Ishan Roy

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Cornell MechE junior developing Magnus Effect-powered ultralight and leading Cornell's Design Build Fly team. Leveraging CAD, FEA, and MATLAB along with organizational and analytical skills to deliver lightweight, competition-ready prototypes.

CORE COMPETENCIES: technical project leadership, design for manufacture, CAD, MATLAB modeling, rapid prototyping.

EDUCATION

Cornell University, College of Engineering, Ithaca, NY **Expected Graduation May 2027**

Bachelor of Science in Mechanical Engineering with a Minor in Aerospace Engineering.
Courses: Dynamics | Statics | Fluid Mechanics | System Dynamics | Mechanics of Engineering Materials | Intro to Aeronautics
GPA: 3.52/4.0.

EXPERIENCE

Cornell Mechanical & Aerospace Engineering, Magnus Ultralight Project **Jan 2025 – present**

Team Lead, Advised by Professor Mason Peck and funded by industry partners.

- Lead a student research team hoping to develop the first production Magnus Effect-powered ultralight aircraft.
- Designed a scale VTOL vehicle capable of consistent performance for data collection, utilizing SOLIDWORKS, ANSYS, and MATLAB.
- Fabricated and flight-tested prototype, conducting ten five-minute hovers while lifting 4 kg of = payload (25% above initial goal).
- Designed and fabricated a dynamically balanced, gear-driven hub system for 1,500+ RPM Magnus Effect sphere actuation.
- Targeting Fall 2025 to test prototype using only the Magnus Effect to maintain steady level flight.

CU Design Build Fly (DBF) Project Team. Ithaca, NY

Design, build, test, and optimize a radio-controlled aircraft to compete in the AIAA Annual DBF Competition.

Full Team Co-Lead **May 2025 – present**

- Direct 40 members across four subteams with a $35k budget. Responsible for technical project management and day-to-day operations.
- Lead weekly all-hands meetings, subteam leadership meetings, and faculty advisor meetings.
- Responsible for all engineering decision making and directing the development of the team's competition aircraft.
- Encourage team culture and commitment by fostering collaboration across subteams and coordinating regular social mixers.

Mechanical and Structural Subteam Co-Lead **Jun 2024 – May 2025**

- Led a 9-member team responsible for the mechanical and structural subsystems.
- Designed and fabricated DBF's first composite fuselage and landing gear structure, reducing aircraft weight by 45%.
- Successfully met all required project deadlines by coordinating and supervising subteam projects, scheduling, and logistics.
- Mentored five new team members in aircraft design theory, CAD skills, and aircraft fabrication skills.

Mechanical and Structural Subteam Member **Sep 2023 – May 2024**

- Redesigned aircraft nosecone, utilizing 3D printing and weight-focused design techniques to reduce nose cone mass by 65%.
- Responsible for nose cone detailed design and landing gear trade studies of technical report (ranked 25/110).
- Co-headed technical inspection and performed onsite fixes and upgrades to the aircraft at AIAA competition in Kansas.

Mohawk Mountain Alpine Ski Race Team, Cornwall, CT **Mar 2022 – present**

Alpine Race Coach

- Coached 20 U12 athletes for 2022-2023 season, winning the overall league and sending six athletes to regional championships.
- Train U10-U16 athletes on return-to-snow techniques in December race camps.

PROJECTS

MATLAB Design Optimization Program **May 2025 – present**

- Developed a MATLAB design optimization program to produce theoretical aircraft designs for AIAA DBF competition.
- Wrote the module to generate a high-fidelity structural model of the aircraft based on the design vector's input parameters.
- Cut overall program runtime by 85% by developing a pre-loading script for data tables.
- Tested algorithm and successfully generated designs scoring in the top 5% of previous competition cycles.

TECHNICAL SKILLS

CAD and Simulation: SOLIDWORKS (advanced) | ANSYS (Fluent and Static Structural) (intermediate) | MATLAB (advanced).
Programming Languages: Python (advanced) | HTML/CSS (intermediate). **Tools:** NumPy | pandas | scikit-learn | Flask | Git.
Hardware: machining (mill, lathe, bandsaw) (intermediate) | 3D printing (advanced) | soldering (intermediate) | composite fabrication (advanced).
Office/Data: PowerPoint (advanced) | Excel (intermediate) | Photoshop (intermediate) | Illustrator (intermediate).