

# WEIYU LIU

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## RESEARCH INTEREST

My research develops semantic reasoning frameworks capable of modeling complex semantic knowledge, enabling robots to effectively perceive, model, and interact with objects in the real world.

## EDUCATION

Georgia Institute of Technology, Atlanta, GA <i>Ph.D. in Robotics</i> Advisor: Sonia Chernova	2017 – Present
Georgia Institute of Technology, Atlanta, GA <i>Bachelor of Science, Electrical Engineering with Distinction</i> GPA: 3.96	2012 – 2017

## RESEARCH EXPERIENCE

NVIDIA Research, Seattle, WA, <i>Robotics Research Intern</i>	Summer 2021
Georgia Institute of Technology, Atlanta, GA <i>Graduate Research Assistant</i>	2017 – Present
Georgia Institute of Technology, Atlanta, GA <i>Undergraduate research with Prof. Sonia Chernova</i>	2016 – 2017
Georgia Institute of Technology, Atlanta, GA <i>Undergraduate research with Prof. Fumin Zhang</i>	2014 – 2016

## PUBLICATIONS

### *Preprints*

- StructFormer: Learning Spatial Structure for Language-Guided Semantic Rearrangement of Novel Objects  
**Weiyu Liu**, Chris Paxton, Tucker Hermans, and Dieter Fox.  
*Under review*, 2021
- A Survey of Semantic Reasoning Frameworks for Robotic Systems  
**Weiyu Liu**, Angel Daruna, and Sonia Chernova.  
*Under review, Robotics and Autonomous Systems (RAS)*, 2020
- Leveraging Semantics for Incremental Learning in Multi-Relational Embeddings  
Angel Daruna, **Weiyu Liu**, Zsolt Kira, and Sonia Chernova.  
*arXiv*, 2019

### *Conference and Journal Papers*

- Learning Instance-Level N-Ary Semantic Knowledge At Scale For Robots Operating in Everyday Environments  
**Weiyu Liu**, Dhruva Bansal, Angel Daruna, and Sonia Chernova.  
*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  
Ruian 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, Zolt 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**, Zolt 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.

## Teaching Experience

Georgia Institute of Technology, Atlanta, GA

Spring 2018

*Graduate Teaching Assistant*

CS 3630 Introduction to Robotics and Perception, Instructor: Prof. Sonia Chernova

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: ICRA, RA-L, RSS

2019 – 2021

## **AWARDS and HONORS**

Fetch it! The Mobile Manipulation Challenge, *First Place*

2019

Georgia Institute of Technology, *Dean's List*

2012 – 2017