Stanford

Shuran Song

Assistant Professor of Electrical Engineering and, by courtesy, of Computer Science

Bio

BIO

Shuran Song is an Assistant Professor of Electrical Engineering at Stanford University. Before joining Stanford, she was faculty at Columbia University. Shuran received her Ph.D. in Computer Science at Princeton University, BEng. at HKUST. Her research interests lie at the intersection of computer vision and robotics. Song's research has been recognized through several awards, including the Best Paper Awards at RSS'22 and T-RO'20, Best System Paper Awards at CoRL'21, RSS'19, and finalists at RSS, ICRA, CVPR, and IROS. She is also a recipient of the NSF Career Award, Sloan Foundation fellowship as well as research awards from Microsoft, Toyota Research, Google, Amazon, and JP Morgan.

To learn more about Shuran's work, please visit: https://shurans.github.io/

ACADEMIC APPOINTMENTS

- Assistant Professor, Electrical Engineering

HONORS AND AWARDS

- Research Scholar, Google (2023)
- Gabilan Faculty Fellow, Stanford (2023)
- Microsoft Faculty Fellowship, Microsoft (2021)
- Research Fellowship, Alfred P. Sloan Foundation (2022)
- Career Award, National Science Foundation (2022)

PROGRAM AFFILIATIONS

- Stanford SystemX Alliance

LINKS

- Academic website: https://shurans.github.io/
- Google Scholar: https://scholar.google.com/citations?hl=en&user=5031vK4AAAAJ
- Lab Site: https://real.stanford.edu/

Teaching

COURSES

2025-26

- Robot Perception: CS 227A, EE 227 (Aut)

- Robotics and Autonomous Systems Seminar: ENGR 319 (Aut)

2024-25

- Robot Perception: CS 227A, EE 227 (Aut)
- Robotics and Autonomous Systems Seminar: ENGR 319 (Aut, Win, Spr)
- Sensorimotor Learning for Embodied Agents: CS 381, EE 381 (Win)

2023-24

- Robot Perception: Hardware, Algorithm, and Application: CS 227A, EE 227 (Win)
- Sensorimotor Learning for Embodied Agents: EE 381 (Aut)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Hao Li, Jingyun Yang

Postdoctoral Faculty Sponsor

Changhao Wang

Doctoral Dissertation Advisor (AC)

Yihuai Gao, Zeyi Liu, Chuer Pan, Austin Patel, Xiaomeng Xu, Mandi Zhao

Master's Program Advisor

Zoe Brickley, Josh Citron, Chenault Ellis, Yuming Feng, Cole McBeth, Kennaissa Nabi, Karthik Pythireddi

Doctoral (Program)

Max Du, Zeyi Liu, Chuer Pan, Austin Patel, Juntao Ren, Zhanyi Sun, Xiaomeng Xu, Han Zhang, Mandi Zhao

Publications

PUBLICATIONS

- **DoughNet: A Visual Predictive Model for Topological Manipulation of Deformable Objects**
  Bauer, D., Xu, Z., Song, S.
  edited by Leonardis, A., Ricci, E., Roth, S., Russakovsky, O., Sattler, T., Varol, G.
  SPRINGER INTERNATIONAL PUBLISHING AG.2025: 92-108
- **Semantically controllable augmentations for generalizable robot learning** *INTERNATIONAL JOURNAL OF ROBOTICS RESEARCH*
  Chen, Z., Mandi, Z., Bharadhwaj, H., Sharma, M., Song, S., Gupta, A., Kumar, V.
  2024
- **Diffusion policy: Visuomotor policy learning via action diffusion** *INTERNATIONAL JOURNAL OF ROBOTICS RESEARCH*
  Chi, C., Xu, Z., Feng, S., Cousineau, E., Du, Y., Burchfiel, B., Tedrake, R., Song, S.
  2024
- **Foundation models in robotics: Applications, challenges, and the future** *INTERNATIONAL JOURNAL OF ROBOTICS RESEARCH*
  Firoozi, R., Tucker, J., Tian, S., Majumdar, A., Sun, J., Liu, W., Zhu, Y., Song, S., Kapoor, A., Hausman, K., Ichter, B., Driess, D., Wu, et al
  2024
- **Asynchronously Assigning, Monitoring, and Managing Assembly Goals in Virtual Reality for High-Level Robot Teleoperation**
  Aoyama, S., Liu, J., Wang, P., Jain, S., Wang, X., Xu, J., Song, S., Tversky, B., Feiner, S., IEEE Comp Soc
  IEEE COMPUTER SOC.2024: 450-460
- **Dynamic Grasping with a Learned Meta-Controller**
  Jia, Y., Xu, J., Jayaraman, D., Song, S., IEEE

