Ruohan Zhang

Assistant Professor (2026 -)
Department of Computer Science, Northwestern University
Postdoctoral Researcher (2021 - 2026)
Stanford Vision and Learning (SVL) Lab
Department of Computer Science, Stanford University
Personal website Google scholar

Education

2021 PhD, Computer Science, University of Texas at Austin
Advisor: Dana H. Ballard
Dissertation: A modular attention hypothesis for modeling visuomotor behaviors
2014 Master of Science, Computer Science, University of Texas at Austin
2012 Bachelor of Arts, Psychology, Rhodes College, *Cum laude*
Minors in Computer Science and Economics

Publications

*indicates equal contribution; †indicates equal advising

2026 [53] IMPASTO: Integrating Model-Based Planning with Learned Dynamics Models for Robotic Oil Painting Reproduction.
Yingke Wang, Hao Li, Yifeng Zhu, Koven Yu, Ken Goldberg, Li Fei-Fei, Jiajun Wu, Yunzhu Li, Ruohan Zhang. *International Conference on Robotics and Automation (ICRA)*.

2026 [52] Dream2Flow: Bridging Video Generation and Open-World Manipulation with 3D Object Flow.
Karthik Dharmarajan, Wenlong Huang, Jiajun Wu, Li Fei-Fei†, Ruohan Zhang†. *International Conference on Robotics and Automation (ICRA)*.

2026 [51] Theory of Space: Can Foundation Models Construct Spatial Beliefs through Active Exploration?
Pingyue Zhang*, Zihan Huang*, Yue Wang*, Jieyu Zhang*, Letian Xue, Zihan Wang, Qineng Wang, Keshigeyan Chandrasegaran, Ruohan Zhang, Yejin Choi, Ranjay Krishna, Jiajun Wu, Li Fei-Fei, Manling Li. *International Conference on Learning Representations (ICLR)*.

2026 [50] ENACT: Evaluating Embodied Cognition with World Modeling of Egocentric Interaction.
Qineng Wang*, Wenlong Huang*, Yu Zhou, Hang Yin, Tianwei Bao, Jianwen Lyu, Weiyu Liu, Ruohan Zhang†, Jiajun Wu†, Li Fei-Fei†, Manling Li†. *International Conference on Learning Representations (ICLR)*.

2026 [49] MoMaGen: Generating Demonstrations under Soft and Hard Constraints for Multi-Step Bimanual Mobile Manipulation.

Chengshu Li*, Mengdi Xu*, Arpit Bahety*, Hang Yin*, Yunfan Jiang, Huang Huang, Josiah Wong, Sujay Garlanka, Cem Gokmen, Ruohan Zhang, Weiyu Liu, Jiajun Wu, Roberto Martín-Martín, Li Fei-Fei. *International Conference on Learning Representations (ICLR).*

2026 [48] ROSETTA: Constructing Code-Based Reward from Unconstrained Language Preference.
Sanjana Srivastava*, Kangrui Wang*, Yung-Chieh Chan*, Tianyuan Dai, Manling Li, Ruohan Zhang, Mengdi Xu, Jiajun Wu, Li Fei-Fei. *International Conference on Learning Representations (ICLR).*

2025 [47] Chain-of-Modality: Learning Manipulation Programs from Multimodal Human Videos with Vision-Language-Models.
Chen Wang, Fei Xia, Wenhao Yu, Tingnan Zhang, Ruohan Zhang, Karen Liu, Li Fei-Fei, Jie Tan, Jacky Liang. *International Conference on Robotics and Automation (ICRA).*

2025 [46] UAD: Unsupervised Affordance Distillation for Generalization in Robotic Manipulation.
Yihe Tang, Wenlong Huang, Yingke Wang, Chengshu Li, Roy Yuan, Ruohan Zhang, Jiajun Wu, Li Fei-Fei. *International Conference on Robotics and Automation (ICRA)* — Best Paper Award Finalist.

2025 [45] BEHAVIOR Robot Suite: Streamlining Real-World Whole-Body Manipulation for Everyday Household Activities.
Yunfan Jiang, Ruohan Zhang, Josiah Wong, Chen Wang, Yanjie Ze, Hang Yin, Cem Gokmen, Shuran Song, Jiajun Wu, Li Fei-Fei. *Conference on Robot Learning (CoRL).*

2025 [44] ReKep: Spatio-Temporal Reasoning of Relational Keypoint Constraints for Robotic Manipulation.
Wenlong Huang, Chen Wang*, Yunzhu Li*, Ruohan Zhang, Li Fei-Fei. *Conference on Robot Learning (CoRL).* Workshop on Learning Effective Abstractions for Planning at CoRL — Best Paper Award.

