

RESEARCH INTERESTS

My research spans robot learning, computer vision, and embodied AI, with a focus on grounding reasoning in robotic manipulation and developing general-purpose robotic foundation models that reason before they act.

CURRENT APPOINTMENT

- 2026-present **Presidential Young Professor (Tenure-track), National University of Singapore**
School of Computing, Singapore
- 2026-present **Research Scientists A*STAR IAIC (Joint Appointment)**
Singapore

EDUCATION

- 2022-2026 **Ph.D. in Computer Science and Engineering, University of Washington**
Seattle, USA - Advised by Dieter Fox and Ranjay Krishna
- 2022-2024 **M.S. in Computer Science and Engineering, University of Washington**
Seattle, USA - CGPA: 3.91/4.00 (Magna Cum Laude)
- 2018-2021 **B.Eng. in Electrical and Electronic Engineering, Nanyang Technological University**
Singapore - CGPA: 4.75/5.00 (Highest Distinction)
- 2020 **Exchange Student, Georgia Institute of Technology**
School of Electrical and Computer Engineering, Atlanta, GA, USA
- 2013-2016 **Diploma with Merit in Engineering Science, Ngee Ann Polytechnic**
Singapore - CGPA: 3.97/4.00

RESEARCH PUBLICATIONS

*See my google scholar for an always up-to-date list and manuscripts under review.

- Haoquan Fang*, **Jiafei Duan***, Donovan Clay, Sam Wang, Shuo Liu, Weikai Huang, Xiang Fan, Wei-Chuan Tsai, Shirui Chen, Yi Ru Wang, Shanli Xing, Jaemin Cho, Jae Sung Park, Ainaz Eftekhari, Peter Sushko, Karen Farley, Angad Wadhwa, Cole Harrison, Winson Han, Ying-Chun Lee, Eli VanderBilt, Rose Hendrix, Suveen Ellawela, Lucas Ngoo, Joyce Chai, Zhongzheng Ren, Ali Farhadi, Dieter Fox, Ranjay Krishna "MolmoAct2: Action Reasoning Models for Real-world Deployment", ArXiv 2026.
- Weikai Huang, Jieyu Zhang, Sijun Li, Taoyang Jia, **Jiafei Duan**, Yunqian Cheng, Jaemin Cho, Matthew Wallingford, Rustin Soraki, Chris Dongjoo Kim, Shuo Liu, Donovan Clay, Taira Anderson, Winson Han, Ali Farhadi, Bharath Hariharan, Zhongzheng Ren, Ranjay Krishna "WildDet3D: Scaling Promptable 3D Detection in the Wild", ArXiv 2026.
- Abhay Deshpande*, Maya Guru*, Rose Hendrix*, Snehal Jauhri*, Ainaz Eftekhari, Rohun Tripathi, Max Argus, Jordi Salvador, Haoquan Fang, Matthew Wallingford, Wilbert Pumacay, Yejin Kim, Quinn Pfeifer, Ying-Chun Lee, Piper Wolters, Omar Rayyan, Mingtong Zhang, **Jiafei Duan**, Karen Farley, Winson Han, Eli Vanderbilt, Dieter Fox, Ali Farhadi, Georgia Chalvatzaki, Dhruv Shah, Ranjay Krishna "MolmoBOT: Large-Scale Simulation Enables Zero-Shot Manipulation", ArXiv 2026
- Yalcin Tur, Jalal Naghiyev†, Haoquan Fang†, Wei-Chuan Tsai, **Jiafei Duan***, Dieter Fox*, Ranjay Krishna* "Recurrent-Depth VLA: Implicit Test-Time Compute Scaling of Vision-Language-Action Models via Latent Iterative Reasoning", ArXiv 2026 In submission.
- Shirui Chen, Cole Harrison, Ying-Chun Lee, Angela Jin Yang, Zhongzheng Ren, Lillian J. Ratliff, **Jiafei Duan†**, Dieter Fox†, Ranjay Krishna† "TOPReward: Token Probabilities as Hidden Zero-Shot Rewards for Robotics", ArXiv 2026
- Jianing Zhang, Chenhao Zheng, Yajun Yang, Max Argus, Rustin Soraki, Winson Han, Taira Anderson, Chun-Liang Li, Shuo Liu, **Jiafei Duan**, Zhongzheng Ren, Jieyu Zhang, Ranjay Krishna "MolmoMotion: Forecasting Point Trajectories in 3D with Language Instruction", ArXiv 2026.
- Shuo Liu, Ishneet Sukhvinder Singh, Yiqing Xu, **Jiafei Duan***, Ranjay Krishna* "VLS: Steering Pretrained Robot Policies via Vision-Language Models", In submission.
- Zijun Lin, **Jiafei Duan**, Haoquan Fang, Dieter Fox, Ranjay Krishna, Cheston Tan, Bihan Wen. "FailSafe : Reasoning and Recovery from Failures in Vision-Language-Action Models", IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2026).
- Yejin Kim*, Wilbert Pumacay*, Omar Rayyan*, Max Argus*, Winson Han, Eli VanderBilt, Jordi Salvador, Abhay Deshpande, Rose Hendrix, Snehal Jauhri, Shuo Liu, Nur Muhammad Mahi Shafullah, Maya Guru, Arjun Guru, Ainaz Eftekhari, Karen Farley, Donovan Clay, **Jiafei Duan**, Piper Wolters, Alvaro Herrasti, Ying-Chun Lee, Georgia Chalvatzaki, Yuchen Cui, Ali Farhadi, Dieter Fox, Ranjay Krishna "MolmoSpaces: A Large-Scale Open Ecosystem for Robot Navigation and Manipulation", RSS 2026 (Oral)
- Suvir Mirchandani*, Mia Tang*, **Jiafei Duan**, Jubayer Ibn Hamid, Michael Cho, Dorsa Sadigh. "RoboCade: Gamifying Robot Data Collection", ICRA 2026.

