Wallace Tucker

Mechanical engineer at Colorado State, specializing in rotorcraft systems and aerodynamics.
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EDUCATION

Colorado State University, M.S. Mechanical Engineering, expected Spring 2027. Thesis: rotor blade design, variable-pitch systems and aerodynamic optimization, with figure of merit as the main metric. Graduate coursework in materials science.

Colorado State University, B.S. Mechanical Engineering, Fall 2025. GPA 3.2.

EXPERIENCE

Teaching Assistant, EMEC, Colorado State University. Spring 2026 to present. Teach sophomores the fundamentals of manual and CNC machining: lathes, mills, lasers and forging.

Rapid Prototyping Lab, Colorado State University. Fall 2023 to present. Led 3 to 4 projects (details under NDA) alongside many lab projects.

- CNC subtractive manufacturing on 3-, 4- and 5-axis Haas mills and a Haas lathe, programmed in Fusion CAM.
- 3D modeling and design of complex systems in Fusion 360 and SolidWorks.
- Additive manufacturing across FDM, SLA and SLS design.
- PCB design in KiCad and assembly of surface-mount and through-hole components.

PROJECTS

Medium-lift hexacopter, undergraduate capstone. Designed the core, removable arms, landing gear and motor mounts for a modular, packable electric hexacopter on the Medium Lift Hexacopter capstone team. 1,250 mm wheelbase, yet all six arms pack into one rifle case, ready to fly in under 3 minutes. I manufactured most of the aircraft's parts. 10 kg aircraft, 1 to 10 kg design payload, 40 minutes unloaded on a 3.5 kg 6S8P lithium-ion pack of EVE 50PL 21700 cells: about 80% more energy than the 3.2 kg LiPo pack for about 9% more weight (22 minutes on LiPo).

- Isogrid core machined from 6061 on five axes: under 300 g, over 55% lighter than a plain tube of the same envelope.
- Motor mounts with integrated ESC, CFD-optimized, five-axis-machined finned heat sinks, 60 A per mount at 6S and about 9 kg thrust each. Temperatures stayed normal in an 18-minute hover.
- Arms held by titanium cam levers, with power and signal through blind-mate connectors on custom boards. About 25 attach cycles without incident.

Rotor blade design, graduate capstone (thesis). Designing a family of blades for one airframe to suit different missions, optimized for variable pitch and scored on hover figure of merit. Predicted figure of merit near 0.8 in simulation for the endurance blade.

Model four-stroke engine. Designed and manufactured every part of a running 4-cylinder model engine, including CNC machining of the rotating assembly, block and valvetrain. Built the electronics: combustion LEDs, RPM indicator and safety interlocks.

Composite beam. Foam core with wet-layup glass and 10-ply prepreg skins. Carried 795 lb in three-point bending at 179 g and 21 in long.

Custom aircraft. Built a 7 inch long-range quad (22 minute maximum flight), a generatively designed 5 inch freestyle quad (400 g) and a 60 g tiny whoop.

SKILLS

- **Design:** Fusion 360 and Fusion CAM (8 years), SolidWorks (4 years), KiCad (3 years). Analysis in QBlade, MATLAB and CFD.
- **Manufacturing:** CNC milling (3-, 4- and 5-axis) and turning, waterjet, CO2, fiber and diode laser cutting, sheet metal bending.
- **Additive:** FDM on Bambu Lab, Creality, Snapmaker, Prusa, MakerBot and Markforged; SLA; SLS part design; silicone casting.
- **Composites:** Wet layup and prepreg; design around prefab composite tube and plate.
- **Electronics:** PCB design, surface-mount reflow and through-hole assembly.
- **Flight systems:** ArduPilot and Cube Orange, RTK GPS, FPV and multirotor builds.

LEADERSHIP AND AWARDS

Colorado State Club Rowing. President for two years, after one year as travel safety lead. Membership grew from 10 to 30 and nationals qualifiers from 2 to 15 under my term. Travel safety lead planned trips, hotels and rental cars and owned on-water safety.

- 1st in the collegiate age group, Men's Championship Double, Head of the Charles, 2025.
- 5th of 32, men's double, American Collegiate Rowing Association (ACRA) national championships, 2025.
- Two 10th-place finishes in the open-weight men's single at ACRA nationals (fields of 19 and 34), and many regional podiums and wins.