

# KELSEY FONTENOT

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## EDUCATION

### Massachusetts Institute of Technology

Cambridge, MA

*Candidate for Bachelor of Science in Mechanical Engineering*

Class of 2026

GPA: 4.8/5.0, Concentration in Controls, Instrumentation, and Robotics; Minor in Literature

- MIT's NEET program in Autonomous Machines with a focus on interdisciplinary and hands-on projects
- Relevant Coursework: Dynamics & Controls I & II, Design & Manufacturing I: Autonomous Machines, Fundamentals of Programming, Design of Electromechanical Robotic Systems, Introduction to Robotics
- Ron Brown Scholar Program – Captain, Member of Pi Tau Sigma – Pi Kappa Chapter

## PUBLICATIONS

Fontenot, K., Gorti, A., Goel, I., Buonassisi, T. & Siemenn, A.E. (2025). *Closed-Loop Robotic Manipulation of Transparent Substrates for Self-Driving Laboratories using Deep Learning Micro-Error Correction*. [Manuscript submitted for publication.] <https://doi.org/10.48550/arXiv.2512.06038>

## RESEARCH EXPERIENCE

### MIT Accelerated Materials Laboratory for Sustainability

Cambridge, MA

*Undergraduate Researcher*

January 2024 – Present

- Developed a closed-loop system for automated placement and validation of glass slide substrates.
- Integrated a UFACTORY robotic arm and Intel RealSense Depth camera for use in an autonomous laboratory dedicated to the fabrication, characterization, and optimization of semiconductor materials.
- Designed and iterated custom grippers for robot end effector, a substrate hotel & dispenser, and an actuating platform to allow the robot easier access to the substrates with SolidWorks and Arduino.

### MIT Laboratory for Aviation and the Environment

Cambridge, MA

*Undergraduate Researcher*

September 2024 – December 2024

- Collaborated with team of researchers to design, build, and test an electroaerodynamic aircraft prototype.
- Designed and manufactured the aircraft's main landing gear interface and nose landing gear with CAD.
- Produced a main landing gear prototype using carbon fiber and balsa to test the design's structurability.

### Interactive Robotics Group, MIT Computer Science & Artificial Intelligence Lab

Cambridge, MA

*Undergraduate Researcher*

February 2023 – May 2023

- Explored multi-agent learning each week through neural networks and PyTorch.
- Programmed an image classifier to learn the basics of training/testing sets and tracking accuracy.
- Conducted several tests using a variational autoencoder by changing different variables to understand each working component of the autoencoder through visualization of the latent space.

### Agile Robotics & Perception Lab, New York University

Brooklyn, NY

*Research Intern*

June 2021 – June 2022

- Collaborated with a team of graduate students to brainstorm new ways for attaching onboard camera holders to drones and record different angles of the drone's flight.
- Improved design and method of attaching payloads to drones with Autodesk Fusion 360 and Autodesk Inventor therefore improving the visual feedback from the drone's cameras.
- Used Robot Operating System (ROS) to create a tag detection program that could locate the tag and give its coordinates to relative to the drone's camera.

## **Hofstra University Summer Science Research Program**

Hempstead, NY

*Research Assistant*

June 2020 – August 2020

- Designed a housing cassette with blood collection capability for COVID-19 serological lateral flow immunoassay kit in a remote project advised by Dr. Roche de Guzman of Bioengineering Materials Lab.
- Used Autodesk Inventor to create hand-drawn sketches and 3D models of the cassette.
- Developed and tested several prototype iterations to minimize size and retain full functionality.

## **TEACHING & MENTORING**

### **MIT Mechanical Engineering Department**

Cambridge, MA

*Lab Assistant*

February 2025 – Present

- Guiding students through and grading their lab assignments for Dynamics & Controls II to strengthen their understanding of fundamental controls concepts covered in the course's lectures and problem sets.

### **Alpha Phi Sorority**

Cambridge, MA

*Coordinator of Academic Development*

January 2024 – Present

- Engaging chapter members of scholarship opportunities and campus resources via monthly newsletters.
- Encouraging good academic practices and intellectual development with an engaging, incentive program.

### **DesignPlus Learning Community**

Cambridge, MA

*Associate Advisor*

September 2023 – Present

- Guiding and providing academic and emotional support to a group of eight first year students each year.
- Meeting weekly with the larger cohort brought together by a passion for design in its many forms.

### **MIT Physics Department**

Cambridge, MA

*Teaching Assistant*

September 2023 – May 2023

- Assisted students in lecture group problem solving for Mechanics and Electricity & Magnetism courses.

