanos to ROS2 Humble and wrote base C++ nodes for Go1 motion control and camera interfacingIntegrated Go1 control package and LiDAR with Nav2 stack for SLAM, autonomous navigation, and obstacle avoidanceUtilized 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 ROS2 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 ROS2 MoveIt Motion Planning Framework in PythonDesigned 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 ROS2 with C++ for localization of a Turtlebot3 with LiDAR dataEmployed 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">Programmed an nRF52-based microcontroller in C to move a 2-DoF robotic arm based on input signals from a 9-DoF IMUWrote drivers for I2C communication, PWM, servos, capacitive touch sensors, and more to interact with required devices	
SimpleStrings Assistive Guitar Device:	January 2019 – May 2019
<ul style="list-style-type: none">Worked with a team of engineers to develop an Arduino-based programmable assistive chord playing device for music therapyDesigned, laid out, and assembled custom PCB/device electronics to receive inputs and control 24 actuation motors	
Purdue Lunabotics:	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, Python, Robot Operating System (ROS2/ROS), Linux, Git, SVN, SQL, Structured Text, 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
Pi Tau Sigma Mechanical Engineering Honors Society, Beta Chapter	September 2016 – May 2019