Michael Burgess

mjburgessjr@gmail.com • mburgjr.github.io

EDUCATION

Massachusetts Institute of Technology (MIT) / *M.S. Candidate in Mechanical Engineering*   May 2025
Researching topics in robotic manipulation, machine learning, and tactile-sensing hardware design.

Massachusetts Institute of Technology (MIT) / *B.S. in Mechanical Engineering*   May 2023
Courses: Underactuated Robotics, Bio-inspired Robotics, Nonlinear Control, Machine Learning, Algorithms
GPA: 5.0 / 5.0, GRE: 170 Quant / 160 Verbal, SAT: 1520/1600, SAT Math II: 800/800

WORK & RESEARCH

Commonwealth Fusion Systems / *Mechanical Engineering Intern*   May 2023 - Aug. 2023
- Modeled parts for magnet subsystems on a novel tokamak nuclear fusion reactor using NX and ANSYS software.
- Specifically designed supports for poloidal field coils with consideration of loading from the larger system's magnetic fields.
- Key takeaways from the internship were skills in electromechanical analysis, communication of results, modeling techniques.

MIT Biomimetic Robotics Lab / *Undergraduate Researcher*   Jan. 2022 - May 2023
- Performing research on trajectory planning over non-flat terrain for a quadruped (cheetah-like) robotic system.
- Developing a novel controller that decouples kinematic and dynamic constraints to enable online planning over rough terrain.
- Primary work done in Matlab using Casadi package, requires knowledge of algorithms, non-linear optimization, RRT.

Markforged / *Software Engineering Intern*   May 2022 - Aug. 2022
- Wrote simulated annealing based algorithm to improve printer bed packing, thereby increasing number of parts per print
- Researched and tested solutions over the course of the summer. All code was written in Typescript.
- Learned a lot about the day-to-day workflow as a software engineer. Held meetings and gave presentations.

NASA Langley Research Center / *Engineering Intern*   Jan. 2021 - May 2021
- Optimized convolutional neural networks that estimate where a fluid flow becomes turbulent along the surface of an airfoil.
- These models predict the amplification rate of instabilities over the wing based on flow profile.
- Incorporated these models into flight simulation solvers for practical use in minimizing viscous drag.

General Motors (GM) / *Controls Engineering Intern*   May 2020 - Aug. 2020
- Automated standard hardware-in-the-loop test cases for engine controller software using Python and dSpace.
- Built code libraries to locate and diagnose errors across cars' control communication network.
- Required knowledge of multiple coding languages and control theory to investigate and resolve nested issues in software.

ACTIVITIES & PROJECTS

MIT Global Teaching Labs (GTL) − Italy   Jan. 2020
- Spent a month in Rho, Italy teaching robotics concepts to high school students.
- Created and taught my own curriculum of circuits and PID control systems, including lectures, exams, and experiments.

Electric Skateboard   Feb. 2019
- Designed and constructed an electrical circuit and mechanical drive train for a homemade motorized skateboard.
- Used CNC to cut a custom-designed adjustable motor bracket, which holds together a pulley drive-train system.

MIT Momentum Design Competition   Jan. 2019
- Prototyped an embedded system that alerts ride-share passengers of any forgotten items detected in the vehicle.
- Connected speakers and an array of lights to a Raspberry Pi running object recognition software with the help of Arduino.

TECHNICAL SKILLS

Software: Machine Learning | Python | C++ | Matlab | Drake | ROS | Isaac Gym | PyTorch | TensorFlow
Mechanical: Solidworks | Autodesk | ANSYS | NX | Fluids | FEA / CFD Simulation | CNC | Lathe
Electrical: Arduino | Raspberry Pi | Circuits | Simulink | LabView | Soldering