Ajay Mandlekar
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Overview

I am a Staff Research Scientist at NVIDIA AI in the GEAR lab. I obtained my Ph.D. in Electrical Engineering from Stanford University (2016-2022) advised by Silvio Savarese and Fei-Fei Li.

I lead simulation-based research on the GEAR team, with a focus on making simulation a scalable method for training humanoid foundation models. Our research encompasses many different directions, such as synthetic data generation, real-to-sim and sim-to-real methods, extending simulation platforms to new applications such as deformable manipulation and loco-manipulation, and learning algorithms leveraging imitation learning, reinforcement learning, and planning, in simulation.

Selected Publications (see website for full list)

- *ScheduleGen: Demonstration Generation via Skill Scheduling for Multi-Arm Imitation Learning*
  Neel Jawale, Stephan Pleines, Soha Pouya, Yuke Zhu, **Ajay Mandlekar**[†], Caelan Garrett[†]
  Under Review
  [arXiv] [website]
- *SimFoundry: Modular and Automated Scene Generation for Policy Learning and Evaluation*
  Nadun Ranawaka[*], Josiah Wong[*], Wei-Lin Pai, Wei-Teng Chu, Tianyuan Dai, Masoud Moghani, Hang Yin, Yunfan Jiang, Wesley Durbano[*], Brandon Huynh[*], Yu Fang, Linxi Fan, Danfei Xu, Ruohan Zhang, Li Fei-Fei, Bowen Wen, **Ajay Mandlekar**[†], Yuke Zhu[†]
  CoRL 2026
  [arXiv] [website]
- *HumanoidMimicGen: Data Generation for Loco-Manipulation via Whole-Body Planning and Adaptation*
  Kevin Lin[*], **Ajay Mandlekar**[*], Caelan Reed Garrett[*], Nikita Chernyadev, Yu Fang, Runyu Ding, Yuqi Xie, Justin Tran, Linxi Fan[†], Yuke Zhu[†]
  CoRL 2026
  Best Paper Finalist at ICRA 2026 Workshop on Synthetic Data for Robot Learning
  [arXiv] [website] [OpenReview]
- *SoftMimicGen: A Data Generation System for Scalable Robot Learning in Deformable Object Manipulation*
  Masoud Moghani, Mahdi Azizian, Animesh Garg, Yuke Zhu, Sean Huver[*], **Ajay Mandlekar**[*]
  ICRA 2026
  [arXiv] [website]
- *Point Bridge: 3D Representations for Cross Domain Policy Learning*
  Siddhant Haldar, Lars Johannsmeier, Lerrel Pinto, Abhishek Gupta, Dieter Fox, Yashraj Narang, **Ajay Mandlekar**
  Technical Report 2026
  [arXiv] [website] [code]
- *DexMachina: Functional Retargeting for Bimanual Dexterous Manipulation*
  Mandi Zhao, Yifan Hou, Dieter Fox, Yashraj Narang, **Ajay Mandlekar**[†], Shuran Song[†]
  ICML 2026
  [arXiv] [website] [code]
- *Generalizable Domain Adaptation for Sim-and-Real Policy Co-Training*
  Shuo Cheng[*], Liqian Ma[*], Zhenyang Chen, **Ajay Mandlekar**[†], Caelan Garrett[†], Danfei Xu
  NeurIPS 2025
  [arXiv] [website] [code]
- *What Matters in Learning from Large-Scale Datasets for Robot Manipulation*
  Vaibhav Saxena, Matthew Bronars[*], Nadun Ranawaka Arachchige[*], Kuancheng Wang, Woo Chul Shin, Soroush Nasiriany, **Ajay Mandlekar**[†], Danfei Xu[†]
  ICLR 2025
  [arXiv] [website] [code]

