

LECHEN ZHANG

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EDUCATION

Columbia University (Advisor: Prof. [Hod Lipson](#))
Master of Science in Mechanical Engineering (Robotics and Control)

New York, NY
Expected Dec 2024

University of Nottingham, Ningbo (Advisor: Prof. [Adam Rushworth](#))
Bachelor of Engineering with Honours in Mechanical Engineering

Ningbo, CN
Jul 2022

- **Honors:** Dean's Scholarship in Academic Year 2018/2019

PUBLICATION

- Lin, J., **Zhang, L.**, Lee, K., Ning, J., Goldfeder, J., & Lipson, H. (2024). [AutoURDF](#): Unsupervised Robot Modeling from Point Cloud Frames Using Cluster Registration. *arXiv preprint arXiv:2412.05507*. (CVPR 2025 Under Review)
- Zhou, H., Guo, Z., Ren, Y., Liu, S., **Zhang, L.**, Zhang, K., & Li, M. (2024). [MoD-SLAM](#): Monocular Dense Mapping for Unbounded 3D Scene Reconstruction. *IEEE Robotics and Automation Letters*. (Published)
- **Zhang, L.** (2024). CUDA-Accelerated Soft Robot Neural Evolution with Large Language Model Supervision. *arXiv preprint arXiv:2405.00698*. (**Technical Spotlight Oral** at ICRA 2024 [Workshop on Co-design in Robotics](#))

WORK EXPERIENCE

Xiong'an Institute of Innovation, Chinese Academy of Sciences
Research Fellow (Full-time) Supervised by Prof. [Wuling Huang](#)

Xiong'an New Area, CN
Jul 2022 – Jul 2023

- Developed and deployed a novel deep learning network for automated bird's-eye view map reconstruction from sparse roadside sensor data, reducing map generation time by 80% compared to traditional manual drone-based surveying methods
- Designed a novel monocular pose-free pipeline to train Neural Radiance Fields for large-scale scene digital twin reconstruction
- Led industry collaborative project with HAOMO.AI to develop an autonomous road inspection system, integrating multi-modal perception with deep learning-based defect detection algorithms for real-time road condition monitoring

RESEARCH EXPERIENCE

Self-Supervised Physically Embodied 3D Gaussian Splatting

New York, NY

Advisor: Prof. [Hao Sun](#), Renmin University & Prof. Changxi Zheng, Columbia University

Aug 2024 – Present

- Designed physics-informed deep neural network to infer kinematics and dynamics from pure visual supervision
- Achieved dense per-point scene flow estimation better than previous AutoURDF work while using pure visual supervision

Self-Supervised Articulated Kinematics Discovery from 4D Point Cloud (AutoURDF)

New York, NY

Advisor: Prof. Hod Lipson, Columbia University

Jan 2024 – Dec 2024

- Proposed a novel weighted geodesic-Euclidean distance metric for robust cluster segmentation, improving the accuracy of the kinematics calculation and physical plausibility
- Developed pipeline for joint estimation and URDF generation from trained cluster transformations, enabling 'AutoURDF'
- Achieved 15x training speedup through optimized model design and improved kinematics discovery accuracy via continuous rotation representation in deep learning

RoboBIM: Autonomous BIM Model Reconstruction System (Bachelor Thesis Project with \$15000 funding)

Ningbo, CN

Advisor: Prof. Adam Rushworth, University of Nottingham, Ningbo

Jun 2021 – Jul 2022

- Designed and prototyped a novel autonomous mobile robot system for Building Information Modeling (BIM)
- Built modular hardware stack with multi-modal sensors, Jetson Xavier AGX computing unit, and robust power & signal system
- Built a complete ROS-based software stack, including URDF design, low-level control, Gazebo simulation, LiDAR-based localization, mapping, and path planning. Achieving centimeter-level reconstruction accuracy

TECHNICAL SKILLS

Programming: Python, C++, CUDA, Matlab

Robotics Middleware: ROS, ROS 2, Cyber RT

Simulation: Gazebo, Carla, Unreal Engine, PyBullet, MuJoCo

Deep Learning: PyTorch, Tensorflow, Keras

CAD: Solidworks, AutoCAD, Fusion360

FEA & CFD: Abaqus, Ansys

Prototype: FDM 3D Printing, Laser Cutting, CNC

Computer Vision: OpenCV, PCL, Open3D