Grant Gao

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Education

University of Wisconsin–Madison — Madison, WI
Bachelor of Science in Mechanical Engineering — *Expected May 2029*

Stuyvesant High School — New York, NY
GPA: 92.18 — *Sept 2021 – June 2025*

Experience

President — June 2021 – June 2025
Stuy Fission 310 - FIRST Tech Challenge Robotics Team — *New York, NY*

- Designed 4-stage coaxial telescoping arm in Onshape achieving 60 in/s extension speed while supporting 30 lb loads, validated structural integrity through FEA analysis
- Reduced telescoping arm weight by 30% versus linear-slide systems using CNC-routed pocketed aluminum boxtubing with UHMWPE cable-driven extension mechanism
- Implemented deadwheel odometry system using sprung omni-wheel pods and throughbore encoders, achieving 0.4 inch position tracking accuracy during 30-second autonomous period
- Engineered servo-powered over-center linkage claw end effector capable of gripping 2 hexagonal game elements simultaneously through guided prongs and slot mechanism
- Managed 50-person team operations and raised $25,000 in sponsorships as president (2023-2025)
- Led transition from COTS to custom-manufactured parts, enabling modular designs and 25% weight reduction

STEM Center Intern — July 2024 – Aug 2024
Cornell Tech NYC FIRST — *New York, NY*

- Designed custom mounting frame for TIAGo mobile robotic base, enabling modular attachment of healthcare-specific embodiments for medical professional applications
- Created laser-cut cardboard robot kit and curriculum using Adobe Illustrator, teaching 40 elementary students engineering principles and digital fabrication techniques
- Trained 30 high school teachers and students on 3D printer, laser cutter, and CNC router operation including safety protocols and maintenance procedures

Projects

Limelight Game Element Detection | *Python, Roboflow, Google Colab* — Dec 2024 – Mar 2025

- Trained custom object detection model on 600 annotated images using Roboflow and Google Colab, achieving 90% detection accuracy for colored rectangular blocks within 20-inch operational range
- Improved autonomous period pickup accuracy by 40% through real-time computer vision classification of game elements during competition matches

Power Take-Off System | *Onshape, 3D Printing, Prototyping* — June 2025 – July 2025

- Prototyped drivetrain power take-off mechanism coupling two 435 RPM motors to bypass FIRST Tech Challenge 8-motor limit, enabling actuation of additional robot components without exceeding motor allocation constraints
- Validated PTO design by lifting 30 lb robot at 10 in/s, achieving 85% power transfer efficiency

Skills

Design: Onshape, SolidWorks, Fusion 360, nTop, FEA, GD&T (ASME Y14.5)
Manufacturing: CNC Mill, Waterjet, Laser Cutter, 3D Printing (FDM, SLA), Hand Tools
Programming: Java, Python, HTML, CSS, Computer Vision, PID Control

Achievements

FIRST Tech Challenge: 3rd Place Worldwide in Sample Offensive Power Rating out of 7000 teams (2025), World Championship Playoffs (Top 48/7000, 2024), Dean's List Semi-Finalist (2024)