### **MIT Admissions**

Cambridge, MA

*Tour Guide*

January 2023 – Present

## **INDUSTRY EXPERIENCE**

### **General Motors**

Spring Hill, TN

*Controls Engineering Intern*

June 2024 – August 2024

- Supported controls installation and launch activities for Rechargeable Energy Support System (RESS) module equipment with Vehicle Systems Automation Controls Execution team at Spring Hill Plant.
- Ensured production readiness & support during early launch period via PLC, HMI, and robot work.
- Worked with safety, controls, and process teams to update cell safety placards across the building.

### **THINK Conservatory**

Chicago, IL

*Intern*

June 2023 – August 2023

- Collaborated on projects for strategy consulting firm's major clients, Kraft Heinz and Chamberlain Group, researching consumer relationships and attitudes with their brands.
- Worked on projects for Kraft Heinz's major products, Kraft Mac and Cheese, Delimex, and Cheese Singles, including strategic restructuring necessitated by pandemic-related economic impact, consumer impact from branding campaigns and on-pack information architecture, and innovation in packaging design. Attended all interviews, analyzed interview transcripts, and provided relevant verbatims to support strategic direction of final reporting, and joined in final deliverable meetings with client.
- Participated in an early product innovation project for Chamberlain Group's major B2B brands, meeting in-person with UX and engineering development team to kick off and ensure alignment on project objectives.

## LEADERSHIP

### Gordon-MIT Engineering Leadership Program

Cambridge, MA

*Gordon Engineering Leader*

September 2024 – Present

- Participating in selective leader development program focused on being an effective member or leader of industry engineering team, actively practicing leadership, teamwork, and communication skills.

### MIT Motorsports (FSAE)

Cambridge, MA

*Impact Attenuator Lead*

September 2022 – June 2025

- Optimized total weight savings, material usage, and testing time with a team of three for the 2025 car.
- Led 2024 car's impact attenuator for entire design cycle, including R&D, manufacturing, and testing.

## CLASS PROJECTS

### 2.009 Product Engineering Process

Fall 2025

- Led and managed a 15-person team as a System Integrator to design and construct our product prototype
- Scribbly is a user-friendly embroidery pattern printer that draws directly onto multiple types of fabric (ie. denim, cotton, polyester) with our custom software that converts .png, .jpg, or .svg images into g-code

### 2.12 Introduction to Robotics

Spring 2025

- Final project was centered on landfills with a focus on sorting bottles on a conveyor belt into correct bins
- Collaborated with another student to design our team's custom controller for the Universal Robot 5 arm and to develop the path plans for picking and placing the different colored and different shaped bottles.

### 2.017 Design of Electromechanical Robotic Systems

Spring 2025

- Semester long project centered on designing and developing an underwater robot that could locate, semi-autonomously navigate towards, and retrieve abandoned crab and lobster pots from the sea floor.
- Collaborated with another student to design a PID controller for our underwater robot to autonomously navigate toward an abandoned lobster pot so the pot can be retrieved.

### 2.671 Measurement and Instrumentation

Fall 2024

- Tested aluminum honeycomb structures via axial loading and developed a model relating the structure's volume to energy it absorbed and peak and average forces the structure withstood over a set distance.
- Model was used for MIT Motorsports to influence design choices of the impact attenuator with the goal of minimizing size while maintaining safety of the car in accordance with the rules of the FSAE competition.

### 2.S007 Design & Manufacturing I: Autonomous Machines

Spring 2024

- Designed, manufactured, and programmed a wheeled autonomous robot for a gameboard competition.
- My robot was focused on simplicity of design and ease of switch into autonomous mode with the goal of moving a weighted ball up a ramp and into a pit to maximize points gained through autonomous actions.

### 16.632 Introduction to Autonomous Machines

Fall 2023

- Learned the fundamental aspects of autonomous navigation and localization through a series of hands-on exercises with a variety of sensors and a small-scale autonomous vehicle utilized for implementation.
- Culminating project involved using an inertial measurement unit sensor, a line detection sensor, an optical distance sensor, and PID turning on our robots to autonomously navigate a maze in the least time.

## TECHNICAL SKILLS

- Programming languages: Python, MATLAB, Java, C++, Javascript
  - Computer aided design: Autodesk Inventor, Fusion 360, SolidWorks, Siemens NX
  - Machining: Lathe, Waterjet, Mill (CNC & Manual), Drill Press, Bandsaw, Press Brake, Sandblaster, Epoxy
  - Other: Linux, ROS/ROS 2, Soldering, Circuitry, 3D Printing (FDM), Arduino, Teamcenter, SQL
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