

Michael Burgess

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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

The AI Institute / *Research Intern* Sept. 2024 - Dec. 2024

- Worked on developing a robust and agile manipulation hardware platform for dynamic, contact-rich manipulation tasks.
- Responsibilities included developing an efficient computer vision system to track a baseball in real-time via high-speed camera to catch the baseball on hardware. This project required use of PyTorch Lightning, Ray, and OpenCV tools.

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.

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