2025 [43] ShapeCraft: Body-Aware and Semantics-Aware 3D Object Design.
Michelle Guo*, Mia Tang*, Hannah Cha, Ruohan Zhang, Karen Liu, Jiajun Wu. To appear in IEEE/CVF Winter Conference on Applications of Computer Vision (WACV).

2024 [42] Daily And Technological Challenges And Needs In Older Ages: A Mixed Methods Study.
Li Chu, Michelle Cruz, Laura Paola Gomezjurado Gonzalez, Ruohan Zhang, Li Fei-Fei, Jiajun Wu, Laura L. Carstensen. To appear in Gerontological Society of America.

2024 [41] Motivating Information-Seeking Behaviors For New Technology Across The Life Span.
Li Chu, Kayla Patterson, Tasha Kim, Angel Meng Zhang, Sanjana Srivastava, Ruohan Zhang, Li Fei-Fei, Jiajun Wu, Laura L. Carstensen. To appear in Gerontological Society of America.

2024 [40] MARPLE: A Benchmark for Long-Horizon Inference.
Emily Jin*, Zhuoyi Huang*, Jan-Philipp Fränken, Weiyu Liu, Hannah Cha, Erik Brockbank, Sarah Wu, Ruohan Zhang, Jiajun Wu, Tobias Gerstenberg. NeurIPS Datasets and Benchmarks Track.

2024 [39] Embodied Agent Interface: Benchmarking LLMs for Embodied Decision Making.
Manling Li*, Shiyu Zhao*, Qineng Wang*, Kangrui Wang*, Yu Zhou*, Sanjana Srivastava, Cem Gokmen, Tony Lee, Li Erran Li, Ruohan Zhang, Weiyu Liu, Percy Liang, Li Fei-Fei, Jiayuan Mao, Jiajun Wu. NeurIPS Datasets and Benchmarks Track — Oral Presentation.

2024 [38] TRANSIC: Sim-to-Real Policy Transfer by Learning from Online Correction.
Yunfan Jiang, Chen Wang, Ruohan Zhang, Jiajun Wu, Li Fei-Fei. *Conference on Robot Learning (CoRL).*

2024

[37] Automated Creation of Digital Cousins for Robust Policy Learning.
Tianyuan Dai, Josiah Wong, Yunfan Jiang, Chen Wang, Cem Gokmen, Ruohan Zhang, Jiajun Wu, Li Fei-Fei. *Conference on Robot Learning (CoRL)* .

2024 [36] Learning Compositional Behaviors from Demonstration and Language.
Weiyu Liu, Neil Nie, Jiayuan Mao, Ruohan Zhang, Jiajun Wu. *Conference on Robot Learning (CoRL)*. Workshop on Learning Effective Abstractions for Planning at CoRL — Oral Presentation.

2024 [35] Open X-Embodiment: Robotic Learning Datasets and RT-X Models.
Open X-Embodiment Collaboration. *International Conference on Robotics and Automation (ICRA)* — Best Paper Award.

2024 [34] DexCap: Scalable and Portable Mocap Data Collection System for Dexterous Manipulation.
Chen Wang, Haochen Shi, Weizhuo Wang, Ruohan Zhang, Li Fei-Fei, C. Karen Liu. *Robotics: Science and Systems (RSS)*.

2024 [33] Whodunnit? Inferring What Happened from Multimodal Evidence.
Sarah A. Wu*, Erik Brockbank*, Hannah Cha, Jan-Philipp Fränken, Emily Jin, Zhuoyi Huang, Weiyu Liu, Ruohan Zhang, Jiajun Wu, Tobias Gerstenberg. *Proceedings of the Annual Meeting of the Cognitive Science Society (CogSci)*.