- Jason Lee*, **Jiafei Duan***, Haoquan Fang*, Yuquan Deng, Shuo Liu, Boyang Li, Bohan Fang, Jieyu Zhang, Yi Ru Wang, Sangho Lee, et al. "MolmoAct : Action Reasoning Models that can Reason in Space", ICRA 2026.
- Yi Ru Wang, Carter Ung, Grant Tannert, **Jiafei Duan**, Josephine Li, Amy Le, Rishabh Oswal, Markus Grotz, Wilbert Pumacay, Yuquan Deng, Ranjay Krishna, Dieter Fox, Siddhartha Srinivasa "RoboEval: Where Robotic Manipulation Meets Structured and Scalable Evaluation", ICRA 2026.
- Ainaz Eftekhari, Rose Hendrix, Luca Weihs, **Jiafei Duan**, Ege Caglar, Jordi Salvador, Alvaro Herrasti, Winson Han, Eli VanderBil, Aniruddha Kembhavi, Ali Farhadi, Ranjay Krishna, Kiana Ehsani, Kuo-Hao Zeng "The One RING: A Robotic Indoor Navigation Generalist", ICRA 2026.
- Som Sager, **Jiafei Duan**, Sreevishakh Vasudevan, Yifan Zhou, Heni Ben Amor, Dieter Fox, Ransalu Senanayake "From Mystery to Mastery: Failure Diagnosis for Improving Manipulation Policies", ICLR 2026.
- Abhay Deshpande, Yuquan Deng, Arijit Ray, Jordi Salvador, Winson Han, **Jiafei Duan**, Kuo-Hao Zeng, Yuke Zhu, Ranjay Krishna, Rose Hendrix "GraspMolmo: Generalizable Task-Oriented Grasping via Large-Scale Synthetic Data Generation", CoRL 2025.
- Arijit Ray, **Jiafei Duan**, Reuben Tan, Dina Bashkirova, Rose Hendrix, Kiana Ehsani, Aniruddha Kembhavi, Bryan A. Plummer, Ranjay Krishna, Kuo-Hao Zeng, Kate Saenko "SAT: Spatial Aptitude Training for Multimodal Language Models", CoLM 2025.
- Haoquan, Markus Grotz, Wilbert Pumacay, Yi Ru Wang, Dieter Fox, Ranjay Krishna, **Jiafei Duan** "SAM2Act: Integrating Visual Foundation Model with A Memory Architecture for Robotic Manipulation", ICML 2025.
- **Jiafei Duan**, Wilbert Pumacay, Nishanth Kumar, Yi Ru Wang, Shulin Tian, Wentao Yuan, Ranjay Krishna, Dieter Fox, Ajay Mandlekar*, Yijie Guo* "AHA: A Vision-Language-Model for Detecting and Reasoning over Failures in Robotic Manipulation", ICLR 2025.
- **Jiafei Duan**, Wentao Yuan, Wilbert Pumacay, Yi Ru Wang, Kiana Ehsani, Dieter Fox, Ranjay Krishna, "Manipulate-Anything: Automating Real-World Robots using Vision-Language Models", CoRL 2024.
- Wentao Yuan, **Jiafei Duan**, Valts Blukis, Wilbert Pumacay, Ranjay Krishna, Adithyavairavan Murali, Arsalan Mousavian, Dieter Fox, "RoboPoint: A Vision-Language Model for Spatial Affordance Prediction for Robotics", CoRL 2024.
