

Enlin Gu

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Field of Interests

I am interested in human-robot interaction & collaboration, planning & navigation, and soft robotics.

Education

University of Pennsylvania Aug 2023 – May 2026 (expected)
Master in Robotics & Master in Computer and Information Science (dual degree) GPA: 3.9/4.0

- **Selected Courses:** Introduction to Robotics (A+), Advanced Robotics (A-), Machine Learning (A), Linear Systems Theory(A), Design of Mechatronic Systems(A)

Shanghai Jiao Tong University Sept 2020 – May 2024
Bachelor in Mechanical Engineering GPA: 3.6/4.0

- **Selected Courses:** Dynamics of Machinery(A-), Partial Differential Equations (A), Engineering Material (A), Design and Manufacture II (A-), Design and Manufacture I (A), Modeling Analysis and System Control(A-), Principles of Mathematical Analysis(A-)

Honors and Rewards

- National Undergraduate Mechanical Innovational Design Competition, 2022 First Prize (Top 10 in China)
- International Genetically Engineered Machine Competition (iGEM), 2022 Gold Medal
- Toyota Boshoku Scholarship, 2021
- Changjiang-Siyuan Kechuang Scholarship (Changjiang-Siyuan Scholarship for Scientific Innovation), 2022
- Outstanding Bachelor's Graduate of SJTU, 2024

Publications

1. Yiming Liu, Lijun Han, Enlin Gu, Hesheng Wang, "Learning a General Model: Folding Clothing with Topological Dynamics", *arXiv preprint*. [\[pdf\]](#)
Intelligent Robotics and Machine Vision Lab, SJTU Instructor: Prof. Hesheng Wang
 - Developed a clothing folding workflow for multi-layered clothing like jackets using topological skeleton;
 - Used **semantic augmentation** to analyze self-occlusion and decompose clothing structure;
 - Used **keypoint detection** to generate a novel topological skeleton to represent the clothing state;
 - Deployed an improved **Graph Neural Network** (GNN) to predict the deformation of clothing for control;
2. Yongzhou Long, Zhuang Zhang, Zhuowei Xu, Enlin Gu, Qiujie Lu, Hao Wang, Genliang Chen, "Lightweight and Powerful Vacuum-Driven Gripper With Bioinspired Elastic Spine", *IEEE Robotics and Automation Letters*, vol.8, no.12, pp.8136-8143, 2023. [\[pdf\]](#)
Key Laboratory of Digital Manufacture for Thin-Walled Structure, SJTU Instructor: Prof. Genliang Chen
 - Developed a **durable, rapid, and powerful** vacuum-driven soft gripper inspired by elastic spine;
 - The designed gripper has a maximum grasping force **over 50N** and endures **10000+ cycles**;
 - Carrying out **quasi-static analysis** to predict the bending behavior with high model accuracy;

Selected Projects

Game-theoretic AI Coaching 08/2025 - Present
Safe Autonomous Systems Lab, UPenn Instructor: Prof. Haimin Hu, Rahul Mangharam

- Developing a game-theory based AI Coaching policy for robot racing;
- Trying a **sim-to-sim policy migration** from a gym to a simulator with physics and rendering;

Simple VIO-based Navigation System for Autonomous Quadrotor 03/2024 - 05/2024
MEAM 6200 Advanced Robotics Course Project, UPenn Instructor: Prof. Ani Hsieh

- Implemented **Error State Kalman Filter** to combine camera and IMU data together for local perception;
- Used **Dijkstra** and **A*** for local planning, **Ramer–Douglas–Peucker** and **Min-Jerk** for trajectory generation;
- Implemented a non-linear **geometric PD controller** for quadrotor control;
- Able to pass a narrow window with a tolerance of 0.6m and complete a 10m × 10m maze in 13 seconds.[\[code\]](#)

Bionic Underwater Robotic Fish

Key Laboratory of Digital Manufacture for Thin-Walled Structure, SJTU

05/2022 - 06/2023

Instructor: Prof. Genliang Chen

- Developed an underwater fish robot able to swim, take turns and change speed;
- Designed a **crank rocker** mechanism with **adjustable centerline** for swimming & taking turns;
- Designed a compliant tail and modeled the motion using **principle axis decomposition** with MATLAB;
- *First Prize & Good Creative Design Prize (Top 10 teams in China)* @ National Undergraduate Mechanical Innovational Design Competition; Headline on SJTU homepage;

DL-ecGEM (Deep Learning - Enzyme Constraints GEM)

School of Life Science and Biotechnology, SJTU

12/2021 - 10/2022

Instructor: Prof. Chaochun Wei

- Co-developed a generalized modeling software to fill the gaps in the Actinobacteria protein database by adding enzyme constraints to the genome-wide metabolic model of constraints to the genome-wide metabolic model of the K_{cat} values of model parameters;
- Modeled the reaction network in the language of matrix and optimized it by **linear programming**; Added enzyme constraints to the model and carried out FCC analysis to find key pathway; Used FBA to simulate the growth of Actinobacteria and production of Acarbose;
- *Gold Prize* @ International Genetically Engineered Machine Competition; Headline on SJTU homepage;[[website](#)]

Natural Vibration Analysis for Aeroengine Blade with uncertain fastening

Department of Engineering Mechanics, SJTU

02/2022 - 01/2023

Instructor: Prof. Zhiming Li

- Analyzed the natural vibration behavior of aero-engine blades with uncertain fastening;
- Developed Matlab code using the Rayleigh-Ritz method and finite element analysis separately for simulation;

Grand-Theft-Autonomous

MEAM 5100 Design of Mechatronic Systems Course Project, UPenn

10/2023 - 12/2023

Instructor: Prof. Mark Yim

- Designed an autonomous mobile robot for beacon detection, navigation, gripping, and moving target objects;
- Used ToF sensor for collision-avoidance; Used IR-based beacon detection for self-navigation;[[code](#)]

PennCloud Software System

CIS 5050 Software Systems Course Project, UPenn

02/2025 - 05/2025

Instructor: Prof. Linh Thi Xuan Phan

- Developed a distributed multi-process cloud platform supporting user authentication, mail and storage service;
- Implemented front-end HTTP server with load balancer and communication with big table;

Penn Operation System

CIS 5480 Operating Systems Design and Implementations Course Project, UPenn

06/2025 - 08/2025

Instructor: Joel Ramirez

- Developed an operation system with multi-thread scheduler and file allocation table;
- Implemented the FAT with basic file chunks and inode operation by file entry and discripiter table;

Professional Experience

SAIC Volkswagen Automotive

Senior Design Project

Shanghai, China

11/2023 - 06/2024

- Developed a vision system for seam tracking and PVC sealant quality inspection in automotive assembly lines;
- Used 2D image filtering and feature enhancement for extracting seam and PVC; Using B-spline for fitting;

Fraunhofer Project Center for Smart Manufacturing at SJTU

Research Intern

Shanghai, China

06/2023 - 07/2023

- Designed and developed a high extension ratio pneumatic linear actuator with rapid deployment capability;
- Carrying out quasi-static analysis to model the linear motion; Prototyping and experimental validation;

SKILLS

Programming: Python, MATLAB, C/C++, SQL, Ubuntu, Docker, Robot Operating System (ROS), Git

Hardware: Arduino, ESP32; Solidworks; (CNC) Lathe, Milling; Basic Design & Fabrication Skills;