Luyang Hu

Research Interests: Embodied Robot Learning · Dexterous Manipulation · Simulation-to-Real Transfer

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EDUCATION

University of Pennsylvania **Philadelphia, PA, USA**

M.S.E in Robotics, GRASP Lab — GPA: 4.0/4.0 *Aug 2024 - Present*

Main Courses: Artificial Intelligence, Robot Design and Analysis, Control, Perception

University of Michigan **Ann Arbor, MI, USA**

B.S in Computer Science & Data Science & Linguistics — GPA: 3.896/4.0 *Sep 2020 - May 2024*

Main Courses: Data Structures & Algorithms, Machine Learning, Natural Language Processing, Computer Vision, Autonomous Robotics, Computer Organization, Embedded System Design

RESEARCH EXPERIENCE

RoSHI: Wearable Human Data & SITL Retargeting for Humanoids **University of Pennsylvania**

JIRL Lab (advised by Antonio Loquercio) *Jul 2025 – Present*

- Developed a hybrid wearable system combining 9-IMU sensing with Meta Project Aria to capture full-body and hand motion in egocentric view, robust to severe visual occlusion.
- Enhanced IMU calibration and long-term drift correction through AprilTag-based visual feedback, enabling accurate orientation estimation without static T-pose/A-pose initialization.
- Built a simulation-in-the-loop (SITL) retargeting pipeline converting human SMPL motion to physically feasible Unitree G1 robot poses, achieving high-success deployment on real hardware.

EurekaWorld: LLM-Driven Env Generation for Dexterous Manipulation **University of Pennsylvania**

PennPAL Lab (advised by Dinesh Jayaraman & Osbert Bastani) *Jul 2025 – Present*

- Developed a scalable framework that leverages large language models to automatically construct simulation environments and rewards for dexterous, single-object manipulation and tool-use tasks.
- Incorporated vision-language models (VLMs) to refine URDFs and physical parameters of articulated objects, aligning simulated assets with real-world properties.
- Demonstrated that the generated environments enable effective policy learning and sim-to-real transfer through standard distillation pipelines.

Phonetic Interpretability of Speech Transformers **University of Pennsylvania**

JIRL Lab (advised by Antonio Loquercio) *Feb 2025 – Present*

- Investigated how SOTA transformer-based ASR encoders process and distinguish human phonetic information.
- Visualized and identified attention heads that capture phonetic distinctions, evaluating whether the model discriminates sounds similarly to human perception.
- Conducted pruning experiments to alter encoder attention patterns and examined causal links between internal representations and transcription outcomes.

Persona-Nav: LLM-Generated Personalized Navigation Dataset **University of Michigan**

SLED Lab ((advised by Joyce Chai) *May 2023 – Present*

- Constructed a dataset of over 2,700 houses using a top-down LLM-driven generation process that designs residents, relationships, and personalized rooms before retrieving context-consistent objects.
- Labeled objects with open-vocabulary user-specific attributes (e.g., ownership, preference, emotional significance), yielding realistic and diverse household scenes.
- Generated a large collection of expert trajectories in simulation, and designed benchmark tasks with two baseline models—imitation learning and vision-language navigation—to evaluate performance.

PUBLICATIONS

- Mao, W.*, Ng, J.*, **Hu, L.**, Gehrig, D., Loquercio, A. *RoSHI: A Versatile Robot-oriented Suit for Human Data In-the-Wild*. ICRA 2026 (under review), 2025. ***Equal contribution.**
- **Hu, L.** et al., Jayaraman, D., Bastani, O. *EUREKAWORLD: Scalable Real-World Manipulation via LLM-Automated RL*. In preparation; expected submission RSS 2026.
- **Hu, L.***, Zhang, Y. *, Chai, J. *Persona-Nav: A Large-Scale Personalized Household Navigation Dataset Generated by LLMs*. In preparation; expected submission ICML 2026.***Equal contribution.**

SELECTED PROJECTS

Towards Scalable Quadruped Imitation from In-the-Wild Videos **University of Pennsylvania**
ESE 6500: Learning in Robotics *Spring 2025*

- Developed a pipeline that teaches quadruped robots agile gaits directly from in-the-wild animal videos without motion capture or manual annotations.
- Reconstructed 3D dog motion using SMAL-based pose estimation and inverse-kinematics retargeting, and trained PPO policies in simulation to reproduce realistic gaits on the Unitree Go2.

Autonomous Dynamic Stacking with Franka Panda **University of Pennsylvania**
MEAM 5200: Introduction to Robotics - Course Winner *Fall 2024*

- Built a complete perception-to-control pipeline for autonomous pick-and-place using the 7-DoF Franka arm, integrating AprilTag-based vision, FK/IK control, and RRT motion planning within a ROS–Gazebo framework.
- Enabled precise stacking of both static and dynamic cubes through real-time timing control, achieving first place with a record 28,000-point performance.

Consumer Sentiment Analysis Using Facial Expression Recognition **University of Michigan**
Multidisciplinary Design Project sponsored by FLASH Parking *Jan 2023 – Dec 2023*

- Built a lightweight multimodal model combining facial and audio features, pretrained on internet-scale data and fine-tuned on collected recordings for robust deployment on FLASH Parking kiosks.
- Introduced *Differential Learning*, modeling emotion change between pre- and post-interaction states to isolate sentiment shifts caused by the parking experience while filtering out external factors such as weather, or events.

WORK EXPERIENCE

ByteDance **Beijing, China**
Software Engineering Summer Intern – Feishu (Lark) Team *May 2022 – May 2023*

- Developed an access-control module within the Feishu ShellAPI framework to strengthen enterprise account security and prevent cross-application data leakage.
- Implemented inter-process communication between the desktop client and browser components to enable real-time data synchronization across sessions.

ZTE Corporation **Nanjing, China**
Machine Learning Engineering Intern – NLP Group *Jun 2020 – Aug 2020*

- Developed a neural text-matching model to learn semantic associations between keywords and content, enhancing intranet search retrieval accuracy and reducing query latency.
- Integrated feature-weighting strategies and semantic filtering modules, yielding higher retrieval precision on internal benchmarks.

TopXGun Robotics **Nanjing, China**
Control Systems Engineering Intern – Flight Dynamics Team *Jun 2019 – Aug 2019*

- Developed and field-tested altitude-compensation algorithms for quadrotor flight control under high-altitude and adverse weather conditions, tuning PID parameters to ensure flight stability and robustness.

TEACHING EXPERIENCE

University of Pennsylvania **Philadelphia, PA**
Head Teaching Assistant / Teaching Assistant – MEAM 5200: Introduction to Robotics *Spring 2025 & Fall 2025*

University of Michigan **Ann Arbor, MI**
Teaching Assistant – MATH 214: Applied Linear Algebra *Fall 2021 & Spring 2022*

LEADERSHIP & SERVICE

Chinese Students and Scholars Association (CSSA) **University of Michigan, MI**
President *May 2022 – May 2023*

- Organized campus-wide academic and cultural events for 1,000+ participants annually.
- Coordinated with University administration and established formal collaboration with local PNC bank, Chase bank, AT&T, and Michigan Flyer.

TECHNICAL SKILLS

Programming Languages: Python, C/C++, Java, Verilog, R
Frameworks & Tools: PyTorch, JAX, TensorFlow, ROS, Isaac Sim/IsaacLab, Unity, Mujoco, Genesis, PyBullet