

Education**Robotics and Autonomous Systems (Mechanical Engineering) M.S.** | Arizona State University

Projected Graduation: May 2021

GPA: 4.00/4.00

Mechanical Engineering B.S.E. | Arizona State University, Barrett the Honors College

Graduation: May 2020

GPA: 3.74/4.00

Skills**Programming**

MATLAB
 Linux
 Git
 Python
 ROS
 VRML
 Arduino
 LabVIEW
 Java

CAD & FEA

SolidWorks
 Solid Edge
 ANSYS
 Fusion 360
 Tinkercad

Simulation

Simulink
 Webots
 Gazebo

Optimization

YALMIP

Motion Capture

Motive

Drone Control

QGroundControl

Laser Cutting

UCP

3D Printing

Ultimaker Cura
 LulzBot Cura
 Ideamaker
 Zortrax Z-Suite
 MakerBot Print
 Formlabs Preform

Basic Computing

Microsoft Office
 Google Drive
 Adobe CC

Experience**Graduate Researcher | Optimal Control for Lunar Tumbling Robot**

Arizona State University | Intelligent Control and Estimation of Things (ICE-T) Lab | NASA

 YALMIP
 Aug 2020 – Current

Investigating optimal control techniques for hybrid systems using the YALMIP MATLAB toolbox. Findings will be applied to NASA's lunar tumbling robot in the Webots robotic simulator.

[Optimal Control](#)
[Hybrid Systems](#)
[Model Predictive Control](#)
[Simulation](#)

Summer Intern | Numerical Simulator for Lunar Tumbling Robot

NASA | Goddard Space Flight Center

 VRML
 Jun 2020 – Aug 2020

Created a 3D simulation test bed in Webots as a platform to develop estimation and control algorithms for NASA's lunar tumbling robot. Converted Solid Edge assemblies to VRML-based robot models. Implemented python-based mode logic and motion control algorithms for manual and autonomous control. Optimized workflow with automated processes to rapidly adjust and iterate simulations. Created a wiki page with a user manual and tutorials for others to reuse and reproduce all work from scratch. Generated video demonstrations for project fundraising. Maintained distributed version control of source code with git.

[Simulation](#)
[Mode Logic](#)
[PID](#)
[Automation](#)
[Documentation](#)
[Version Control](#)

Makerspace Student Worker

Arizona State University | Hayden Library Makerspace

 SolidWorks
 Sep 2019 – Current

[3D Printing](#)
[3D Printer Repair](#)
[Laser Cutting](#)
[Media Production](#)
[Consulting](#)
[Trainings / Workshops](#)

Capstone | Satellite Solution for Harmful Orbital Targets (Sat-SHOT)

Arizona State University | Howe Industries

 SolidWorks
 Aug 2019 – May 2020

Designed a thermodynamic system to freeze an ice projectile and reject heat to space. Designed an electronically controlled mechanical system to load ice projectiles into a gas gun that will fire at and deorbit existing space debris. All system components were designed in SolidWorks to be produced by a combination of metal fabrication and 3D printing. Prototype manufacturing was halted due to Covid-19 shutdowns.

[CAD Design](#)
[Thermodynamics](#)
[Orbital Mechanics](#)
[Manufacturing](#)
[Process Control](#)

Independent Researcher | Two-Wheel Self-Balancing Robot

Arizona State University | Independent Research Continued as Team Project

 SolidWorks
 Jan 2019 – Dec 2019

Designed Arduino-based robot on a custom 3D-printed chassis. Team developed PID, full state feedback, and linear quadratic regulator controllers for self-balancing. [See [GrabCAD](#) for more information]

[CAD Design](#)
[Controller Design](#)
[PID](#)
[FSF](#)
[LQR](#)

Undergraduate Researcher | Autonomous Coupling of a UAV and UGV

Arizona State University | Human Oriented Robotics and Control (HORC) Lab

 SolidWorks
 Nov 2018 – Nov 2019

The UAV can follow the UGV through a space, couple with the UGV, and lift the UGV over an obstacle. The UGV can navigate the space while carrying the UAV. This heterogeneous team of simple robots can achieve more together than they could on their own but cost less than a single robot with the same capabilities.

Designed electromagnetic coupling mechanism in SolidWorks. Designed Python/ROS based autonomous controls. Used OptiTrack motion capture system for localization and tracking. Processed position tracking data using MATLAB. Presented research to a panel of professors. Thesis was accepted and approved. [See [Video](#), [Paper](#), or [GrabCAD](#) for more information]

[Multi-Robot System](#)
[Autonomous Control](#)
[Motion Capture](#)
[Rapid Prototyping](#)

See more of my personal projects on [GrabCAD](#)