

Education

University of Michigan - Ann Arbor

M.S.E. Mechanical Engineering, April 2020, *Specialization: Dynamics and Controls*

GPA: 3.850/4.000

B.S.E. Mechanical Engineering, May 2019

GPA: 3.714/4.000

Additional Coursework

MITx 7.00x - Introduction to Biology - the Secret of Life

Audited Nov 2024 - Mar 2025

MITx 7.05x - Biochemistry: Biomolecules, Methods, and Mechanisms

Audited Nov 2024 - Feb 2025

Work Experience

United Launch Alliance

August 2021 - Present

Control Dynamics Engineer

Centennial, CO

- Performs dynamic analysis of stage separation and spacecraft separation events to demonstrate acceptable clearance margins, attitude pointing errors, and rotational rates; documents results in technical memos
- Tunes rocket attitude control systems to ensure stable flight and good controller performance
- Develops mission unique flight sequence, collaborating with multiple stakeholder groups to balance competing interests and ensure compliance with all mission requirements

Ford Motor Company

June 2020 - June-2021

Mechanical Engineer - Suspension Design

Dearborn, MI

- Owned design of rear springs and dampers for new vehicles during early development stages; designed components for optimal size and weight while managing performance targets and packaging constraints

Cold Regions Research and Engineering Laboratory

July – August 2019

Research Mechanical Engineering Intern

Hanover, NH

- Upgraded wheeled robotic vehicle hardware and software to increase sensing capabilities for improved autonomous mobility, enabling implementation of wheel slip detection and adverse terrain avoidance
- Programmed robot's main computer to set up communication with the sensor and actuator array (wheel speed/torque sensors, radar, GPS, radio transmitters/receivers, and 3-phase BLDC motor controllers), enabling remote control of robot and expanding possibilities for feedback control and data collection

Adient

May – August 2018

Mechanical Design Intern – West Coast Business Unit

Plymouth, MI

- Redesigned folding headrest mechanism to bring load carrying capability into compliance with all federal and OEM requirements while also reducing part cost, increasing product marketability
- Performed destructive testing on original headrest design and performed root cause analysis of failures to identify design weaknesses as target areas for redesign efforts
- Modeled design changes in CAD and assessed strength using FEA, showing an improvement in load carrying capability of over 400%, exceeding the strictest OEM requirements

Research / Design Project Experience

Sudoku Solving Robot

January 2021

- Designed and built a robot out of Legos to solve a sudoku puzzle on a touchscreen cell phone
- Wrote Python script to figure out solution to sudoku puzzle and then determine touchscreen actions required to enter solution on cell phone
- Wired motors and sensors to Arduino via breadboard and programmed feedback control loop to provide positional control of the robot's touchscreen effectors, enabling the robot to perform touchscreen actions commanded by the Python script

Digital Control of Active Suspension for Off-Road Vehicle

April 2020

- Designed digital controller to control damping force of active suspension on an off-road racecar to reduce tendency of vehicle to pitch forward when going over jumps, reducing the likelihood of rollover
- Developed half-car model in MATLAB to model vehicle dynamics when going over jumps
- Theorized controller design to optimize damping force for minimal vehicle pitch velocity when jumping
- Implemented controller in simulation and tuned control parameters, showing solution could drastically reduce likelihood of rollover for a wide range of jump sizes and vehicle speeds

Senior Design: Low-Speed Turning Radius Solution for Off-Road Vehicle

September – December 2018

- Designed a novel differential mechanism to implement sprag-type clutches into the driveline of an off-road vehicle, enabling a 15% reduction in low-speed turn radius without incurring traction losses associated with conventional open-differential mechanisms
- Conducted testing to measure rear wheel torques during cornering to gain an understanding of the effects of the rear track on vehicle turn dynamics
- Performed experiment to confirm hypothesis that allowing the outside rear wheel to freely spin in a turn would reduce the turn radius compared to a locked-differential

Michigan Baja Racing Team

September 2016 – June 2019

Technical Director, System Lead – Suspension

June 2018 – June 2019

- Conducted experiment to determine effects of steering kinematic changes on vehicle turn radius, enabling optimization of suspension design resulting in 4.5 ft reduction in turn radius (37% improvement)
- Fitted three rear suspension links with strain gauges and collected load data from on-car testing to derive all six forces/moments acting on rear wheel to correct inaccurate load cases used in finite element analysis
- Redesigned failed rear suspension link to withstand all driving loads without yielding, increasing component life and preventing undesirable rear toe changes

Testing Lead

October 2017 – June 2018

- Utilized Somat eDAQlite data acquisition system to collect data from accelerometers, strain gauges, linear potentiometers, pressure transducers, IR thermometers, and hall effect RPM gauges to improve understanding of component environments and operating conditions to better guide design decisions

System Lead – Brakes

June 2017 – June 2018

- Designed custom hydraulic braking system to eliminate 13 seals and improve system serviceability, reducing potential for system failure through leakage and shortening service time by 8 hours
- Eliminated 50 system components to reduce overall complexity and cut system mass by 1 pound

Autonomous Marble Sorting Mechanism

January – April 2017

- Designed a four-bar linkage and mechatronic control system to autonomously collect and sort marbles based on color using three sensor inputs

Teaching Experience

University of Michigan - Mechanical Engineering Department

September 2019 – May 2020

Graduate Student Instructor - ME 360: Modeling, Analysis, and Control of Dynamic Systems

Winter 2020

Graduate Student Instructor - ME 320: Intro to Fluid Mechanics

Fall 2019

- Held office hours and review sessions to help students grasp course concepts
- Conducted lectures when the professor was unavailable
- Graded quizzes, exams, and final projects

Technical Skills

Programming: proficient with MATLAB, Simulink, Python, and Arduino; familiar with C, C++, and JavaScript

Software: CAD (CATIA, SolidWorks, NX), Teamcenter, FEA (HyperWorks), LabVIEW, and MSC Adams

Manufacturing: TIG welding, CNC machining, composite layups, 3D printing, waterjet, lasercut, and soldering