- *Sim-and-Real Co-Training: A Simple Recipe for Vision-Based Robotic Manipulation*
  Abhiram Maddukuri*, Zhenyu Jiang*, Lawrence Yunliang Chen*, Soroush Nasiriany*, Yuqi Xie, Yu Fang, Wenqi Huang, Zu Wang, Zhenjia Xu, Nikita Chernyadev, Scott Reed, Ken Goldberg, **Ajay Mandlekar**†, Linxi Fan†, Yuke Zhu†
  RSS 2025
  [arXiv] [website]
- *DexMimicGen: Automated Data Generation for Bimanual Dexterous Manipulation via Imitation Learning*
  Zhenyu Jiang*, Yuqi Xie*, Kevin Lin*, Zhenjia Xu, Weikang Wan, **Ajay Mandlekar**†, Linxi Fan†, Yuke Zhu†
  ICRA 2025
  [arXiv] [website] [code]
- *SkillMimicGen: Automated Demonstration Generation for Efficient Skill Learning and Deployment*
  Caelan Garrett*, **Ajay Mandlekar***, Bowen Wen, Dieter Fox
  CoRL 2024
  [arXiv] [website]
- *RoboCasa: Large-Scale Simulation of Everyday Tasks for Generalist Robots*
  Soroush Nasiriany, Abhiram Maddukuri, Lance Zhang, Adeet Parikh, Aaron Lo, Abhishek Joshi, **Ajay Mandlekar**, Yuke Zhu
  RSS 2024
  [arXiv] [website] [code]
- *MimicGen: A Data Generation System for Scalable Robot Learning using Human Demonstrations*
  Ajay Mandlekar, Soroush Nasiriany*, Bowen Wen*, Iretiayo Akinola, Yashraj Narang, Linxi Fan, Yuke Zhu, Dieter Fox
  CoRL 2023
  Oral at CoRL 2023 Towards Generalist Robots Workshop
  [arXiv] [website] [code]
- *Human-in-the-Loop Task and Motion Planning for Imitation Learning*
  Ajay Mandlekar*, Caelan Garrett*, Danfei Xu, Dieter Fox
  CoRL 2023
  Best Paper Runner-Up and Oral at CoRL 2023 Deployable Workshop
  [arXiv] [website]
- *Imitating Task and Motion Planning with Visuomotor Transformers*
  Murtaza Dalal, **Ajay Mandlekar***, Caelan Garrett*, Ankur Handa, Ruslan Salakhutdinov, Dieter Fox
  CoRL 2023
  [arXiv] [website] [code]
- *What Matters in Learning from Offline Human Demonstrations for Robot Manipulation*
  Ajay Mandlekar, Danfei Xu, Josiah Wong, Soroush Nasiriany, Chen Wang, Rohun Kulkarni, Li Fei-Fei, Silvio Savarese, Yuke Zhu, Roberto Martín-Martín
  CoRL 2021
  Oral (6.5% acceptance)
  [arXiv] [website] [video] [code] [blog]
- *Learning Multi-Arm Manipulation Through Collaborative Teleoperation*
  Albert Tung*, Josiah Wong*, **Ajay Mandlekar**, Roberto Martín-Martín, Yuke Zhu, Li Fei-Fei, Silvio Savarese
  ICRA 2021
  Best Multi-Robotic Systems Paper Finalist
  [arXiv] [website] [video]
- *Human-in-the-Loop Imitation Learning using Remote Teleoperation*
  Ajay Mandlekar, Danfei Xu*, Roberto Martin-Martin*, Yuke Zhu, Li Fei-Fei, Silvio Savarese
  Technical Report 2020
  [arXiv] [website] [video]
- *robosuite: A Modular Simulation Framework and Benchmark for Robot Learning*
  Yuke Zhu, Josiah Wong, **Ajay Mandlekar**, Roberto Martin-Martin
  Technical Report 2020
  [arXiv] [website]
- *Learning to Generalize Across Long-Horizon Tasks from Human Demonstrations*
  Ajay Mandlekar*, Danfei Xu*, Roberto Martín-Martín, Silvio Savarese, Li Fei-Fei
  RSS 2020
  [arXiv] [website] [video]
- *IRIS: Implicit Reinforcement without Interaction at Scale for Learning Control from Offline Robot Manipulation Data*
  Ajay Mandlekar, Fabio Ramos, Byron Boots, Silvio Savarese, Li Fei-Fei, Animesh Garg, Dieter Fox
  ICRA 2020
  [arXiv] [website] [video]

- *Scaling Robot Supervision to Hundreds of Hours with RoboTurk: Robotic Manipulation Dataset through Human Reasoning and Dexterity*
  Ajay Mandlekar, Jonathan Booher, Max Spero, Albert Tung, Anchit Gupta, Yuke Zhu, Animesh Garg, Silvio Savarese, Li Fei-Fei
  IROS 2019
  Best Cognitive Robotics Paper Finalist
  [arXiv] [website] [blog] [talk]
- *RoboTurk: A Crowdsourcing Platform for Robotic Skill Learning through Imitation*
  Ajay Mandlekar, Yuke Zhu, Animesh Garg, Jonathan Booher, Max Spero, Albert Tung, Julian Gao, John Emmons, Anchit Gupta, Emre Orbay, Silvio Savarese, Li Fei-Fei
  CoRL 2018
  [arXiv] [website] [talk]

NVIDIA Research Impact

- **NVIDIA Product:** AutoData features our research on synthetic data generation. Available projects: MimicGen, DexMimicGen, and SkillGen.
- **GTC 2026:** G1 Factory Benchmark was highlighted in Jensen's Santa Clara and Taipei keynotes.
- **GTC 2025:** DexMimicGen and SkillGen were featured in Jensen's GTC keynote.

Research Community Engagement

Selected Talks

- *"Removing the Barriers to Simulation Adoption with Automated Environment Construction and Synthetic Data Generation"* - ICRA 2026 Generative Digital Twins Workshop, June 2026
- *"Scaling Synthetic Data Generation for Robotics with Point-Based Representations"* - CoRL 2025 GenPriors Workshop, September 2025
- *"Moving from Data Collection to Data Generation: Addressing the Need for Data in Robotics"* - Cornell Robotics Seminar, December 2024

Workshop Organization

- Data Generation for Robotics, RSS 2024
- Overlooked Aspects of Imitation Learning, RSS 2022
- Advances and Challenges in Imitation Learning for Robotics, RSS 2020

Academic Service

- Area Chair for CoRL 2025, CoRL 2026, and RSS 2027
- Reviewer for CoRL, RSS, ICRA, IROS, ICLR, NeurIPS, ICML, CVPR, IEEE T-RO

Work Experience and Education

Research Scientist, NVIDIA GEAR Lab, July 2025 - Present

Research Scientist, NVIDIA Seattle Robotics Lab, Jan 2022 - June 2025

Ph.D., Electrical Engineering, Stanford University, 2016 - 2022
NDSEG Fellow

M.S., Computer Science, Stanford University, 2018
GPA: 4.1

B.S., Electrical Engineering & Computer Science (dual major), Caltech, 2016
GPA: 4.1
Officer of Tau Beta Pi Engineering Honor Society

Monta Vista High School, Cupertino, CA