2024 [32] BEHAVIOR Vision Suite: Customizable Dataset Generation via Simulation.
Yunhao Ge*, Yihe Tang*, Jiashu Xu*, Cem Gokmen*, Chengshu Li, Wensi Ai, Benjamin Jose Martinez, Arman Aydin, Mona Anvari, Ayush K Chakravarthy, Hong-Xing Yu, Josiah Wong, Sanjana Srivastava, Sharon Lee, Shengxin Zha, Laurent Itti, Yunzhu Li, Roberto Martin-Martin, Miao Liu, Pengchuan Zhang, Ruohan Zhang, Li Fei-Fei, Jiajun Wu. *Conference on Computer Vision and Pattern Recognition (CVPR)* — Highlight.

2024 [31] Partial-View Object View Synthesis via Filtering Inversion.
Fan-Yun Sun, Jonathan Tremblay, Valts Blukis, Kevin Lin, Danfei Xu, Boris Ivanovic, Peter Karkus, Stan Birchfield, Dieter Fox, Ruohan Zhang, Yunzhu Li, Jiajun Wu, Marco Pavone, Nick Haber. *International Conference on 3D Vision (3DV)* — Spotlight presentation.

2023 [30] NOIR: Neural Signal Operated Intelligent Robot for Everyday Activities.
Ruohan Zhang*, Sharon Lee*, Minjune Hwang*, Ayano Hiranaka*, Chen Wang, Wensi Ai, Jin Jie Ryan Tan, Shreya Gupta, Yilun Hao, Gabrael Levine, Ruohan Gao, Anthony Norcia, Li Fei-Fei, Jiajun Wu. *Conference on Robot Learning (CoRL); Bridging the Gap between Cognitive Science and Robot Learning in the Real World Workshop at CoRL* — Oral presentation.

2023 [29] VoxPoser: Composable 3D Value Maps for Robotic Manipulation with Language Models.
Wenlong Huang, Chen Wang, Ruohan Zhang, Yunzhu Li, Jiajun Wu, Li Fei-Fei. *Conference on Robot Learning (CoRL)* — Oral presentation.

2023 [28] Mimicplay: Long-horizon Imitation Learning by Watching Human Play.
Chen Wang, Linxi Fan, Jiankai Sun, Ruohan Zhang, Li Fei-Fei, Danfei Xu, Yuke Zhu, Anima Anandkumar. *Conference on Robot Learning (CoRL)* — Oral presentation, Finalist - Best Paper/Best Student Paper Awards, Finalist - Best Systems Paper Award.

2023

[27] Quantifying the Effect of Visual Impairments on Daily Activities in Virtual, Interactive Environments.
Wensi Ai, Sharon Lee, Li Fei-Fei, Jiajun Wu, Ruohan Zhang. *Proceedings of the Annual Meeting of the Cognitive Science Society (CogSci).*

2023 [26] Primitive Skill-based Robot Learning from Human Evaluative Feedback
Ayano Hiranaka*, Minjune Hwang*, Sharon Lee, Chen Wang, Li Fei-Fei, Jiajun Wu, Ruohan Zhang. *International Conference on Intelligent Robots and Systems (IROS).*

2023 [25] Modeling Dynamic Environments with Scene Graph Memory.
Andrey Kurenkov, Michael Lingelbach, Tanmay Agarwal, Chengshu Li, Emily Jin, Ruohan Zhang, Li Fei-Fei, Jiajun Wu, Silvio Savarese, Roberto Martín-Martín. *International Conference on Machine Learning (ICML).*

2023 [24] Task-Driven Graph Attention for Hierarchical Relational Object Navigation.
Michael Lingelbach, Chengshu Li, Minjune Hwang, Andrey Kurenkov, Alan Lou, Roberto Martín-Martín, Ruohan Zhang, Li Fei-Fei, Jiajun Wu. *International Conference on Robotics and Automation (ICRA).*

2022 [23] BEHAVIOR-1K: A Human-Centered, Embodied AI Benchmark with 1,000 Everyday Activities and Realistic Simulation.
Chengshu Li*, Ruohan Zhang*, Josiah Wong*, Cem Gokmen*, Sanjana Srivastava*, Roberto Martín-Martín*, Chen Wang*, Gabrael Levine*, Wensi Ai*, Benjamin Jose Martinez, Hang Yin, Michael Lingelbach, Minjune Hwang, Ayano Hiranaka, Sujay Garlanka, Arman Aydin, Sharon Lee, Jiankai Sun, Mona Anvari, Manasi Sharma, Dhruva Bansal, Samuel Hunter, Kyu-Young Kim, Alan Lou, Caleb R Matthews, Ivan Villa-Renteria, Jerry Huayang Tang, Claire Tang, Fei Xia, Yunzhu Li, Silvio Savarese, Hyowon Gweon, C. Karen Liu, Jiajun Wu, Li Fei-Fei. *Conference on Robot Learning (CoRL)* — Oral presentation, Best Paper Nominee.