- Jun Wang, Chun-Cheng Chang*, **Jiafei Duan***, Dieter Fox, Ranjay Krishna, "EVE: Enabling Anyone to Train Robot using Augmented Reality", UIST 2024.
- Ainaz Eftekhari*, Kuo-Hao Zeng*, **Jiafei Duan**, Ali Farhadi, Ani Kembhavi, Ranjay Krishna, "Selective Visual Representations Improve Convergence and Generalization for Embodied AI ", ICLR 2024 (Spotlight).
- **Jiafei Duan***, Wilbert Pumacay*, Ishika Singh*, Ranjay Krishna, Jesse Thomason, Dieter Fox, "THE COLOSSEUM: A Benchmark for Evaluating Generalization for Robotic Manipulation", RSS 2024 (Oral).
- Samson Yu, Lin Kelvin, Anxing Xiao, **Jiafei Duan**, Harold Soh, "Octopi: Object Property Reasoning with Large Tactile-Vision-Language-Models", RSS 2024 (Oral).
- Yi Ru Wang, **Jiafei Duan**, Dieter Fox, Siddhartha Srinivasa, "NEWTON: Are Language Models Capable of Physical Reasoning", Findings of EMNLP 2023.
- **Jiafei Duan**, Yi Ru Wang, Mohit Shridhar, Dieter Fox, Ranjay Krishna, "AR2-D2: Training a Robot without a Robot", Conference on Robot Learning (CoRL) 2023.
- Arijit Dasgupta, **Jiafei Duan**, Marcelo H. Ang Jr, Yi Lin, Su-hua Wang, Renee Baillargeon, Cheston Tan, "A Benchmark for Modeling Violation-of-Expectation in Physical Reasoning Across Event Categories", Cogsci 2023.
- Jenny Zhang, Samson Yu, **Jiafei Duan**, Cheston Tan, "Good Time to Ask: A Learning Framework for Asking for Help in Embodied Visual Navigation", Ubiquitous Robot (UR) 2023, Best Paper Award.
- **Jiafei Duan**, Samson Yu, Soujanya Poria, Bihan Wen, Cheston Tan, "PIP: Physical Interaction Prediction via Mental Simulation with Span Selection", ECCV 2022.
- **Jiafei Duan**, Arijit Dasgupta, Jason Fischer, Cheston Tan, "A Survey on Machine Learning Approaches for Modelling Intuitive Physics", IJCAI 2022 Survey Track.
- **Jiafei Duan**, Samson Yu, Hui Li Tan, Zhu Hongyu, Cheston Tan, "A Survey of Embodied AI: From Simulator to Research Tasks", IEEE Transactions on Emerging Topics in Computational Intelligence (TETCI), 2021.
- **Jiafei Duan**, Samson Yu, Hui Li Tan, Cheston Tan, "ActioNet: An Interactive End-to-End Platform for Task-Based Data Collection and Augmentation in 3D Environments", ICIP 2020.

