Michael Tobia

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Education

Northwestern University | Evanston, Illinois | 3.4 GPA *December 2018*
Master of Science, Robotics

University of Houston | Houston, Texas | 3.7 GPA *May 2016*
Bachelor of Science, Mechanical Engineering, Magna Cum Laude, Honors in Major, Mathematics Minor

Experience

Mechanical Engineer, McFarland Pump Company LLC *December 2016 – August 2017*

- Saved months of future production time by producing accurate package models in Solidworks
- Reduced clients' expense by thousands through correctly matching pump seal material with working fluid
- Increased production efficiency through complete overhaul of QA/QC and documentation process

Engineering Intern, Lockheed Martin | Houston, TX *May 2013 – August 2013*

- Reduced battery testing time by weeks through creation of new quality exceptions and standards
- Responsible for testing adhesion strength of methods to secure absorbent material in space suit helmet following a helmet cooling system leak during the January 15th EVA mission that year using an Instron tensile testing unit
- Inspected, tested, and packaged electronics for delivery to the International Space Station

Projects

Hybrid Force/Motion Control

- Created a hybrid force/motion controller on the Sawyer 7-DOF Industrial Robot using an end effector mounted 6-axis ATI Force/Torque sensor
- Implemented accurate constrained velocity control algorithm with force control accurate to $\frac{1}{10}^{th}$ of a Newton
- Programmed in ROS using Python

Sawyer Bottle Cap

- Programmed the Baxter 7-DOF industrial robot to locate, unscrew, place, pick up, and re-screw a laundry detergent bottle cap
- Collaborated with a 5 student team in programming Baxter to both remove and replace a bottle cap
- Implemented algorithms to recognize AR tags used to locate and position the robot's end effector over the cap
- Produced a ROS package written in Python and using OpenCV as final deliverable

Mechatronics Rainbow Road

- Designed and built a robotic cart which is capable of following a rainbow path around a test track that features obstacles and variations in elevation
- Laser cut parts for the carts chassis and 3D printed the wheels after designing both in Solidworks
- Designed custom embedded microcontroller (PIC32MX) circuit in Eagle and programmed using C
- Created accurate motor controllers and wrapped feedback loop around data from Android phone programmed in Android studio to track the rainbow path's center

Image Stitch

- Wrote a program to stitch two images of a scene into a single panoramic image
- Uses SIFT feature matching to calculate homography and extract relative camera movement between images before warping one of the images and merging them into a panorama
- Algorithm was programmed in Python using OpenCV

Skills

Hardware Design: Proficient: Solidworks [MLC CAD Trained], Autocad, OnShape
Novice: Eagle

Programming Proficient: Python, ROS, MATLAB, Mathematica, Arduino IDE, Git/GitHub
Novice: Android Studio, C, Linux, OpenCV, TensorFlow, scikit-learn, weka

Fab and Prototyping: 3D Printing, Laser Cutting, Manual Vertical Milling, Car Modification, Mountain Bike Restoration