# Shuijing Liu

Postdoctoral Scholar

Computer Science

The University of Texas at Austin

## Research interests

I'm excited about enabling robots to operate in unstructured human environments, such as our homes and offices. I consider human modeling, interaction reasoning, and decision making as essential capabilities of such robots. Thus, my research is at the intersection of **robot learning** and **human-robot interaction**. I use AI tools to develop fundamental learning paradigms for human-centered robotics problems. My research is inspired by and deployed in challenging real-world applications, including navigation in human crowds, autonomous driving, instruction following, and assistive robots for people with disabilities.

## Contact

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## Education

**University of Illinois at Urbana-Champaign** 2018 – 2024

Ph.D. in Electrical and Computer Engineering

Advisor: Prof. Katherine Driggs-Campbell

Thesis: Learning Structured Interaction Models for Robot Navigation in Human Environments

**University of Illinois at Urbana-Champaign** 2014 – 2018

B.S. in Computer Engineering, minor in Art and Design (Graduated with Highest Honor)

Undergraduate Thesis: Prostate Cancer Diagnosis with Deep Learning

## Appointments

**The University of Texas at Austin** 08/2024 – current

Postdoctoral scholar with Yuke Zhu

**Municorn Inc** 02/2025 – current

AI Consultant

## Honors and Awards

- RSS Pioneers 2025
- Rising Stars in EECS 2024
- Best Student Paper Award Finalist at CoRL 2023 2023
- Best poster award at the IROS 2023 Last-Mile Robotics Workshop 2023
- Conference Travel Award, ECE department at UIUC 2022
- Honorable mention for TechSAge Stretch Robot Pitch Competition 2021
- Lauren Kelley Memorial Scholarship 2017 – 2018
- Professor N. Narayana Rao Scholarship 2016
- Oakley Scholarship 2015
- Dean's List, ECE department at UIUC 2014 – 2016

## Publications

*, † indicate equal contributions

1. **Learning Coordinated Bimanual Manipulation Policies using State Diffusion and Inverse Dynamics Models**
   H. Chen, J. Xu*, L. Sheng*, T. Ji, **S. Liu**, Y. Li, and K. Driggs-Campbell.
   In International Conference on Robotics and Automation (ICRA), 2025.
2. **DRAGON: A Dialogue-Based Robot for Assistive Navigation with Visual Language Grounding**
   **S. Liu**, A. Hasan, K. Hong, R. Wang, P. Chang, Z. Mizrachi, J. Lin, D. L. McPherson, W. A. Rogers, and K. Driggs-Campbell.
   In Robotics and Automation Letters (RA-L), 2024.
3. **Predicting Object Interactions with Behavior Primitives: An Application in Stowing Tasks**
   H. Chen, Y. Niu, K. Hong, **S. Liu,** Y. Wang, Y. Li, and K. Driggs-Campbell.
   In Conference on Robot Learning (CoRL), 2023.
   (Best Paper/Student Paper Award Finalist)
4. **A Data-Efficient Visual-Audio Representation with Intuitive Fine-tuning for Voice-Controlled Robots**
   P. Chang, **S. Liu,** T. Ji, N. Chakraborty, K. Hong, and K. Driggs-Campbell.
   In Conference on Robot Learning (CoRL), 2023.
5. **Structural Attention-Based Recurrent Variational Autoencoder for Highway Vehicle Anomaly Detection**
   N. Chakraborty, A. Hasan*, **S. Liu*,** T. Ji*, W. Liang, D. L. McPherson, and K. Driggs-Campbell.
   In International Conference on Autonomous Agents and Multiagent Systems (AAMAS), 2023.
6. **Intention Aware Robot Crowd Navigation with Attention-Based Interaction Graph**
   **S. Liu,** P. Chang, Z. Huang, N. Chakraborty, W. Liang, J. Geng, and K. Driggs-Campbell.
   In IEEE International Conference on Robotics and Automation (ICRA), 2023.
   Best poster award at the IROS 2023 Last-Mile Robotics Workshop
7. **Occlusion-Aware Crowd Navigation Using People as Sensors**
   Y. J. Mun, M. Itkina, **S. Liu,** and K. Driggs-Campbell.
   In IEEE International Conference on Robotics and Automation (ICRA), 2023.
8. **Learning Visual-Audio Representations for Voice-Controlled Robots**
   P. Chang, **S. Liu,** and K. Driggs-Campbell.
   In IEEE International Conference on Robotics and Automation (ICRA), 2023.
9. **Learning to Navigate Intersections with Unsupervised Driver Trait Inference**
   **S. Liu,** P. Chang, H. Chen, N. Chakraborty, and K. Driggs-Campbell.
   In International Conference on Robotics and Automation (ICRA), 2022.
10. **Off Environment Evaluation Using Convex Risk Minimization**
    P. Katdare, **S. Liu,** and K. Driggs-Campbell.
    In International Conference on Robotics and Automation (ICRA), 2022.
11. **Combining Model-Based Controllers and Generative Adversarial Imitation Learning for Traffic Simulation**
    H. Chen, T. Ji, **S. Liu,** and K. Driggs-Campbell.
    In IEEE International Conference on Intelligent Transportation Systems (ITSC), 2022.
12. **An Interdisciplinary Approach: Potential for Robotic Support to Address Wayfinding Barriers Among Persons with Visual Impairments**
    M. A. Bayles, T. Kadylak, **S. Liu,** A. Hasan, W. Liang, K. Hong, K. Driggs-Campbell, and W. A. Rogers
    In Human Factors and Ergonomics Society Annual Meeting (HFES), 2022.
13. **Decentralized Structural-RNN for Robot Crowd Navigation with Deep Reinforcement Learning**
    **S. Liu*,** P. Chang*, W. Liang†, N. Chakraborty†, and K. Driggs-Campbell.
    In IEEE International Conference on Robotics and Automation (ICRA), 2021.
14. **Robot Sound Interpretation: Combining Sight and Sound in Learning-based Control**