NON-ARCHIVAL PUBLICATIONS

- Jieyi Ye, **Jiafei Duan**, Samson Yu, Bihan Wen, Cheston Tan, "ABCDE: An Agent-Based Cognitive Development Environment", Computer Vision and Pattern Recognition Embodied AI Workshop (CVPRW) 2022.
- Arijit Dasgupta, **Jiafei Duan**, Marcelo H. Ang Jr, Cheston Tan, "AVoE: A Synthetic 3D Dataset on Understanding Violation of Expectation for Artificial Cognition", Conference on Neural Information Processing Systems (NeurIPS) 2021, Physical Reasoning and Inductive Biases for the Real World Workshop.
- **Jiafei Duan**, Samson Yu, Cheston Tan, "SPACE: A Simulator for Physical Interactions and Causal Learning in 3D Environments", IEEE International Conference for Computer Vision (ICCV) 2021, 1st Simulation Technology for Embodied AI Workshop.

GRANTS

- 2026: Cortex AI Gift Grant, \$24,000 SGD

RESEARCH EXPERIENCES

- 2026-2025 **Research Scientist Intern, Allen Institute for AI**
Advisor: Dr. Ranjay Krishna
- 2024 **Research Scientist Intern, NVIDIA Seattle Robotics Lab**
Advisors: Dr. Ajay Mandlekar and Yijie Guo
- 2021-2022 **AI Research Engineer, Institute for Infocomm Research, A*STAR**
Supervisor: Dr. Cheston Tan Yin Chet
- 2020-2021 **Final Year Undergraduate Researcher, Nanyang Technological University**
Advisor: Asst. Professor Wen Bihan
- 2020 **Visiting Research Scholar, Georgia Institute of Technology**
Advisor: Dr. Ayanna Howard

INVITED TALKS

- 2025 **Meta Robotics Group**
Towards robotics foundation that can reason - Host: Homanga Bharadhwaj
- 2025 **Mila Robot Learning Seminar**
Towards robotics foundation that can reason - Host: REAL Lab
- 2025 **Georgia Tech**
Towards robotics foundation that can reason - Host: GT Institute for Robotics and Intelligent Machines
- 2025 **TRI LBM Group**
Towards robotics foundation that can reason - Host: Jose Barreiros
- 2025 **Johns Hopkins University**
Towards robotics foundation that can reason - Hosts: Tianmin Shu and Peter Kazanzides (LCSR)
- 2025 **Stanford PAIR Group**
Towards a Unified Multimodal Large Language Model for Robotics - Host: Wenlong Huang
- 2025 **CMU RCHI Group**
Grounded Embodied Intelligence - Host: Zackory Erickson
- 2024 **Amazon Lab126**
Towards Democratizing Robot Learning for All - Host: Yuyin Sun
- 2024 **The AI Talks**
Towards Democratizing Robot Learning for All - Host: AI Talks Organizer
- 2023 **Allen School Colloquium**
Democratizing Robot Learning for All - Host: GRAIL Lab
- 2023 **NUS CLeAR Lab**
Benchmarking Robot Learning for Manipulation - Host: Harold Soh
- 2025 **AAAI Summer Symposium**
AR2-D2: Training a Robot without a Robot - Host: Workshop Organizer