2022 [22] A Dual Representation Framework for Robot Learning with Human Guidance.
Ruohan Zhang*, Dhruva Bansal*, Yilun Hao*, Ayano Hiranaka, Jialu Gao, Chen Wang, Roberto Martín-Martín, Li Fei-Fei, Jiajun Wu. *Conference on Robot Learning (CoRL), Aligning Robot Representations with Humans Workshop at CoRL* — Spotlight presentation.

2022 [21] Interaction Modeling with Multiplex Attention.
Fan-Yun Sun, Isaac Kauvar, Ruohan Zhang, Jiachen Li, Mykel Kochenderfer, Jiajun Wu, Nick Haber. *Advances in Neural Information Processing Systems (NeurIPS).*

2022 [20] Selective Visual Attention During Public Speaking in an Immersive Context.
Mikael Rubin, Sihang Guo, Karl Muller, Ruohan Zhang, Michael J. Telch, Mary M. Hayhoe. *Attention, Perception, and Psychophysics* — Journal.

2021 [19] Machine versus Human Attention in Deep Reinforcement Learning Tasks.
Sihang Guo, Ruohan Zhang, Bo Liu, Yifeng Zhu, Dana Ballard, Mary Hayhoe, Peter Stone. *Advances in Neural Information Processing Systems (NeurIPS).*

2021 [18] Widening the Pipeline in Human-Guided Reinforcement Learning with Explanation and Context-Aware Data Augmentation.
Lin Guan, Mudit Verma, Sihang Guo, Ruohan Zhang, Subbarao Kambhampati. *Advances in Neural Information Processing Systems (NeurIPS)* — Spotlight presentation.

2021 [17] Recent Advances in Leveraging Human Guidance for Sequential Decision-making Tasks.
Ruohan Zhang*, Faraz Torabi*, Garrett Warnell, Peter Stone. *Autonomous Agents and Multi-Agent Systems (JAAMAS)* — Journal.

2021 [16] The Hierarchical Evolution in Human Vision Modeling.
Dana H Ballard, Ruohan Zhang. *Topics in Cognitive Science* — Journal.

2021 [15] Efficiently Guiding Imitation Learning Algorithms with Human Gaze.
Akanksha Saran, Ruohan Zhang, Elaine Schaertl Short, Scott Niekum. *International Conference on Autonomous Agents and Multiagent Systems (AAMAS).*

2020 [14] Human Gaze Assisted Artificial Intelligence: A Review.
Ruohan Zhang, Akanksha Saran, Bo Liu, Yifeng Zhu, Sihang Guo, Scott Niekum, Dana H. Ballard, Mary M. Hayhoe. *International Joint Conference on Artificial Intelligence (IJCAI).*

2020 [13] Parallel Neural Processing with Gamma Frequency Latencies.
Ruohan Zhang, Dana H Ballard. *Neural Computation* — Journal.

2020 [12] Atari-HEAD: Atari Human Eye-Tracking and Demonstration Dataset.
Ruohan Zhang, Calen Walshe, Zhuode Liu, Lin Guan, Karl S. Muller, Jake A. Whritner, Luxin Zhang, Mary M Hayhoe, Dana H. Ballard. *Proceedings of the Thirty-Fourth AAAI Conference on Artificial Intelligence (AAAI). Reinforcement Learning in Games Workshop* — Spotlight presentation.

2019 [11] Leveraging Human Guidance for Deep Reinforcement Learning Tasks.
Ruohan Zhang, Faraz Torabi, Lin Guan, Dana H. Ballard, Peter Stone. *International Joint Conference on Artificial Intelligence (IJCAI) Survey Track.*

2018 [10] Modeling Sensory-Motor Decisions in Natural Behavior.
Ruohan Zhang, Shun Zhang, Matthew H. Tong, Yuchen Cui, Constatin A. Rothkopf, Dana H. Ballard, Mary M. Hayhoe. *PLoS Computational Biology* — Journal.

