

Hongru Liu

Pittsburgh, PA | (518) 423-4707 | hongrul@andrew.cmu.edu

EDUCATION

Carnegie Mellon University, Pittsburgh, PA

Dec 2026

Master of Science in Mechanical Engineering - Advanced Study

Relevant Coursework: Modern Control Theory, Robot Dynamics and Analysis, Soft Robots: Mechanics, Design and Modeling, Computer Vision for Engineers

Rensselaer Polytechnic Institute, Troy, NY

May 2025

Bachelor of Science in Mechanical Engineering to be conferred May 2025

Overall GPA: 3.70/4.0 | Dean's Honor List (2021-2024)

Relevant Coursework: Inventor's Studio I&II, Fluid Mechanics, Modeling & Control of Dynamic Systems

RESEARCH EXPERIENCE

Lunar Soil Mix Printing

Sep 2024 - May 2025

Led by Dr. Semih Akin

Rensselaer Polytechnic Institute

- Mixed lunar regolith simulant with resin and fabricated ASTM-compliant tensile bars, enabling strength evaluation across multiple soil ratios(Testing from 20% to 70%), succeeded printed out 20% to 30% simple using clay printer and SLA 3D printer
- Optimized formulations (particle size, resin composition, exposure time) and documented structural performance, providing recommendations to improve printability and material reliability for lunar construction

Thermal Power Dispatch System Design for Nuclear Flexible Plant Operation and Generation Jan – May 2024

Led by Dr. Shanbin Shi
Institute

Rensselaer Polytechnic

- Modeled and simulated thermal dispatch systems in MATLAB Simulink, validating assumptions through thermal-hydraulic literature analysis, accomplished 5% of whole Simulink diagram analysis
- Collaborated with graduate researchers to align methodologies, improving accuracy and efficiency of nuclear flexible plant modeling

PROJECT EXPERIENCE

Active Flutter Control System for UAS Wing - Modeling and Control

Aug 2023 – Dec 2023

- Developed and implemented PID-based flutter suppression system with accelerometer feedback and piezoelectric actuators in MATLAB/Simulink
- Validated stability through root locus and Bode analyses, achieving effective oscillation suppression at required 118.3km/h airspeed

Individual Wheel Rotation System - Inventor's Studio

Jun 2023 – Aug 2023

Objective: Enhance vehicle maneuverability and stability by enabling independent rotation of each wheel.

- Designed CAD model of innovative wheel hub system with independent wheel rotation, improving traction and cornering performance
- Built 3D-printed prototypes and tested functional prototype with motors and control systems, demonstrating enhanced maneuverability about 10%

Hazardous Algae Removal System - Inventor's Studio

Jun 2023 – Aug 2023

Objective: Designed a solar-powered device to mitigate harmful algae blooms by reducing surface water temperatures in freshwater bodies.

- Designed solar-powered water circulation system applying Bernoulli's principle, achieving efficient pumping from 13–15m depth to reduce algae growth
- Tested and optimized 3D-printed prototypes; presented outcomes at campus showcase, earning positive feedback for sustainable water treatment innovation

SKILLS

Modeling: CAD (NX)

Simulation: Finite elements analysis (NX), MATLAB, Simulink

Machining: 3D Printing, Lathe Operations, Milling Machine Operations, Welding, Non-Metallic Fabrication

Language: English (Proficient), Mandarin Chinese (Native)