

Hudson Aibel

hudsonaibel@gmail.com | hudsonaibel.com | 310-867-0725 | linkedin.com/in/hudson-aibel

EDUCATION

Columbia University, School of Engineering and Applied Science New York, NY
Bachelor of Science – Mechanical Engineering | GPA: 3.62 Expected May 2028
Relevant Coursework: Advanced Manufacturing Processes, Materials Selection for Mechanical Design, Materials & Manufacturing, Heat Transfer, Mechanics of Solids, Multivariable Calculus, Applied Mathematics, Electromagnetism & Optics

SKILLS

Manufacturing Processes: DFM, GD&T, machine design, engineering drawing, tolerance stack-up, failure analysis, CNC milling & turning, manual machining, wire EDM, soft jaws, investment casting, sheet metal, progressive dies

Software & CAD: SOLIDWORKS, Onshape, Fusion 360, KiCad, MATLAB, Python, C++, OpenCV, Arduino, HTC Vive, Raspberry Pi

Machines: Haas CNC Mill, Haas 4-Axis Lathe, Bridgeport Mill, Mitsubishi RA90 Wire EDM, Boss Laser Cutter, 3D Printing

WORK EXPERIENCE

Columbia Robotics and Rehabilitation Lab – Undergraduate Researcher August 2025 – Present
• Awarded competitive Summer@SEAS Fellowship (funded, full-time, Summer 2026) to study head and neck biomechanics under impact loading

- Designed, manufactured, and programmed a racing simulator, validated with a six-axis force-torque sensor, that applies real-world-equivalent G-forces to a driver's head during simulated driving to measure neck loading
- Researched soccer heading biomechanics by comparing amateur and professional players. Characterizing forces and motion using HTC Vive trackers, computer vision, and an IMU. Designed a repeatable heading drill using custom solenoid circuit
- Experimenting with BLDC motors in a 7-motor cable-actuated exoskeleton to train and measure neck movement

Columbia Small Scale Mechanics Laboratory – Undergraduate Researcher June 2026 – Present
• Restored a decommissioned 2002 Mitsubishi RA90 wire EDM machine to full operational status, diagnosing and repairing power faults to return it to service for lab research.
• Developed a custom Fusion 360 CAM post-processor that automatically generates machine-ready G-code, replacing the lab's entirely hand-written programming workflow

Columbia University Makerspace – Superuser Sept 2025 – Present
• Perform maintenance and troubleshooting on machines. Certified instructor on Haas CNC mill, 3D printers, laser cutter, and vinyl cutter; onboard and certify new users on safe operation and workholding
• Hold weekly office hours coaching students through machining, fixturing, and DFM on their projects

Columbia University SHAPE Program – Summer Student Leader June 2025 – August 2025
• Teaching assistant for 50 high-school students designing and building quadruped robots

PROJECTS

Columbia University Robotics Club – President and Combat Robotics Lead Sept 2024 – Present
• Elected President of a 200-member club spanning six robotics teams; lead the Executive Board and oversee operations, strategy, a \$40,000 budget, and the MakeCU Hackathon
• Lead the engineering design process for the combat robotics team, owning mechanical design, running manufacturing-feasibility reviews, and ensuring competition readiness. 12lb robot, Roar-E, qualified for the NHRL September Pro Tour
• Designed and manufactured 6061 aluminum drivetrain plates on a Haas Mini Mill using soft jaws for second-side operations; applied GD&T and tolerance stack-up analysis to hold press-fit bearing bores and mating-plate alignment
• Iterate designs through failure analysis and FEA, improving durability while reducing weight

Beach Bots – Founder and Captain June 2020 – April 2024
• Founded an independent FIRST Tech Challenge robotics team; oversaw CAD design, parts manufacturing, assembly, programming, outreach, mentorship, and sponsorship
• **FIRST Leadership Award Finalist** – FIRST's highest individual honor, awarded to 165 students worldwide out of 70,000+ participants

Open Source Projects: opTake, opInsert, opSpool – Founder Nov 2021 – Present
• Designed and published customizable intake and slide mechanisms for FTC robotics teams
• Downloaded by 10,000+ users across 40 U.S. states and 10 countries

Activities & Interests: FRC 9295 Design Mentor · Paid CAD Tutor · Drones (design, build, program, fly) · 3D Printing