WEIYU LIU

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RESEARCH INTEREST

My research aims to develop autonomous robots that can effectively perceive, model, and interact with objects in the real world by integrating semantic knowledge with sensorimotor data.

EDUCATION

Georgia Institute of Technology, Atlanta, GA — 2017 – 2022
Ph.D. in Robotics
Advisor: Sonia Chernova

Georgia Institute of Technology, Atlanta, GA — 2012 – 2017
Bachelor of Science, Electrical Engineering with Distinction, Minor in Computer Science

RESEARCH EXPERIENCE

Stanford Vision and Learning Lab, Stanford, CA — 2023 – Present
Postdoctoral Scholar with Jiajun Wu

NVIDIA Research, Seattle, WA, — Summer 2022
Robotics Research Intern with Dieter Fox, Tucker Hermans, and Animesh Garg

NVIDIA Research, Seattle, WA, — Summer 2021
Robotics Research Intern with Dieter Fox, Tucker Hermans, and Chris Paxton

Georgia Institute of Technology, Atlanta, GA — 2017 – 2022
Graduate Research Assistant with Sonia Chernova

Georgia Institute of Technology, Atlanta, GA — 2016 – 2017
Undergraduate research with Sonia Chernova

Georgia Institute of Technology, Atlanta, GA — 2014 – 2016
Undergraduate research with Fumin Zhang

PUBLICATIONS

Conference and Journal Papers

- Composable Part-Based Manipulation
  Weiyu Liu, Jiayuan Mao, Joy Hsu, Tucker Hermans, Animesh Garg, and Jiajun Wu.
  Conference on Robot Learning (CoRL), 2023
- Task-Oriented Grasp Prediction with Visual-Language Inputs
  Chao Tang, Dehao Huang, Lingxiao Meng, **Weiyu Liu**, and Hong Zhang.
  International Conference on Intelligent Robots and Systems (IROS), 2023
- StructDiffusion: Language-Guided Creation of Physically-Valid Structures using Unseen Objects
  Weiyu Liu, Yilun Du, Tucker Hermans, Sonia Chernova, and Chris Paxton.

Robotics: Science and Systems (RSS), 2023

- A Survey of Semantic Reasoning Frameworks for Robotic Systems
  Weiyu Liu*, Angel Daruna*, Maithili Patel, Kartik Ramachandruni, and Sonia Chernova.
  Robotics and Autonomous Systems (RAS), 2023
- StructFormer: Learning Spatial Structure for Language-Guided Semantic Rearrangement of Novel Objects
  Weiyu Liu, Chris Paxton, Tucker Hermans, and Dieter Fox.
  International Conference on Robotics and Automation (ICRA), 2022
- Learning Instance-Level N-Ary Semantic Knowledge At Scale For Robots Operating in Everyday Environments
  Weiyu Liu, Dhruva Bansal, Angel Daruna, and Sonia Chernova.
  Autonomous Robots, 2023
  Robotics: Science and Systems (RSS), 2021
- Towards Robust One-shot Task Execution using Knowledge Graph Embeddings
  Angel Daruna, Lakshmi Nair, **Weiyu Liu**, and Sonia Chernova.
  International Conference on Robotics and Automation (ICRA), 2021
- An Affordance Keypoint Detection Network for Robot Manipulation
  Ruinian Xu, Fu-Jen Chu, Chao Tang, **Weiyu Liu**, and Patricio Vela.
  Robotics and Automation Letters (ICRA), 2021
- Same Object, Different Grasps: Data and Semantic Knowledge for Task-Oriented Grasping
  Adithya Murali, **Weiyu Liu**, Kenneth Marino, Sonia Chernova, and Abhinav Gupta.
  Conference on Robot Learning (CoRL), 2020
- CAGE: Context-Aware Grasping Engine
  Weiyu Liu, Angel Daruna, and Sonia Chernova.
  International Conference on Robotics and Automation (ICRA), 2020.
- Path Ranking with Attention to Type Hierarchies
  Weiyu Liu, Angel Daruna, Zsolt Kira, and Sonia Chernova.
  Conference on Artificial Intelligence (AAAI), 2020.
- Taking Recoveries to Task: Recovery-Driven Development for Recipe-based Robot Tasks
  Siddhartha Banerjee*, Angel Daruna*, David Kent*, **Weiyu Liu***, Jonathan Balloch, Abhinav Jain, Akshay Krishnan, Muhammad Asif Rana, Harish Ravichandar, Binit Shah, Nithin Shrivatsav, and Sonia Chernova.
  International Symposium on Robotics Research (ISRR), 2019.
- Autonomous flying blimp interaction with human in an indoor space
  Ningshi Yao, Qiuyang Tao, **Weiyu Liu**, Zhen Liu, Ye Tian, Peiyu Wang, Timothy Li, and Fumin Zhang.
  Frontiers of Information Technology & Electronic Engineering, 20, 2019.
- RoboCSE: Robot Common Sense Embedding
  Angel Daruna, **Weiyu Liu**, Zsolt Kira, and Sonia Chernova.
  International Conference on Robotics and Automation (ICRA), 2018.
- SiRoK: Situated Robot Knowledge - Understanding the Balance Between Situated Knowledge and Variability
  Sonia Chernova, Vivian Chu, Angel Daruna, Haley Garrison, Meera Hahn, Priyanka Khante, **Weiyu Liu**, and Andrea Thomaz.
  AAAI Spring Symposium Series (AAAI-SSS), 2018.
- Situated Bayesian Reasoning Framework for Robots Operating in Diverse Everyday Environments
  Sonia Chernova, Vivian Chu, Angel Daruna, Haley Garrison, Meera Hahn, Priyanka Khante, **Weiyu**