P Chang, **S Liu,** H Chen, and K Driggs-Campbell.
In IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2020.

15. **Robust Deep Reinforcement Learning with Adversarial Attacks**
A. Pattanaik, Z. Tang*, **S. Liu*,** G. Bommannan, and G. Chowdhary.
In International Conference on Autonomous Agents and Multiagent Systems (Extended Abstract), 2018.

## Preprints

1. **Open-World Assistive Teleoperation of Mobile Manipulators with Vision Language Models**
H. Liu, R. Shah, **S. Liu**, Y. Cui, Y. Bisk, R. Martín-Martín, and Y. Zhu.
Under review, 2025.
2. **SocialNav-SUB: Benchmarking VLMs for Scene Understanding in Social Robot Navigation**
M. J. Munje, C. Tang, **S. Liu**, Z. Hu, Y. Zhu, J. Cui, G. Warnell, J. Biswas, and P. Stone.
Under review, 2025.
3. **HEIGHT: Heterogeneous Interaction Graph Transformer for Robot Navigation in Crowded and Constrained Environments**
**S. Liu**, H. Xia, F. Cheraghi Pouria, K. Hong, N. Chakraborty, and K. Driggs-Campbell.
Under review, 2024.
Best Paper Award at ICRA 2025 Workshop on Advances in Social Navigation: Planning, HRI and Beyond
4. **Sim-to-Real Adaptation with Graph-Based Neural Dynamics for Granular Object Manipulation**
K. Hong, H. Chen*, R. Wang*, K. Wang*, M. Zhang, **S. Liu**, Y. Li, and K. Driggs-Campbell.
Under review, 2025.
5. **ComposableNav: Composable Instruction-Following Navigation in Dynamic Environments via Diffusion**
Z. Hu, C. Tang, A. Liu, Y. Zhu, M. J. Munje, **S. Liu**, Y. Li, G. Warnell, P. Stone, and J. Biswas.
Under reivew, 2025.
6. Tool-as-Interface: Learning Robot Policies from Observing Human Tool Use
H. Chen, C. Zhu, S. Liu, Y. Li, and K. Driggs-Campbell.
Under review, 2025.
Best Paper Award at ICRA 2025 workshop on Foundation Models and Neural-Symbolic (NeSy) AI for Robotics