HONORS AND AWARDS

- 2026: CVPR Rising Star in Spatial Intelligence, Finalist
- 2026: Best Paper Award (ICRA Workshop 2026, SDRL, VLA Pipeline, Beyond Teleoperation)
- 2025: Best Paper Award (CoRL RememberRL workshop)
- 2025: ICLR Outstanding Reviewer
- 2024: Oral presentation at ICRA Doctoral Consortium
- 2024: People's Choice Award at Allen School Research showcase
- 2024: Spotlight Award at ICLR (Top 5%)
- 2022: Best Paper Award at UR conference 2022
- 2021: Koh Boon Hwee Scholars Award (Top university award, 1/1392)
- 2021: National Science (PhD) Scholarship, Agency for Science, Technology and Research of Singapore (A*STAR)
- 2021: NTU Class of 1985 Book Prize
- 2021: Nanyang Award for Teamwork (Highest recognition given by the university to a student club)
- 2021: NTU EEE Excellence Award
- 2021: NTU EEE Final Year Project Challenge, 3rd Prize

- 2020: MakeMIT Hackathon, Most Innovative 5G/IoT/Sensors Design Award
- 2020: Singapore Airline APP Challenge, Superlative Award
- 2020: AI Singapore Summer School, Best Poster Award
- 2019: Singapore India Hackathon, 1st Runner-up
- 2019: 6th ASPIRE Undergraduate Research Academy Conference, Excellent Undergraduate Research Award
- 2019: Dean List's Academic Year 2018/2019
- 2019: NTU EEE Silicon Valley Study Trip Award
- 2019: A*STAR Undergraduate Scholarship
- 2016: Tan Kah Kee Young Inventor's Award (Defence Science)
- 2016: Ngee Ann Polytechnic Outstanding Technology Team Award
- 2015: Ngee Ann Polytechnic Character Award (The highest honor students with exceptional character, 1 recipient per year)

ACADEMIC SERVICE

- Workshop: Lead organizer for Workshop on Generalization in Robotics Manipulation Workshop and Challenges (CVPR 2025), Workshop on 3D Vision Language Models (VLMs) for Robotic Manipulation: Opportunities and Challenges (CVPR 2025), Workshop on Mobile Manipulation: Emerging Opportunities & Contemporary Challenges (RSS 2025), Workshop on SPACE in vision, language and embodied AI (SpaVLE) (NeurIPS 2025), Workshop on Generalizable Priors for Robot Manipulation (CoRL 2025), Workshop and Challenge on Embodied Reasoning in Action (ERA) (CVPR 2026), and organizer for Workshop on RoboPAD: Post-Training Adaptation of Robot Foundation Models (NeurIPS 2026)
- Conference: Area Chair for CoRL 2026. Reviewer for ICRA, CVPR, ECCV, ICCV, IROS, NeurIPS, RSS, CoRL, AAAI, ICML, and ICLR.
- Journal: Associate Editor for RA-L. Reviewer for Neurocomputing, RA-L, Robotics and Automation System.
- Others: Chief Judge for MLDA@EEE Deep Learning Week Hackathon, General Chair for the AI Student Research Conference (ARSC).

MEDIA COVERAGE

- 2025 **MolmoAct: An Action Reasoning Model that Reasons in 3D Space**
Coverage: Business Wire, The AI Economy, GeekWire, Emergent Mind, RealSense, Yahoo! Finance, and VentureBeat
- 2024 **AR2-D2: Training a Robot Without a Robot**
Coverage: MIT Technology Review

REFERENCES

- Prof. Dieter Fox: Professor, Paul G. Allen School of Computer Science & Engineering, University of Washington Email: fox@cs.washington.edu Relationship: Ph.D. Advisor
- Prof. Ranjay Krishna: Assistant Professor, Paul G. Allen School of Computer Science & Engineering, University of Washington Email: ranjay@cs.washington.edu Relationship: Ph.D. Advisor and Collaborator
- Prof. Ali Farhadi: CEO, Allen Institute for AI (AI2); Professor, University of Washington Email: afarhad2@gmail.com Relationship: Research Collaborator and Mentor