Yifeng Liu

liuyf23@mit.edu | (213) 820-4748 | Cambridge, MA | lauyihong.github.io | github.com/lauyihong

Summary

Robotics researcher and engineer working on VLM-based manipulation, articulated object reconstruction, and imitation learning, with systems deployed on real arms (xArm 6, SO-100, Panthera-HT) and in Isaac Sim. Background in large-scale optimization and ML shipped to production at ByteDance and Meituan.

Education

Massachusetts Institute of Technology Aug 2023 – Feb 2026
Master's (MCP); concurrent S.M., EECS *Cambridge, MA*
Advisor: Manish Raghavan. DUSP Fellowship & SERC Scholarship (full tuition + stipend).
Thesis: *From Extraction to Retrieval: A Graph-Enhanced Framework for Spatio-Temporal Reasoning in Historical Legal Documents*
Coursework: Robotic Manipulation, Reinforcement Learning, Deep Learning, NLP, Optimization Methods, Probability.

Tsinghua University Aug 2018 – Jun 2023
Bachelor of Architecture; Minor in Statistics *Beijing, China*
Excellent Undergraduate Thesis (2023); Chinese Mathematical Olympiad (2017).

Robotics Research

CoRL 2026 TOWER Challenge (Team Sakai) — #1 on Leaderboard Oct – Nov 2026
Agentic Task Decomposition for Skill-Specialist Robot Policies *Isaac Sim, dual-arm*

- Benchmarked ACT, a custom diffusion policy, and $\pi_{0.5}$ (LoRA vs. full fine-tune); averaging 8 flow samples raised one task's success rate from 0.30 to 0.80 without retraining.
- Rebuilt the evaluation simulator from official HDF5 configs, exposing a 180° static-camera rotation mismatch in the official setup.
- Designed RAX-AM: classical perception, an MLP skill selector, and an MLP motion executor with a safety filter, trained by behavior cloning with kinematic-retargeting augmentation (IK re-solving to random block offsets); networks (0.45–17M params) run on CPU in 20–40 ms.
- Reached an overall score of 93.58 with 91/100 successful episodes and the maximum score on 7 of 10 task variants, including 1 mm-clearance insertion.

Research Affiliate, MIT Media Lab Sep 2025 – Present
Multisensory Intelligence Group; Supervisors: Kaichen Zhou, Paul Liang *Cambridge, MA*

Act2See: Active Articulated Object Reconstruction *(co-first author; RSS 2026 workshop; extension under review at ICRA 2027)*

- Built a closed-loop system that incrementally reconstructs URDFs of unknown articulated objects through robot interaction, coupling perception and action in a mutually reinforcing loop.
- Designed a VLM planner (Qwen3-VL-32B) conditioned on RGB-D observations, URDF state, and interaction history to select action primitives and ground them into executable motions.
- Estimated joint axes and types online from end-effector trajectories, with axis-triggered rollback for mid-interaction self-correction; closing the loop with online reconstruction raised revolute-door completion from 45.5% to 72.7% (81.8% when reusing previously estimated axes).
- Achieved 100% articulation-type accuracy and the best revolute-joint accuracy among prior-free methods in SAPIEN at 4.23 s latency (10–100× faster than offline baselines); deployed on a UFactory xArm 6.

Robot Platform & VLA Fine-tuning

- Built a tabletop manipulation platform with SO-100 arms and Joy-Con teleoperation; fine-tuned $\pi_{0.5}$ to >90% success on pick-and-place tasks.
- Reproduced and extended Real2Code (PointNet shape completion, Blender rendering, SAPIEN) to generate simulation-ready articulated digital twins.

Hardware Design

LeRobotNeck: Open-Source Low-Cost Robot Neck for Active Perception [project page] 2026

- Designed a 6-DoF open-source robot neck built on the SO-101 platform, with under $3 in 3D-printing cost.
- Replaces fixed ego-camera mounts with an actively controlled viewpoint, enabling active-vision research for manipulation.

Manipulation Platform Hardware 2025 – 2026

- Assembled and integrated a Panthera-HT arm and a modified SO-ARM101 leader arm into the teleoperation and data-collection pipeline, extending it beyond the SO-100 setup.

Industry Experience

ML Engineer Intern, ByteDance Jun – Aug 2025
Global E-Commerce, Logistics & Supply Chain *San Jose, CA*

- Built a MILP for multi-origin, multi-destination middle-mile truck planning with pallet-level orders and rolling forecasts; validated with discrete-event simulation and deployed to production (>16% cost savings).
- Trained a masked-PPO policy for constraint-aware 3D bin packing that matches a strong heuristic baseline.

R&D Engineer Intern, Meituan Feb – May 2025
Decision Intelligence Center, Smart Scheduling Group *Beijing, China*

- Reduced dispatch failures by 3% in real-time driver scheduling serving 400M daily deliveries; built a GIS-integrated dispatch engine and monitoring dashboard.

ML Engineer Intern, ByteDance Jun – Aug 2024
Logistics & Supply Chain, Instant Delivery *Beijing, China*

- Built order-prediction models for Douyin's first-stage ranking (AUCPR 0.60 → 0.93), +4.3% revenue in A/B tests.
- Reformulated shop delivery-range generation as a 4M-variable optimization: +1.7% revenue, solve time 12 h → <3 min.

Other Research (MIT)

- Deep RL (DQN) for traffic-light and speed-limit control to mitigate Braess's paradox (with Cathy Wu), 2024.
- Decomposition and Tabu Search for large-scale facility location, solve time 300 h → 36 min (with Alexandre Jacquillat), 2023.

Publications

- **Liu Y***, Chen Y*, Wang B*, Li C, Lu J, Li H, Zhou K, Wang M, Zhan F. *Act2See: Structured Articulated Representations through Robot Interaction*. RSS 2026 FM4RoboPlan Workshop; extended version under review at ICRA 2027. (*equal contribution)
- **Liu Y**, Lai Y. *Analyzing jogging activity patterns and adaptation to public health regulation*. Environment and Planning B: Urban Analytics and City Science, 2023.
- Three additional urban analytics papers (2022): *Land*, *IJERPH*, IEEE PerCom Workshops.

Skills

Robotics: LeRobot, $\pi_{0.5}$ / ACT / diffusion policies, Isaac Sim, MuJoCo, ManiSkill, SAPIEN, Drake, URDF, IK, teleoperation, hardware assembly & redesign (xArm, UR, SO-100/101, Panthera-HT)
ML: PyTorch, VLM/VLA fine-tuning, RL (PPO, DQN), RAG
Optimization: MILP (Gurobi), dynamic programming, simulation
Languages: Python, C/C++, Julia, SQL