Carter Tucker

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EDUCATION

Massachusetts Institute of Technology (MIT) – Cambridge, MA **Expected May 2028**

Bachelor of Science in Mechanical Engineering

GPA: 5.0/5.0

Relevant Coursework: Mechanics and Materials I/II, Dynamics and Control I, Design and Manufacturing, Measurement and Instrumentation

PROJECTS & TECHNICAL EXPERIENCE

2007 Kawasaki Ninja Restoration & Modification **2025 - Present**

- Restoring a sport bike with custom aerodynamic bodywork and modern, digital electronics
- Rebuilt and tuned dual carburetors to factory specifications
- Reverse-engineering OEM throttle linkage to guide the development of an electronic throttle-by-wire replacement
- Performing CFD analysis in ANSYS Fluent on custom fenders to evaluate drag reduction

College Football Prediction Model **January 2026**

- Developed a Python-based statistical model to predict college football game outcomes using 25,000+ games since 1980
- Trained the primary model parameters using time-series adaptive learning with Kalman filtering, and time-weighted batch learning
- Correctly predicted the winner of 2024-25 season games 73.1% of the time; correctly predicted the championship over/under where ESPN failed

Autonomous Line-Following Robot **2025**

- Designed and programmed an autonomous robot using PID control and a line-finding search algorithm implemented in C++
- Achieved path tracking accuracy within a 3 cm deviation from the path centerline using an IR sensor array, motor drivers, and encoders
- Tuned gain over many iterations to minimize oscillations through and after sharp turns

MITERS & Pappalardo Machine Shops – Member **2025 - Present**

- Fabricate aluminum, acrylic, and steel components using manual mills, lathe, and band saw
- Machined a custom flashlight seal and housing assembly to ±0.005 in tolerances
- Assisted with tooling setup, equipment maintenance, and shop clean-up
- Supported prototyping and troubleshooting of various member projects

Custom Desktop Speaker System **2024 - 2025**

- Designed and fabricated a ported speaker enclosure tuned for uniform low-frequency response and minimal resonance effects
- Assembled the crossover module, amplifier, and drivers
- Analyzed Bode plots to refine frequency response for my specific drivers

OTHER EXPERIENCE

STEM Instructor & Assistant **July 2024 - Present**

- Tutor 75+ high school students at annual STEM summer camps
- Serve as a TA for Physics I, Physics II, and an Introduction to Making seminar, mentoring students in problem-solving and fabrication

TECHNICAL SKILLS

CAD & Simulation: SolidWorks, ANSYS (FEA/CFD), MATLAB, Fusion360
Fabrication: Manual machining (mill, lathe), welding, 3D printing
Electronics: Circuit design, soldering, sensor integration, motor drivers
Programming: Python (pandas, NumPy, scikit-learn), Java, C++