IEEE.2024: 3608-3615

- **Decision Making for Human-in-the-loop Robotic Agents via Uncertainty-Aware Reinforcement Learning**
  Singi, S., He, Z., Pan, A., Patel, S., Sigurdsson, G. A., Piramuthu, R., Song, S., Ciocarlie, M., IEEE
  IEEE.2024: 7939-7945

- **RoCo: Dialectic Multi-Robot Collaboration with Large Language Models**
  Mandi, Z., Jain, S., Song, S., IEEE
  IEEE.2024: 286-299

- **Open X-Embodiment: Robotic Learning Datasets and RT-X Models**
  O'Neill, A., Rehman, A., Gupta, A., Maddukuri, A., Gupta, A., Padalkar, A., Lee, A., Pooley, A., Gupta, A., Mandlekar, A., Jain, A., Tung, A., Bewley, et al
  IEEE.2024: 6892-6903

- **AuRo special issue on large language models in robotics guest editorial** *AUTONOMOUS ROBOTS*
  Xia, F., Ichter, B., Song, S., Hausman, K.
  2023

- **TidyBot: personalized robot assistance with large language models** *AUTONOMOUS ROBOTS*
  Wu, J., Antonova, R., Kan, A., Lepert, M., Zeng, A., Song, S., Bohg, J., Rusinkiewicz, S., Funkhouser, T.
  2023

- **Iterative residual policy: For goal-conditioned dynamic manipulation of deformable objects** *INTERNATIONAL JOURNAL OF ROBOTICS RESEARCH*
  Chi, C., Burchfiel, B., Cousineau, E., Feng, S., Song, S.
  2023

- **CoWs on PASTURE: Baselines and Benchmarks for Language-Driven Zero-Shot Object Navigation**
  Gadre, S., Wortsman, M., Ilharco, G., Schmidt, L., Song, S., IEEE
  IEEE COMPUTER SOC.2023: 23171-23181

- **Tracking and Reconstructing Hand Object Interactions from Point Cloud Sequences in the Wild**
  Chen, J., Yan, M., Zhang, J., Xu, Y., Li, X., Weng, Y., Yi, L., Song, S., Wang, H.
  edited by Williams, B., Chen, Y., Neville, J.
  ASSOC ADVANCEMENT ARTIFICIAL INTELLIGENCE.2023: 304-312

- **XSkill: Cross Embodiment Skill Discovery**
  Xu, M., Xu, Z., Chi, C., Veloso, M., Song, S.
  edited by Tan, J., Toussaint, M., Darvish, K.
  JMLR-JOURNAL MACHINE LEARNING RESEARCH.2023

- **Scaling Up and Distilling Down: Language-Guided Robot Skill Acquisition**
  Ha, H., Florence, P., Song, S.
  edited by Tan, J., Toussaint, M., Darvish, K.
  JMLR-JOURNAL MACHINE LEARNING RESEARCH.2023

- **REFLECT: Summarizing Robot Experiences for FaiLure Explanation and CorrecTion**
  Liu, Z., Bahety, A., Song, S.
  edited by Tan, J., Toussaint, M., Darvish, K.
  JMLR-JOURNAL MACHINE LEARNING RESEARCH.2023

- **Rearrangement Planning for General Part Assembly**
  Li, Y., Zeng, A., Song, S.
  edited by Tan, J., Toussaint, M., Darvish, K.
  JMLR-JOURNAL MACHINE LEARNING RESEARCH.2023

- **DATACOMP: In search of the next generation of multimodal datasets**
  Gadre, S., Ilharco, G., Fang, A., Hayase, J., Smyrnis, G., Thao Nguyen, Marten, R., Wortsman, M., Ghosh, D., Zhang, J., Orgad, E., Entezari, R., Daras, G., et al

edited by Oh, A., Neumann, T., Globerson, A., Saenko, K., Hardt, M., Levine, S.
NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2023

