# Xinhao Liu

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## Research Direction

My research interests lie at the intersection of robotics, computer vision, and deep learning, with a focus on embodied AI in open-world environments. My research focuses on *Universal Navigation*, where I aim to build embodied intelligence that can go anywhere that humans can go.

**Keywords**: World modeling, Video Understanding, Digital Twins

## Education

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| 2023 – present | **Ph.D. in Computer Science**, New York University. |
| | PhD advisor: Prof. Chen Feng |
| 2023 | **B.Sc. in Mathematics**, New York University. |
| | Major: Honors Mathematics | Data Science |

## Experience

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| Nov 2025 – Present | **Applied Scientist Intern**, Amazon FAR, San Francisco |
| May – Aug 2025 | **Research Intern**, Waymo, Mountain View |
| 2021 – 2023 | **Research Intern**, AI4CE Lab, New York University |
| Jun – Aug 2021 | **Intern Developer**, FNZ, Shanghai, China |

## Research Publications

First-authored papers (including equal contribution): 6    Citations: 165    H-index: 6

Full publication list on https://scholar.google.com/citations?user=6pI4Xa4AAAAJ

* indicates equal contribution.

### Preprint

1. **Xinhao Liu\***, Jiaqi Li\*, Youming Deng, Ruxin Chen, Yingjia Zhang, Yifei Ma, Li Guo, Yiming Li, Jing Zhang, and Chen Feng, *Wanderland: Geometrically grounded simulationfor open-world embodied ai*, 2025.

### Conference Proceedings

1. **Xinhao Liu\***, Jintong Li\*, Yicheng Jiang, *et al.*, "Citywalker: Learning embodied urban navigation from web-scale videos," in *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, 2025.

2. Yiming Li\*, Sihang Li\*, **Xinhao Liu\***, Moonjun Gong\*, Kenan Li, Nuo Chen, Zijun Wang, Zhiheng Li, Tao Jiang, Fisher Yu, Yue Wang, Hang Zhao, Zhiding Yu, and Chen Feng, "Sscbench: Monocular 3d semantic scene completion benchmark in street views," in *2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, IEEE, 2024.

3. **Xinhao Liu\***, Moonjun Gong\*, Qi Fang, Haoyu Xie, Yiming Li, Hang Zhao, and Chen Feng, "Lidar-based 4d occupancy completion and forecasting," in *2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, IEEE, 2024.

**4** Juexiao Zhang, Gao Zhu, Sihang Li, **Xinhao Liu**, Haorui Song, Xinran Tang, and Chen Feng, "Multiview scene graph," in *Advances in Neural Information Processing Systems (NeurIPS)*, 2024.

**5** Chao Chen*, **Xinhao Liu***, Yiming Li, Li Ding, and Chen Feng, "Deepmapping2: Self-supervised large-scale lidar map optimization," in *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition*, 2023, pp. 9306–9316.

## Journal Articles

**1** Chao Chen, Zegang Cheng, **Xinhao Liu**, Yiming Li, Li Ding, Ruoyu Wang, and Chen Feng, "Self-supervised place recognition by refining temporal and featural pseudo labels from panoramic data," *IEEE Robotics and Automation Letters*, vol. 10, no. 1, pp. 248–255, 2025. 🔗 DOI: 10.1109/LRA.2024.3495584.

## Honors & Awards

2025   **Deborah Rosenthal, MD Award**, New York University, New York NY. Awarded for outstanding performance on PhD qualifying exam (2 awardees per year).

2024   **Conference Attendance Grant**, New York University, New York, NY. ($1,500 grant)

2023   **University Honors Scholar**, New York University, New York, NY.

**Student Travel Grant for Conference**, NYU Shanghai, Shanghai, China. ($4,000 grant)

2022 – 2023   **Dean's List of Academic Year**, NYU Shanghai, Shanghai, China.

2022   **UGSRP Research Fund**, NYU Tandon, New York, NY. ($5,000 fund)

2020   **Best Research Project**, Undergraduate Research Symposium, NYU Shanghai, Shanghai, China. (2 out of 30+ projects)

**Dean's Undergraduate Research Fund**, NYU Shanghai, Shanghai, China. (¥7,000 fund)

## Invited Talks

2025   **Amazon FAR**, *CityWalker: Learning Embodied Urban Navigation from Web-Scale Videos*.

## Grants

2025   **The START Program**, Samsung Research America. *Action-Conditioned Video Generation for Dynamic Environments* (Rejected). **Role**: Project Collaborator, proposal writing, leading the project.

2024   **The NVIDIA Academic Grant Program**, NVIDIA. *Open Digital Twins for New York City*. **Amont**: 8 NVIDIA RTX 6000 Ada Grafics Cards (worth of $54,400). **Role**: Project Collaborator, main proposal writing and project lead.

## Professional Services

Reviewer   **NeurIPS**, 2025.
**ICCV**, 2025.
**CVPR**, 2024–2025.
**ICLR**, 2024–2025.
**IROS**, 2024–2025.
**ICRA**, 2023.

## Technical Skills

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| Programming | Python, Matlab, C#, JavaScript, Shell |
| Library | PyTorch, JAX, ROS, OpenCV, Open3D |
| Text Editing | LaTeX, Markdown, MS Office |