

Hangxin Liu

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EDUCATION

University of California, Los Angeles	Los Angeles, CA
Ph.D. in Computer Science , Computer Vision concentration	04/2018 – 06/2021
M.S. in Mechanical Engineering , Robotics concentration	09/2016 – 03/2018
Virginia Polytechnic Institute & State University (Virginia Tech)	Blacksburg, VA
B. S. in Mechanical Engineering , Robotics concentration	08/2012 – 05/2016
B. S. in Computer Science , Scientific Computing concentration	01/2014 – 05/2016
Magna Cum Laude, Honors Scholar	
Shanghai Jiao Tong University (University of Michigan-SJTU Joint Institute)	Shanghai, China
Exchange Student (Mechanical Engineering)	05/2014 – 08/2014

APPOINTMENTS

Beijing Institute for General Artificial Intelligence	
Research Scientist in Robotics	04/2021 – present
<ul style="list-style-type: none"> Leading the Robotics lab (PhD and MS level) 	
Center for Vision, Cognition, Learning, and Autonomy	UCLA
Graduate Student Researcher, Advisor: Dr. Song-Chun Zhu	09/2016 – 03/2021
<ul style="list-style-type: none"> ONR N00014-19-1-2153: Scene Understanding for Robot Autonomy & DURIP N00014-20-1-2812: A Cognitive Robot Platform for Scene Understanding and Expeditionary Maneuver DARPA XAI N66001-17-2-4029: Learning and Communicating Explainable Representations for Analytics and Autonomy ONR MURI N00014-16-1-2007: Understanding Scenes and Events through Joint Parsing, Cognitive Reasoning and Lifelong Learning DARPA SIMPLEX N66001-15-C-4035: Learning Homogeneous Knowledge Representation from Heterogeneous Data for Quantitative and Qualitative Reasoning in Autonomy 	
Computational Multi-physics Systems (CMS) Laboratory	Virginia Tech
Undergraduate/Graduate Research Assistant, Advisor: Dr. Tomonari Furukawa	01/2015 – 09/2016
<ul style="list-style-type: none"> Worked on a probabilistic approach for Non-Line-Of-Sight visual/ acoustical target estimation and tested on human and mobile sensor platform (NSF-EAGER-1554961). Developed an infrastructural traffic monitoring system using Arduino, laser ranger finders, IR image sensor with Raspberry Pi. Led a student software team to implement way-point control on a drive-by-wire gofcart using Robot Operating System (ROS) with Sick LiDAR, IMU, GPS, and RGB-D sensors. Worked on motion tracking and feature detection using non-stationary camera that enabled UAV to locate, track and land on a moving ground vehicle for the Mohamed Bin Zayed International Robotics Challenge (MBZIRC 2017). 	

PUBLICATIONS

Journal Paper (* indicates joint first authors, ✉ indicates corresponding authors)

- [J6] Z. Zhang*, Z. Jiao*, W. Wang, Y. Zhu, S.-C. Zhu, **H. Liu**✉, “Understanding Physical Effects for Effective Tool-use,” IEEE Robotics and Automation Letters (RA-L), 2022, DOI: 10.1109/LRA.2022.3191793
- [J5] Y. Su, Y. Jiang, Y. Zhu, **H. Liu**✉, “Objects Gathering with Tethered Robot Duo,” IEEE Robotics and Automation Letters (RA-L), 2022, DOI: 10.1109/LRA.2022.3141828