Liu, and Andrea Thomaz.
International Symposium on Robotics Research (ISRR), 2017.

Preprints

- Latent Space Planning for Multi-Object Manipulation with Environment-Aware Relational Classifiers
  Yixuan Huang, Nichols Crawford Taylor, Adam Conkey, **Weiyu Liu**, and Tucker Hermans.
  Under Review, 2023
- GraspGPT: Leveraging Semantic Knowledge from a Large Language Model for Task-Oriented Grasping
  Chao Tang, Dehao Huang Wenqi Ge, **Weiyu Liu**, and Hong Zhang.
  Under Review, 2023
- Leveraging Semantics for Incremental Learning in Multi-Relational Embeddings
  Angel Daruna, **Weiyu Liu**, Zsolt Kira, and Sonia Chernova.
  arXiv, 2019

TEACHING

Georgia Institute of Technology, Atlanta, GA — Fall 2021
Graduate Teaching Assistant for Sonia Chernova and Sean Wilson
CS 7785 Intro Robotics Research

Georgia Institute of Technology, Atlanta, GA — Spring 2018
Graduate Teaching Assistant for Sonia Chernova
CS 3630 Introduction to Robotics and Perception

Georgia Institute of Technology, Atlanta, GA — Fall 2014
Peer Tutor
Learning Assistance Program, Best Tutor Award

LEADERSHIP and PROFESSIONAL SERVICE

Georgia Institute of Technology, *Vice President Academic, RoboGrads*	2019 – 2020
Reviewer for RSS	2021, 2023
Reviewer for CoRL	2021 – 2023
Reviewer for ICRA	2019 – 2023
Reviewer for RA-L	2020 – 2023
Reviewer for IROS	2022 – 2023
Reviewer for EMNLP	2023
Reviewer for COLING	2022
Reviewer for Autonomous Agents and Multi-Agent Systems	2022

AWARDS and HONORS

RSS Pioneers	2022
Fetch it! The Mobile Manipulation Challenge, *First Place*	2019
Georgia Institute of Technology, *Dean's List*	2012 – 2017

TALKS

Invited Talk, Berkeley Artificial Intelligence Research Lab, UC Berkeley	2023

Invited Talk, Stanford Vision and Learning Lab, Stanford University	2022
Invited Talk, RoboGrads Student Seminar, Georgia Tech	2022
Invited Talk, Toronto AI in Robotics Seminar, University of Toronto	2022
Invited Talk, Laboratory for Progress, University of Michigan	2022
Invited Talk, NeurIPS Robot Learning Workshop	2021
Presentation, ICRA Semantic Representations Workshop	2021
Presentation, ICRA	2020
Presentation, ICRA	2020
Presentation, AAAI	2020
Presentation, ISRR	2019

MENTORSHIP

Chao Tang, ECE M.S. → Robotics Ph.D. at SUSTech, China	2022 – Present
Dhruva Bansal, CS B.S. → CS M.S. at Stanford	2021
Jayanta Bhowmick, CS M.S. → Amazon	2021
Sushrut Kulkarni, CS M.S.	2021