

Mason Elms

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EDUCATION

University of Pennsylvania, School of Engineering and Applied Sciences, Philadelphia, PA **August 2020 - May 2021**

Candidate for Master of Science in Mechanical Engineering

- Relevant Coursework: Design of Mechatronic Systems (Spring 2021), Hovering Vehicle Design (Spring 2021), Computer Vision (Spring 2021), Introduction to Robotics, Machine Learning

University of Pennsylvania, School of Engineering and Applied Sciences, Philadelphia, PA **August 2016 - May 2020**

Bachelor of Science in Mechanical Engineering

- Relevant Coursework: Aerodynamics; Stability, Control, and Performance of UAV's; Control Theory; Fluid Mechanics; Dynamics; Machining and Mechanical Design; Mathematical Basis of Computer Science

The Bishop's School, La Jolla, CA

August 2012 - May 2016

- National Merit Scholar Finalist; Marlene Teitelman Performing Arts Award in Technical Theatre; awarded for recognition of artistic excellence in technical theatre

SKILLS AND PROJECTS

Technical Skills and Software:

- Advanced Knowledge: Python; C; Scikitlearn; SolidWorks; Design for Manufacturing; ANSYS 19.1; COMSOL Multiphysics; MATLAB; Machining; Rapid Prototyping; Microcontroller Register Manipulation
- Basic Knowledge: ROS; PyTorch; Feedback Control; C++; Thermal manufacturing methods; OpenCV; Computer Vision; Java

Projects:

- Built full code base in Python to control a simulated 5-axis robot arm in ROS to compete in a block picking and stacking game. The code base included path planning, gameplay decision making, and the pickup of randomized static and dynamic blocks. Implemented forward and inverse kinematics, an RRT path planning algorithm, and coordinate system transforms to assist in gameplay.
- Worked on a team to use Scikitlearn tools to complete a Kaggle challenge for a binary prediction problem using stock market and news headline data. Implemented Random Forests, Logistic Regression, SVM, and Multi-Layer Perceptron models for classification problem, including hyperparameter search for optimal results.
- Designed and fabricated two degree of freedom master-slave teleoperation system using AT32Mega Teensy 2.0 microcontroller using register-level ADC reading of two potentiometers and timer-controlled PWM to mirror motion with servos.
- Designed and fabricated a Wi-Fi-enabled semi-autonomous differential drive mobile base to complete driving and game challenges. Fabricated electrical hardware to control and drive two DC motors, control of two servos, and handling of bump sensors, IR break sensors, a 6-axis IMU, and using an ESP32 and a Teensy 2.0 slaved over I2C to a master ESP32.

WORK EXPERIENCE

TAIT Towers, Lititz, PA

June – August 2019

Integration Intern

- Worked in a large team interfacing with management, fabrication, and design departments to plan and test construction and assembly and guide parts through fabrication to completion.
- Assisted in fabrication, assembly, and integration of single permanent installation stage for major theme park company, including two automated stage lifts, steel structure, and a pneumatic actuation system
- Assisted in assembly and integration of multiple touring stages

ModLab, Philadelphia, PA

May – August 2018

Research assistant on Spiral Zipper project

- Prototyped and performed tests to develop thermoforming production techniques utilizing steam heating of 1/32" ABS bands.
- Wrote process documentation to allow continued research into the processes and techniques developed through the project.
- Designed and fabricated aluminum structures and equipment to improve controllability and efficiency of heating and eliminate unwanted deformations in the finished bands.

LEADERSHIP AND ACTIVITIES

The Mask and Wig Club of the University of Pennsylvania, Philadelphia, PA

August 2016-May 2020

Stage Manager for collegiate musical theater company

- Managed a team of 12 undergraduate crew members to design and build sets and operate backstage, show-running, and logistical necessities for two productions each school year
- Acted as Technical Director, Stage Manager, Set Designer, and Master Carpenter for fall sketch show and Technical Director, Stage Manager, and Master Carpenter for original full book musical for the entirety over a four month run including a week-long tour

Hexagon Senior Engineering Society, Philadelphia, PA

March 2019-May 2020

Executive Board Member, Active Member

- Organize and guide tours of University engineering facilities for prospective students
- Plan social gatherings and prospective member recruitment