SUYU LUOHONG (NAME ON PASSPORT: HONGSUYU LUO)

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RESEARCH INTERESTS

- Robotics simulation, fluid-structure interaction, soft robotics, machine learning, control systems, FEA

EDUCATION

COLUMBIA UNIVERSITY — **NEW YORK, NY**

*Master of Science in **Mechanical Engineering*** — *Sep 2023 – Jan 2025*

- GPA: **3.90/4**
- **Selected Courses:** Advanced Machine Dynamics (A), Robot Learning (A), Intro to Control Theory (A), MS Projects in Mechanical Engineering (A), Big Data in Transportation (A+)

UNIVERSITY OF PITTSBURG — **PITTSBURG, PA**

*Bachelor of Science in **Mechanical Engineering** (minor in **Computer Science**)* — Sep 2021 – May 2023

- GPA: **3.96/4**
- **Selected Courses:** Differential Equations (A+), Intro to Fluid Mechanics (A+), Dynamic Systems (A+), Intermediate Programming (A+), Mechanical Design II (A), Mechanical Measurement II (A+), Automatic Controls (A+), Applied Fluid Mechanics (A), Algorithms and Data Structures 2 (A)
- **Honors:** Dean's Honors (Spring 2022); Term Honor (Fall 2021& Spring 2022)

SICHUAN UNIVERSITY — **CHENGDU, CHINA**

*Bachelor of Science in **Mechanical Engineering*** — *Sep 2019 – Jul 2021*

- **Weighted Average Mark:** 86.86/100
- **Selected Courses:** MATH Calculus 1, 2 & 3, ENGR Probability and Statistics, ENGR Statics 1 & 2, ENGR Circuitry, ENGR Manufacture, H/SS Micro-economics, H/SS Macro-economics
- **Honors:** Monomial First-class Scholarships of Sichuan University (**5%**); Third-class Scholarship of Sichuan University

PUBLICATION

- Xiong, Z., **Luohong, S.**, Lee, J. H., & Lipson, H. (2023). Accelerating aquatic soft robots with elastic instability effects. arXiv preprint arXiv:2310.14119. https://arxiv.org/abs/2310.14119

RESEARCH EXPERIENCE

RESEARCH ON BISTABLE COMPLIANT FISH ROBOTS — **NEW YORK, NY**

Advisor: Professor Hod Lipson, Columbia University — *Sep 2023 – Present*

- Conducted swim tests on the fish robot and performed dynamics simulations, particularly examining the unique Hair Clip Mechanism (HCM) swimming pattern using COMSOL.
- Analyzed forces, torques, and efficiency of the robotic fish and created an efficiency-Strouhal plot for detailed performance evaluation.
- Compared the performance of the HCM swimming pattern to traditional sine wave and cambering sine wave patterns.

DATA-DRIVEN ANALYSIS OF CYCLIST ACCIDENTS WITHIN NEW YORK CITY — **NEW YORK, NY**

Advisor: Professor Sharon Di, Columbia University — *Jan 2024 – May 2024*

- Identified prevalent accident locations using a K-Means clustering model, with the final model consisting of 20 clusters, pinpointing high-accident areas in Manhattan, Queens, and Brooklyn.

- Used a Multilayer Perceptron (MLP) deep learning model to forecast future accident occurrences.
- Supported by the Northeast Big Data Innovation Hub and received certification for the project.

3D Reconstruction Research — **Pittsburg, PA**

Advisor: Professor Jinghua, Wayne State University — *Jan 2023 – Jun 2023*

- Led a team in Professor Jinghua's visual algorithms group and worked on 3D reconstruction from single views using deep learning methods.
- Ran test datasets with the OpenMVS library and verified point cloud results to ensure the accuracy and effectiveness of the 3D reconstruction process.

Selected Projects

Robotic Studio Project — **New York, NY**

Supervisor: Professor Hod Lipson, Columbia University — *Step 2024 – Dec 2024*

- Designed and built a legged robot with 8 servomotors and 240° motion range.
- Designed and 3D-printed all custom robot components.
- Developed walking functionality and optimized movement speed using NSGA-II.
- Make a journal video (https://www.youtube.com/watch?v=RdD6Z4WlUA0)

Mechanical Measurement Semester Team Project — **Pittsburg, PA**

Team Leader; Supervisor: Professor John Whitefoot, University of Pittsburgh — *Sep 2021 – Dec 2021*

- Designed a high-speed shaft for the transmission of a small industrial mixing apparatus.
- Found the appropriate parts supplier and used SolidWorks to make models and the overall layout drawing.
- Calculated manufacturing costs and presented the project report.

Teaching Experience

Department of Mechanical Engineering, Columbia University — **New York, NY**

Teaching Assistant for EEME E6601, supervised by Professor Nicolas Chbat — *Sep 2024 – Present*

- Graded problem sets and exams covering topics such as state-space analysis, frequency response, and root locus techniques and guided students to analyze and design linear feedback control systems.
- Held office hours to support students in mastering Laplace transforms, Bode plots, and Nyquist stability criteria and assisted in MATLAB simulations for modeling and testing control systems.

Department of Mechanical Engineering & Materials Science, Pitt — **Pittsburg, PA**

Student Grader for MEMS 1042, supervised by Professor John Whitefoot — *Sep 2022 – Jan 2023*

- Graded detailed lab reports that included statistical analysis of measurement uncertainty, calibration procedures, and the application of strain gauges for stress analysis on experimental setups.
- Guided students on technical writing and led them to accurately present experimental data and analyze dynamic system responses through Fourier transform techniques and signal processing.

Extracurricular Experience

Animation Comic and Game Club — **Chengdu, China**

Member — *Sep 2019 – Jul 2021*

- Managed the club's WeChat Media Platform account and promoted club events.

Music Club of Sichuan University — **Chengdu, China**

Member — *Sep 2019 – Jul 2021*

- Promoted club events and participated in school musical shows as an instrumentalist.

SKILLS AND HOBBIES

- **Computer Skills:** MATLAB, Comsol, SolidWorks, Python, C, Java, OpenCV, Ansys, Pybullet, 3D Printing
- **Languages:** Chinese (native), English (fluent), Japanese (basic)
- **Hobbies:** piano, live music, animation, trading cards, orienteering, tennis, basketball
- **GitHub Personal Website Link:** https://luohongsuyu.github.io