## Invited Talks

- **Structured Interaction Models Enables Human-Robot Coexistence in the Wild**
University of Utah, 2025.
- **Learning Structured Interaction Models for Robot Navigation in Human Environments**
RobotiXX Lab, George Mason University, 2024.
Stanford Intelligent Systems Laboratory (SISL), 2024.
Learning Agents Research Group (LARG), UT Austin, 2024.
- **Robot Learning to Interact in Human Spaces**
UT Austin Robot Perception and Learning Lab, 2024.
Stanford Vision and Learning Lab (SVL), 2024.
- **A Dialogue-Based Robot for Assistive Navigation with Visual Language Grounding**
CSL Student Conference, 2024.
- **Intelligent Robot Crowd Navigation**
Shuzihuanyu Lecture Series, 2023.
- **Pedestrian Trajectory Prediction Meets Social Robot Navigation**
Robotics Seminar at Illinois, 2022.
- **Robot Learning Through Interactions with Humans**
Robotics Seminar at Illinois, 2021.

## Academic Service

**Program committee**

- Co-organizer of ICLR 2025 Workshop on Human-AI Coevolution

**Students mentored**

- Huihan Liu, Ph.D. student in UT Austin.
- Zichao Hu, Ph.D. student in UT Austin.
- Michael Munje, Ph.D. student in UT Austin.
- Michael (Pengen) Zhang, B.S. Computer Science 2026 in UT Austin.
- Changyeon Kim: Ph.D. student in KAIST, visiting scholar in UT Austin.
- Haonan Chen: Ph.D. student in UIUC.
    - IROS 2020
    - ICRA 2022, 2025
    - ITSC 2022
    - CoRL 2023 best student paper award finalist
- Kaiwen Hong: Ph.D. student in UIUC.
    - ICRA 2023
    - RA-L 2024
    - CoRL 2023 best student paper award finalist
    - T-RO in submission.
- Neeloy Chakraborty: B.S. Computer Engineering 2021, now Ph.D. student in UIUC.
    - ICRA 2021, 2022, 2023
    - CoRL 2023
    - T-RO in submission.
- Eric (Weihang) Liang: M.S. Electrical and Computer Engineering in UIUC, now at Tesla.
    - ICRA 2021, 2023.
- Simon (Haochen) Xia: B.S. Computer Engineering 2026 in UIUC.
    - T-RO in submission.
- Jerry (Ruoxuan) Wang: B.S. Computer Engineering 2024 in UIUC, now M.S. student at UPenn.
    - RA-L 2024
- Justin Lin: B.S. Computer Engineering 2023 in UIUC, now at Capgemini.
    - RA-L 2024
- Zachary Mizrachi: B.S. Computer Engineering 2024 in UIUC.
    - RA-L 2024

**Reviews**

- Journal reviews: IEEE T-RO, IEEE RA-L, SAGE IJRR, IEEE TAI
- Conference reviews: RSS, ICRA, IROS, CoRL, Humanoids

## Teaching

**Guest Lecturer**

- CS 343H: Artificial Intelligence: Honors (Fall 2024)

**Graduate Teaching Assistant**

- ECE 598: Human-Centered Robotics (Fall 2020)
- ECE 470: Introduction to Robotics (Fall 2019 - Spring 2020)
- ECE 120: Introduction to Computing (Fall 2018 - Spring 2019)

**Undergraduate Course Assistant**

- ECE 110: Introduction to Electronics (Fall 2016 - Spring 2018)

## Industry Experience

- Research Scientist Internship, Bosch Center for Artificial Intelligence — Summer 2023
- Applied Scientist Internship, Robotics & AI, Amazon — Summer 2022

## References


- Katherine Driggs-Campbell, Associate Professor in ECE department at UIUC

  Email: krdc@illinois.edu

- Yuke Zhu, Associate Professor in CS department at UT Austin

  Email: yukez@cs.utexas.edu

- Nancy M. Amato, Abel Bliss Professor of Engineering and Department Head in CS department at UIUC

  Email: namato@illinois.edu

- Junyi Geng, Assistant Professor in Aerospace Engineering department at The Pennsylvania State University

  Email: jgeng@psu.edu