

# Hangxin Liu

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## EDUCATION

### University of California, Los Angeles

**Ph.D. in Computer Science**, Computer Vision concentration  
**M.S. in Mechanical Engineering**, Robotics concentration  
 Overall GPA 3.82/4.00

Los Angeles, CA

04/2018 – Present  
 09/2016 – 03/2018

### Virginia Polytechnic Institute & State University (Virginia Tech)

**B. S. in Mechanical Engineering**, Robotics concentration  
**B. S. in Computer Science**, Scientific Computing concentration  
 Minor: **Mathematics**  
 Overall GPA 3.78/4.00, Magna Cum Laude, Honors Scholar

Blacksburg, VA

08/2012 – 05/2016  
 01/2014 – 05/2016

### Shanghai Jiao Tong University (University of Michigan-SJTU Joint Institute)

Exchange Student (Mechanical Engineering)

Shanghai, China

5/2014 – 08/2014

## APPOINTMENTS

### Center for Vision, Cognition, Learning, and Autonomy

Graduate Student Researcher, Advisor: Dr. Song-Chun Zhu

09/2016 – Present

- ONR N00014-19-1-2153: Scene Understanding for Robot Autonomy
- 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

Undergraduate/Graduate Research Assistant, Advisor: Dr. Tomonari Furukawa

01/2015 – 09/2016

- 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 goftcart 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)

- [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)

- [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 Sensing 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," 2<sup>nd</sup> 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," 33<sup>rd</sup> 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**

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- 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
- Dean’s List (Two semesters). Spring 2015, Fall 2015
- Dean’s List with Distinction (Six semesters). Fall 2012 – Fall 2014, Spring 2016
- University Honor Student at Virginia Tech. Summer 2014 – Spring 2016

## PROFESSIONAL SERVICE

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**Journal Reviewer:** IEEE RA-L

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

## LANGUAGES & SKILLS

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

**Skills:** Computer Languages: Java, C/C++, Python  
Operating Systems: Windows, Linux

Software: Robot Operating System (ROS), MATLAB, Eclipse  
CAD: AutoDesk Inventor, Solidworks

## MEMBERSHIPS & AFFILIATION

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- 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