Grace Yu

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Education

Rensselaer Polytechnic Institute, Troy, NY Expected Graduation Date: December 2026

Bachelor of Science in Aeronautical and Mechanical Engineering, Dean's Honor List, GPA: 3.99.

- 2025 Summer Undergraduate Research Award, Rensselaer Leadership Award

Research

Modification, Modeling, and Control of an Off-Road Vehicle at the Limit of Grip Oct. 2024 to Present

- Led the platform research team to automate the throttle, steering, and brakes of the car, collected relevant data to conduct system identification, and integrated relevant sensors and electronics onto the car.
- Designed and manufactured many PCBs for power distribution and signal processing, filtering and spoofing. Integrated features that minimize noise and ill-effects from in-vehicle vibration and harshness.
- Modelled the low-level controllers and transfer functions. Used fundamental vehicle dynamics and kinematics to model the steering and braking systems and used testing data to model the throttle system.

Convergent Manufacturing of Ceramic-Metal Composites Apr. 2024 to Present

- High-voltage and power electronics lead on the research team developing a proprietary additive manufacturing method for ceramic-metal composites (under invention disclosure stage).
- Helped to design and implement a roller-based sintering apparatus that can withstand high pressure, temperature, voltage, and current concurrently.
- Worked on a vacuum system to control the atmospheric conditions for multi-field assisted laser sintering.
- Manually machined many components and fixtures out of various materials, including 7075 aluminum, stainless steel, tool steel, Inconel, and tungsten carbide, some of which to tight tolerances (±0.002").

CRC-3 Vertical-Takeoff Fixed-Wing Aircraft Dec. 2023 to Oct. 2024

- Used a combination of hand calculations, CFD, and FEA to determine the optimal rotor and wing geometries. Rapidly prototyped many versions of the wings using laser cutting, 3D printing, and CNC routing.
- Built a virtual physics model of the drone to simulate the behavior of the drone in quadcopter mode to aid the development of firmware architecture.

Student on the Beamline (Canadian Light Source, Synchrotron Accelerator) Mar. 2021 to Oct. 2024

- Experimentally assessed the impact of different (x-ray) exposure times at cryogenic and room temperature on Bovine Insulin proteins using the CMCF Bending-Magnet beamline.
- Presented at the 2024 CLS Annual User Conference on further simulation of protein reconstruction using PyMol and GROMACS using the original crystallography results collected in August 2022.

Extracurricular Experiences

Rensselaer Motorsport (Formula SAE, Student-Built Electric Racecar Team) Sept. 2023 to Present

Chassis-Suspension-Tires Lead (June 2024 - Present), Chassis-Suspension Manufacturing Lead (Dec.2023-Jun.2024)

- Designed and delegated tasks related to the chassis, suspension, ergonomics, and brakes of the current car iteration, RM28. Lead the manufacturing process of the chassis and suspension of the previous car, RM27.
- Iteratively designed and optimized suspension kinematic parameters via VI-Grade simulations and chassis tube arrangements via gradient-based numerical methods and finite element analysis to achieve maximized grip and torsional rigidity while keeping these subsystems reliable and lightweight.
- Applied machining knowledge and GD&T to improve the design of RM28's bellcranks for tight tolerance manufacturing. Changed various fillet radii and pocket depth to reduce tool deflection.

MANE Student Advisory Council (Rensselaer Polytechnic Institute) Jan. 2024 to Present

Student representative for the Department of Mechanical, Aerospace, and Nuclear Engineering

Society of Mechanical Engineers (Rensselaer Polytechnic Institute Chapter) Jan. 2025 to Present

Chapter board member and won the 2025 SME Digital Manufacturing Challenge as part of the chapter's team

Stride Adaptive Sports Nov. 2024 to Present

Volunteer ski coach and camp counsellor

Skills

Software: CAD (SolidWorks CSWA Certified), Finite Element Method and Computational Fluid Dynamics (SolidWorks Simulation, ANSYS, COMSOL), Programming (MATLAB, Simulink, Python, C++, ROS2, Java)

Additional Skills: GD&T, Numerical Design Optimization, Manufacturing (Welding, CNC, Material Extrusion, Powder/Wire DED, Cermet Sintering, Stereolithography), Power Electronics, PCB Design