Jeffrey Lau

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Education

Carnegie Mellon University — Pittsburgh, PA
B.S. in Mechanical Engineering; Additional Major in Robotics: 4.0 / 4.0 UW — *Aug. 2026 – May 2030*

Great Neck South High School — Great Neck, NY
GPA: 4.0 / 4.0 UW — *Sept. 2022 – June 2026*

Experience

Carnegie Mellon Racing — Carnegie Mellon University
Perception Engineer (Autonomous Team) — *Sept. 2026 – Present*

- Implemented DBSCAN cluster filtering to reject objects exceeding a configurable query threshold, improving cone candidate selection
- Combined LiDAR and camera data to estimate a confidence score for each detected cone
- Created incremental DBSCANs between LiDAR sectors to increase efficiency

FIRST Robotics Team: Rebel Robotics — Great Neck South High School
CAD Team Lead — *Sept. 2022 – June 2026*

- Designed all mechanisms on the robot (elevator, drive base, intake, shooter, agitator, claw, etc.) and directed robot layout using Inventor CAD
- Facilitated part manufacturing through CNC operation and 3D printing
- Handled robot wiring and consolidated electrical packaging
- Led the team to qualify for the FIRST Robotics World Championship all four years (2023–2026)
- Mentored 30+ rookie members, organizing offseason development activities, and creating an Inventor CAD course

Projects

Thrust-Vectoring EDF Rocket | *C++, CAD, Electronics* — May 2026 - June 2026

- Worked with team of 3 to build an electric ducted-fan rocket with thrust vector control and active stabilization
- CAD-designed and 3D-printed the complete rocket structure with an 80 mm EDF and 4 servo-actuated TVC flaps
- Managed electronic wiring, design, and packaging for an ESP32-based system
- Developed a PID control algorithm using MPU feedback to calculate corrective flap movement for thrust vector control
- Created a digital testing interface to simulate rocket orientation and TVC responses
- Supported tethered testing to tune PID system and evaluate flight balance

Automatic Piano Player | *C++, Python, CAD, Electronics* — Jan. 2026 – April 2026

- Worked with team of 3 to design and build an 84-key modular automated piano player that uses solenoid actuation arrays driven via a MOSFET circuit controlled by an Arduino Mega
- CAD-designed complete piano player structure and electric packaging
- Developed embedded C++ firmware for real-time note-to-actuator mapping that translates incoming digital note events into chronological solenoid actuations
- Built a Python-based web application for MP3 processing and audio-to-MIDI transcription, generating time-stamped note events streamed over serial communication

Hexapod | *C++, JS, CAD, Electronics* — March 2025 – June 2025

- Designed and built a six-legged remote-controlled robotic platform with coordinated multi-leg locomotion
- Modeled the hexapod in Inventor CAD and 3D printed all structural components out of ABS
- Programmed gait algorithms in C++ (tripod gait & ripple gait) that ensured stable walking, turning, terrain adaptation, and gyroscopic stabilization
- Implemented inverse kinematics and Bezier curves to debug jitter and decrease motion discontinuity
- Developed a web-based control UI using JavaScript, HTML, and CSS to enable local live remote operation of the hexapod on a given WiFi network

Awards

STEM: 4x FIRST Robotics World Championship Qualifier (2023, 2024, 2025, 2026), FIRST World's 2024 Galileo Division Engineering Inspiration Award, 2x FIRST Regional Engineering Inspiration Award (Long Island, Rocket City), 3x FIRST Regional Finalist (Greater Pittsburgh, 2x Long Island), FIRST 2024 Kenneth R. Vessey Jr. Robotics Invitational Winner

Skills

Technical: CAD (SolidWorks, Inventor, Fusion360), C++, C, Python, MATLAB, Circuits, 3D Printing, CNC Milling
Creative: Video Editing, Photoshop
Language: Fluent in English, Mandarin, Cantonese