- [J4] **H. Liu**, Y. Zhu, S.-C. Zhu, “Patching Interpretable And-Or Graph Knowledge Representation using Augmented Reality,” *Applied AI Letters (DARPA XAI Special Issue)*, 2021, DOI: 10.1002/ail2.43
- [J3] Y. Zhu, T. Gao, L. Fan, S. Huang, M. Edmonds, **H. Liu**, F. Gao, C. Zhang, S. Qi, Y.N. Wu, J.B. Tenenbaum, S.-C. Zhu, “Dark, Beyond Deep: A Paradigm Shift to Cognitive AI with Human-like Commonsense,” *Engineering*, 2020, DOI: 10.1016/j.eng.2020.01.011
- [J2] M. Edmonds*, F. Gao*, **H. Liu***, X. Xie*, S. Qi, B. Rothrock, Y. Zhu, Y.N. Wu, H. Lu, S.-C. Zhu, “A Tale of Two Explanations: Enhancing Human Trust by Explaining Robot Behavior,” *Science Robotics*, 2019, DOI: 10.1126/scirobotics.aay4663
- [J1] Y. Tian, **H. Liu**, and T. Furukawa, “Reliable Infrastructural Urban Traffic Monitoring Via Lidar and Camera Fusion,” *SAE International Journal of Passenger Cars-Electronic and Electrical Systems*, 10(2017-01-0083), pp.173-180, 2017, DOI: 10.4271/2017-01-0083.

Conference Paper (* indicates joint first authors)

- [C20] Z. Jiao, Y. Niu, Z. Zhang, S.-C. Zhu, Y. Zhu, **H. Liu**, “Sequential Manipulation Planning on Scene Graph,” *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2022
- [C19] Y. Su*, C. Chu*, M. Wang, J. Li, L. Yang, Y. Zhu, **H. Liu**, “Downwash-aware Control Allocation for Over-actuated UAV Platforms,” *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2022
- [C18] Z. Jiao*, Z. Zhang*, W. Wang, D. Han, S.-C. Zhu, Y. Zhu, **H. Liu**, “Efficient Task Planning for Mobile Manipulation: a Virtual Kinematic Chain Perspective,” *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2021
- [C17] Z. Jiao*, Z. Zhang*, X. Jiang, D. Han, S.-C. Zhu, Y. Zhu, **H. Liu**, “Consolidating Kinematic Models to Promote Coordinated Mobile Manipulations,” *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2021
- [C16] M. Han*, Z. Zhang*, Z. Jiao, X. Xie, Y. Zhu, S.-C. Zhu, **H. Liu**, “Reconstructing Interactive Scenes by Panoptic Mapping and CAD Model Alignments,” *IEEE International Conference on Robotics and Automation (ICRA)*, 2021
- [C15] S. Qiu*, **H. Liu***, Z. Zhang, Y. Zhu, S.-C. Zhu, “Human-Robot Interaction in a Shared Augmented Reality Workspace,” *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2020
- [C14] M. Wang, Y. Su, **H. Liu**, Y. Xu, “WalkingBot: Modular Interactive Legged Robot with Automated Structure Interpretation and Motion Planning,” *IEEE International Conference on Robot and Human Interactive Communication (RO-MAN)*, 2020
- [C13] Z. Zhang, **H. Liu**, Z. Jiao, Y. Zhu, S.-C. Zhu, “Congestion-aware Evacuation Routing using Augmented Reality Devices,” *IEEE International Conference on Robotics and Automation (ICRA)*, 2020
- [C12] T. Yuan, **H. Liu**, L. Fan, Z. Zheng, T. Gao, Y. Zhu, S.-C. Zhu, “Joint Inference of States, Robot Knowledge, and Human (False-)Beliefs,” *IEEE International Conference on Robotics and Automation (ICRA)*, 2020
- [C11] X. Xie, **H. Liu**, Z. Zhang, Y. Qiu, F. Gao, S. Qi, Y. Zhu, S.-C. Zhu, “VRGym: A Virtual Testbed for Physical and Interactive AI,” *2nd ACM Turing Celebration Conference - China (ACM TURC)*, 2019
- [C10] **H. Liu***, Z. Zhang*, Xu Xie, Y. Zhu, Y. Liu, Y. Wang, S.-C. Zhu, “High-Fidelity Grasping in Virtual Reality using a Glove-based System,” *IEEE International Conference on Robotics and Automation (ICRA)*, 2019
- [C9] **H. Liu***, Z. Zhang*, Y. Zhu, S.-C. Zhu, “Self-Supervised Incremental Learning for Sound Source Localization in Complex Indoor Environment,” *IEEE International Conference on Robotics and Automation (ICRA)*, 2019
- [C8] **H. Liu**, C. Zhang, Y. Zhu, C. Jiang, S.-C. Zhu, “Mirroring without Overimitation: Learning Functionally Equivalent Manipulation Actions,” *33rd AAAI Conference on Artificial Intelligence (AAAI)*, 2019
- [C7] **H. Liu***, Y. Zhang*, W. Si, X. Xie, Y. Zhu, S.-C. Zhu, “Interactive Robot Knowledge Patching using Augmented Reality,” *IEEE International Conference on Robotics and Automation (ICRA)*, 2018

