

Yixiao Liu

yxlewis@engineering.upenn.edu | Philadelphia, PA | Website | GitHub | LinkedIn

EDUCATION

University of Pennsylvania

Philadelphia, PA

M.S.E. in Mechanical Engineering and Applied Mechanics

Aug. 2025 – Expected Jun. 2027

- Selected for the SJTU–Penn 3+1+1 Accelerated Master’s Program with a one-year tuition waiver.

Shanghai Jiao Tong University

Shanghai, China

B.S. in Mechanical Engineering

Aug. 2022 – Jun. 2026

RESEARCH INTERESTS

Multi-agent collaboration and negotiation; world models; robot learning; robotic perception.

RESEARCH EXPERIENCE

University of Pennsylvania

Feb. 2026 – Present

Research Assistant; Advisor: Jiatao Gu

- Investigating multi-agent collaboration and negotiation in virtual environments.

Institute of Automation, Chinese Academy of Sciences

Jun. – Sep. 2026

Research Intern; Advisor: Qiang Liu

- Contributed to idea development, method implementation, experiments and co-writing for **UniForget**, studying concept unlearning across image generation and visual understanding.
- Evaluated BAGEL-7B-MoT and Janus-Pro-7B using joint-forgetting, neighboring-concept retention and capability-preservation metrics; conducted ablation and robustness experiments.

Shanghai Jiao Tong University

Nov. 2025 – Jun. 2026

Undergraduate Thesis; Advisor: Chenggang Yuan

- Developed an RGB-D pipeline for ripe cherry tomato counting in mobile greenhouse video, combining YOLOv8s detection, depth filtering and short-term tracklet event association.
- Designed local temporal matching and crossing-event logic for occlusion and viewpoint changes; evaluated counting pipelines against manual video counts.

PUBLICATIONS

Is Forgetting Unified? Exploring Concept Unlearning in Unified Multimodal Models

Zhongkai Xue, Junkai Chen, Mingcong Lei, Rumo Zhang, **Yixiao Liu**, Zhimin Sun, Shu Wu, Qiang Liu, Lihua Zhang, Liang Wang.

Submitted to ICLR 2027.

- **Research question:** Investigates whether suppressing a concept in image generation also removes its recognition in visual understanding within a unified multimodal model; finds limited joint forgetting from single-pathway methods and their direct composition.
- **Benchmark:** Introduces UUBench with 30 target concepts, 60 semantically related neighbors and 720 reference images, evaluating forgetting, capability preservation and robustness across both pathways.
- **Method:** Proposes UniForget, combining preservation-constrained generation editing with utility-aware understanding updates to suppress target identity while retaining non-identity visual information and neighboring concepts.
- **Results:** Achieves joint forgetting rates of **80.0% on BAGEL-7B-MoT** and **92.7% on Janus-Pro-7B**; ablations and capability evaluations characterize the trade-off between forgetting and preservation.

SELECTED ENGINEERING PROJECTS

3D Reconstruction and Neural Rendering

Spring 2026

- Implemented calibrated stereo reconstruction with SSD/SAD/ZNCC matching, depth estimation and colored point-cloud export.
- Trained a PyTorch NeRF achieving **24.19 dB PSNR / 0.831 SSIM** across six held-out 100×100 views; compared positional encoding and rendering sample counts.

ROBA Mobile Robot and Embedded Control

Fall 2025

- Integrated dual-ESP32 sensing and control, a Python gamepad station, UDP/UART communication, wall following and Vive-based target navigation on a physical competition robot.
- Achieved a **third-place alliance finish** in the Penn MEAM 5100 robotics competition.

Robotic Motion Planning and Optimal Control

Fall 2025

- Implemented input-constrained MPC and clipped LQR on a nonlinear planar quadrotor; compared prediction horizons, control costs, disturbances and mass mismatch.
- Built a minimum-snap waypoint solver with continuity and numerical checks; doubling trajectory duration reduced integrated squared snap by **128×**.

UR16e Motion Planning and Control

Spring 2025

- Connected collision-checked RRT, smooth trajectory timing and torque-driven PyBullet execution, achieving **0.001179 rad** pooled tracking RMS and **18.349 mm** minimum sampled clearance.
- Implemented URDF-based kinematics and dynamics checks; compared PD plus gravity compensation and computed-torque tracking under nominal and unmodeled-payload conditions.

Upper-Limb Rehabilitation Robot

Fall 2024

- Designed and built hand-grasping, wrist-rotation and elbow-flexion mechanisms using linear actuators, linkages, a synchronous belt transmission and an adjustable arm support.
- Integrated STM32 control and IMU-driven bilateral wrist motion; fabricated the prototype through 3D printing, laser cutting and machining. Received **Outstanding Course Project Award**.

RC Fixed-Wing Aircraft

Spring 2023

- Built a 3D-printed fuselage, integrated the battery, ESC, motor, propeller and radio-control system, and completed ground and flight testing as a first-year undergraduate project.

INDUSTRY EXPERIENCE

UAES (United Automotive Electronic Systems)

Jun. – Aug. 2025

Software Engineer Intern

Shanghai, China

- Supported software testing for automotive hardware systems.

TECHNICAL SKILLS

Programming: Python, C/C++, MATLAB, Git

Robotics & Control: PyBullet, RRT, rigid-body dynamics, LQR, MPC, trajectory optimization

Vision & ML: PyTorch, NumPy, SciPy, stereo reconstruction, NeRF, YOLO

Embedded Systems: ESP32, STM32, UART, I²C, UDP, prototype integration