

Ziwei Liao

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Research Interests	<p>My long-term goal is to make intelligent robots and machines perceive, understand, and interact with real environments to help human beings in the real world. Specifically, my research interests include Mapping and localization (SLAM), Pose Estimation, 3D Reconstruction, NeRF, Deep Learning, Generative Models, and Uncertainty Modeling.</p>
Education	<p>University of Toronto, Toronto, Canada, Sep 2021-Aug 2025 (<i>Expected</i>) Ph.D. Candidate, Institute for Aerospace Study (UTIAS) Affiliated with the Vector Institute, and the Robotics Institute</p> <p>Beihang University, Beijing, China M.Sci., Robotics Institute, Sep 2018-July 2021 B.Eng., Mechatronics Engineering, Sep 2014-July 2018</p>
Research Experiences	<p>University of Toronto, Research Assistant, Sep 2021-Present Toronto Robotics and AI Lab, Supervisor: Prof. Steven L. Waslander Project: Deep Learning for 3D Objects Perception</p> <p>Microsoft Research Asia, Research Intern, 2022-2023 Intelligent Multimedia & Visual Computing Group, Mentor: Dr. Chunyu Wang Project: 3D Human Pose Estimation with Transformers</p> <p>Beihang University, Research Assistant, 2019-2021 Autonomous Robots Lab, Supervisor: Prof. Wang Wei Project: Object-level SLAM for Indoor Robots</p> <p>Beihang University, Research Assistant, 2018-2020 Autonomous Robots Lab, Supervisor: Prof. Wang Wei Project: Mapping and Localization with Point, Lines and Planes</p> <p>Megvii Research (Face++), Research Intern, 2018-2019 SLAM and Robotics Group Project: Semantic Localization from Monocular Images</p> <p>Tsukuba University, Japan, Research Assistant, 2017-2018 Intelligent Robot Lab, Supervisor: Prof. Akihisa Ohya Project: Semantic Navigation for Indoor Robots</p>

Academic
Service

Conference Reviewer: CVPR 2023-2024, ECCV 2024,
ICRA 2023-2024, WACV 2024
Journal Reviewer: IJRR, RA-L

Publications

7. *Uncertainty-aware 3D Object-Level Mapping with Deep Shape Priors*
Ziwei Liao*, Jun Yang*, Jingxing Qian*, Angela P. Schoellig, Steven L. Waslander
International Conference on Robotics and Automation (**ICRA**), 2024
6. *Multi-view 3D Object Reconstruction and Uncertainty Modelling with Neural Shape Prior*
Ziwei Liao, Steven L. Waslander
Winter Conference on Applications of Computer Vision (**WACV**), 2024
5. *SO-SLAM: Semantic Object SLAM with Scale Proportional and Symmetrical Texture Constraints*
Ziwei Liao, Yutong Hu, Jiadong Zhang, Xianyu Qi, Xiaoyu Zhang, Wei Wang
IEEE Robotics and Automation Letters (**RA-L**) (presented at **ICRA** 2022)
4. *RGB-D Object SLAM using Quadrics for Indoor Environments*
Ziwei Liao, Wei Wang, Xianyu Qi, Xiaoyu Zhang
Sensors, 2020
3. *Coarse-To-Fine Visual Localization Using Semantic Compact Map*
Ziwei Liao, Jieqi Shi, Xianyu Qi, Xiaoyu Zhang, Wei Wang, Yijia He, Ran Wei, Xiao Liu
International Conference on Control and Robots, 2020, (Best Session Presentation)
2. *Stereo plane slam based on intersecting lines*
Xiaoyu Zhang, Wei Wang, Xianyu Qi, **Ziwei Liao**
International Conference on Intelligent Robots and Systems (**IROS**), 2021
1. *Point-Plane SLAM Using Supposed Planes for Indoor Environments*
Xiaoyu Zhang, Wei Wang, Xianyu Qi, **Ziwei Liao**, Ran Wei
Sensors, 2019

Under review

2. *Multiple View Transformers for 3D Human Pose Estimation*
Ziwei Liao*, Jialiang Zhu*, Chunyu Wang, Han Hu, Steven Waslander
Computer Vision and Pattern Recognition (**CVPR**), 2024, *under review*
1. *CITI: An Intersection Traffic Dataset for 2D/3D Object Detection and Tracking*
Kartikeya Bhargava, Bardia Esmaeili, Juan Carillo Garcia, Yuqian Hou, Kumar Vaibhav Jha, **Ziwei Liao**, Sajjad Pakdamansavoji, Trong Thao Tran, Shreejal Trivedi, Bahar abdulhai, James H Elder, Steven L. Waslander
Computer Vision and Pattern Recognition (**CVPR**), 2024, *under review*

Preprints	1. <i>Object-oriented SLAM using Quadrics and Symmetry Properties for Indoor Environments</i> Ziwei Liao , Wei Wang, Xianyu Qi, Xiaoyu Zhang, Lin Xue, Jianzhen Jiao, Ran Wei arXiv, 2020
Awards	2022 Mary H. Beatty Fellowship, University of Toronto 2021 DiDi Scholarship 2020 National Scholarship, Ministry of Education, China 2018 Chinese National Robocon Robotics Competition (Second Award) 2018 Outstanding Graduate of Beijing, China
Languages and Skills	English, Japanese (N2), Chinese (native) Python/C++, PyTorch, OpenCV, ROS, Open3D, Robot platforms (wheeled, rotorcraft), Sensors (RGB-D, laser/lidar, odometry, IMU)