- [C6] X. Xie*, **H. Liu***, M. Edmonds, F. Gao, S. Qi, Y. Zhu, B. Rothrock, S.-C. Zhu, "Unsupervised Learning of Hierarchical Models for Hand-Object Interactions," IEEE International Conference on Robotics and Automation (*ICRA*), 2018
- [C5] M. Edmonds*, F.Gao*, X. Xie, **H. Liu**, S. Qi, Y. Zhu, B. Rothrock, S.-C. Zhu, "Feeling the Force: Integrating Force and Pose for Fluent Discovery through Imitation Learning to Open Medicine Bottles," IEEE/RSJ International Conference on Intelligent Robots and Systems (*IROS*), 2017
- [C4] **H. Liu***, X. Xie*, M. Millar*, M. Edmonds, F.Gao, Y. Zhu, V. Santos, B. Rothrock, S.-C. Zhu, "A Glove-based System for Studying Hand-Object Manipulation via Joint Pose and Force Sensing," IEEE/RSJ International Conference on Intelligent Robots and Systems (*IROS*), 2017
- [C3] K. Takami, **H. Liu**, T. Furukawa, M. Kumon, G. Dissanayake, "Non-Field-of-View Sound Source Localization Using Diffraction and Reflection Signal," IEEE/RSJ International Conference on Intelligent Robots and Systems (*IROS*), 2016
- [C2] **H. Liu**, Y. Tian, T. Furukawa, "Design of Highly Reliable Infrastructural Traffic Monitoring Using Laser and Vision Sensors," ASME IDETC/CIE, 2016
- [C1] K. Takami, **H. Liu**, T. Furukawa, M. Kumon, G. Dissanayake, "Recursive Bayesian Estimation of NFOV Target Using Diffraction and Reflection Signals," ISIF International Conference on Information Fusion, 2016

HONORS & AWARDS

- ACM TURC Conference Best Paper Award 2019
- ICRA 2019 Conference Travel Award 2019
- ICRA 2018 Conference Travel Award 2018
- Pratt Engineering Scholarship (\$5000 each academic year) from Collage of Engineering 2013 – 2016
- Dean's Scholarship (\$3000) from Collage of Engineering Spring 2013
- 6 × Dean's List with Distinction, 2 × Dean's List 2012 – 2016
- University Honor Student at Virginia Tech. Summer 2014 – Spring 2016

PROFESSIONAL SERVICE

Journal Reviewer: IEEE RA-L, Applied AI Letters, IEEE Transactions on Circuits and Systems for Video Technology

Conference Reviewer: ICRA (2022, 2020, 2019), IROS (2022, 2020, 2019), RO-MAN (2020)

LANGUAGES & SKILLS

Language: Chinese Mandarin and Cantonese: Native
English: Full professional proficiency

Skills: Computer Languages: Java, C/C++, Python Software: Robot Operating System (ROS), MATLAB, Eclipse
Operating Systems: Windows, Linux CAD: AutoDesk Inventor, Solidworks

MEMBERSHIPS & AFFILIATION

- Student Member of IEEE and RAS. 06/2017
- Member of **Phi Beta Kappa** Honor Society. 04/2016
- Student Member of ASME. 01/2016
- Member of **Tau Beta Pi** National Engineering Honor Society. 04/2014