2018 [9] AGIL: Learning Attention from Human for Visuomotor Tasks.
Ruohan Zhang, Zhuode Liu, Luxin Zhang, Jake A. Whritner, Karl S. Muller, Mary M. Hayhoe, Dana H. Ballard. *European Conference on Computer Vision (ECCV).*

2018 [8] Model Checking For Safe Navigation Among Humans.
Sebastian Junges, Nils Jansen, Joost-Pieter Katoen, Ufuk Topcu, Ruohan Zhang, Mary Hayhoe. *International Conference on Quantitative Evaluation of SysTem (QEST).*

2017 [7] Attention Guided Deep Imitation Learning.
Ruohan Zhang*, Zhuode Liu*, Mary M. Hayhoe, Dana H. Ballard. *Cognitive Computational Neuroscience (CCN).*

2017 [6] Fast and Precise Black and White Ball Detection for RoboCup Soccer.
Jacob Menashe, Josh Kelle, Katie Genter, Josiah Hanna, Elad Liebman, Sanmit Narvekar, Ruohan Zhang, Peter Stone. *RoboCup Symposium.*

2017 [5] Greedy Direction Method of Multiplier for MAP Inference of Large Output Domain.
Xiangru Huang, Ian E.H. Yen, Ruohan Zhang, Qixing Huang, Pradeep Ravikumar, Inderjit S. Dhillon. *Artificial Intelligence and Statistics (AISTATS).*

2016

[4] Dual Decomposed Learning with Factorwise Oracle for Structural SVM of Large Output Domain.
Ian E.H. Yen, Xiangru Huang, Kai Zhong, Ruohan Zhang, Pradeep Ravikumar, Inderjit S. Dhillon. *Advances in Neural Information Processing Systems (NIPS).*

2016 [3] UT Austin Villa: Project-Driven Research in AI and Robotics.
Katie Genter, Patrick MacAlpine, Jacob Menashe, Josiah Hanna, Elad Liebman, Sanmit Narvekar, Ruohan Zhang, Peter Stone.*IEEE Intelligent Systems 31(2)* — Journal.

2016 [2] Maximum Sustainable Yield Problem for Robot Foraging and Construction System.
Ruohan Zhang, Zhao Song. *International Joint Conference on Artificial Intelligence (IJCAI).*

2016 [1] Decision-Making Policies for Heterogeneous Autonomous Multi-Agent Systems with Safety Constraints.
Ruohan Zhang, Yue Yu, Mahmoud El Chamie, Behçet Açikmese, Dana H. Ballard. *International Joint Conference on Artificial Intelligence (IJCAI).*

Grants and Awards

2022-2024 Wu Tsai Human Performance Alliance Fellowship, Stanford University. ($150k)
2019 University Continuing Fellowship, University of Texas at Austin ($44k)
2019 AAAI/SIGAI Doctoral Consortium Scholarship
2018 General International Student and Scholar Services Financial Aid Award ($1k)
2017-2018 Google AR/VR Research Award ($70k)
2014-17 College Continuing Fellowship, University of Texas at Austin Department of Computer Science ($30k)
2011 PSI CHI International Honor Society in Psychology
2010 Wolfram Certificate of Proficiency Mathematica Advanced Foundations Level
2010 Rhodes College Honor Roll Fall 2010 (semester GPA of 3.85 or better)
2010 Rhodes College Honor Roll Spring 2010
2009 Rhodes College Honor Roll Fall 2009
2009 Rhodes College Dean's List Spring 2009 (semester GPA of 3.70 or better)
2008-12 Rhodes College Grants ($80k+)

Academic Services

Editor, IEEE Robotics and Automation Letters (RA-L)
Program committee, ICCV, ECCV, NeurIPS workshops.
Conference review, CoRL, RSS, IROS, ICRA, NeurIPS
Journal review, *Frontiers in Artificial Intelligence*
Journal review, *Journal of Vision*
Book review, *Chapman & Hall/CRC Press*

Teaching

2023 Deep Learning for Computer Vision, Instructor, Stanford University
2019 Computational Brain, Teaching Assistant, University of Texas at Austin
2015 Machine Learning, Teaching Assistant, University of Texas at Austin
2014 Discrete Mathematics (Honor), Teaching Assistant, University of Texas at Austin
2013 Discrete Mathematics, Teaching Assistant, University of Texas at Austin
2013 Logic, Sets, and Functions, Teaching Assistant, University of Texas at Austin
2012 Qualitative Methods, Teaching Assistant, Rhodes College