- **Pick2Place: Task-aware 6DoF Grasp Estimation via Object-Centric Perspective Affordance**
  He, Z., Chavan-Dafle, N., Huh, J., Song, S., Isler, V., IEEE
  IEEE.2023: 7996-8002
- **TANDEM3D: Active Tactile Exploration for 3D Object Recognition**
  Xu, J., Lin, H., Song, S., Ciocarlie, M., IEEE
  IEEE.2023: 10401-10407
- **Structure from Action: Learning Interactions for 3D Articulated Object Structure Discovery**
  Nie, N., Gadre, S., Ehsani, K., Song, S., IEEE
  IEEE.2023: 1222-1229
- **Bag All You Need: Learning a Generalizable Bagging Strategy for Heterogeneous Objects**
  Bahety, A., Jain, S., Ha, H., Hager, N., Burchfiel, B., Cousineau, E., Feng, S., Song, S., IEEE
  IEEE.2023: 960-967
- **TidyBot: Personalized Robot Assistance with Large Language Models**
  Wu, J., Antonova, R., Kan, A., Lepert, M., Zeng, A., Song, S., Bohg, J., Rusinkiewicz, S., Funkhouser, T., IEEE
  IEEE.2023: 3546-3553
- **Built to Order: A Virtual Reality Interface for Assigning High-Level Assembly Goals to Remote Robots**
  Wang, P., Jain, S., Li, M., Aoyama, S., Wang, X., Song, S., Liu, J., Feiner, S.
  edited by Spencer, S. N.
  ASSOC COMPUTING MACHINERY.2023
- **Cloth Funnels: Canonicalized-Alignment for Multi-Purpose Garment Manipulation**
  Canberk, A., Chi, C., Ha, H., Burchfiel, B., Cousineau, E., Peng, S., Song, S., IEEE
  IEEE.2023: 5872-5879
- **TANDEM: Learning Joint Exploration and Decision Making With Tactile Sensors** *IEEE ROBOTICS AND AUTOMATION LETTERS*
  Xu, J., Song, S., Ciocarlie, M.
  2022; 7 (4): 10391-10398
- **Learning Pneumatic Non-Prehensile Manipulation With a Mobile Blower** *IEEE ROBOTICS AND AUTOMATION LETTERS*
  Wu, J., Sun, X., Zeng, A., Song, S., Rusinkiewicz, S., Funkhouser, T.
  2022; 7 (3): 8471-8478
- **Universal Manipulation Policy Network for Articulated Objects** *IEEE ROBOTICS AND AUTOMATION LETTERS*
  Xu, Z., He, Z., Song, S.
  2022; 7 (2): 2447-2454
- **Scene Editing as Teleoperation: A Case Study in 6DoF Kit Assembly**
  Li, Y., Agrawal, S., Liu, J., Feiner, S. K., Song, S., IEEE
  IEEE.2022: 4773-4780
- **DextAIRity: Deformable Manipulation Can be a Breeze**
  Xu, Z., Chi, C., Burchfiel, B., Cousineau, E., Feng, S., Song, S.
  edited by Hauser, K., Shell, D., Huang, S.
  RSS FOUNDATION-ROBOTICS SCIENCE & SYSTEMS FOUNDATION.2022
- **Iterative Residual Policy for Goal-Conditioned Dynamic Manipulation of Deformable Objects**
  Chi, C., Burchfiel, B., Cousineau, E., Feng, S., Song, S.
  edited by Hauser, K., Shell, D., Huang, S.
  RSS FOUNDATION-ROBOTICS SCIENCE & SYSTEMS FOUNDATION.2022
- **Continuous Scene Representations for Embodied AI**
  Gadre, S., Ehsani, K., Song, S., Mottaghi, R., IEEE COMP SOC

IEEE COMPUTER SOC.2022: 14829-14839

- **Sim2Real in Robotics and Automation: Applications and Challenges** *IEEE TRANSACTIONS ON AUTOMATION SCIENCE AND ENGINEERING*
  Hofer, S., Bekris, K., Handa, A., Gamboa, J., Mozifian, M., Golemo, F., Atkeson, C., Fox, D., Goldberg, K., Leonard, J., Karen Liu, C., Peters, J., Song, et al
  2021; 18 (2): 398-400

- **Leveraging SE(3) Equivariance for Self-Supervised Category-Level Object Pose Estimation**
  Li, X., Weng, Y., Yi, L., Guibas, L., Abbott, A., Song, S., Wang, H.
  edited by Ranzato, M., Beygelzimer, A., Dauphin, Y., Liang, P. S., Vaughan, J. W.
  NEURAL INFORMATION PROCESSING SYSTEMS (NIPS).2021

- **Dynamic Grasping with Reachability and Motion Awareness**
  Akinola, I., Xu, J., Song, S., Allen, P. K., IEEE
  IEEE.2021: 9422-9429

- **AdaGrasp: Learning an Adaptive Gripper-Aware Grasping Policy**
  Xu, Z., Qi, B., Agrawal, S., Song, S., IEEE
  IEEE.2021: 4620-4626

- **Spatial Intention Maps for Multi-Agent Mobile Manipulation**
  Wu, J., Sun, X., Zeng, A., Song, S., Rusinkiewicz, S., Funkhouser, T., IEEE
  IEEE.2021: 8749-8756

- **Visual Perspective Taking for Opponent Behavior Modeling**
  Chen, B., Hu, Y., Kwiatkowski, R., Song, S., Lipson, H., IEEE
  IEEE.2021: 13678-13685

- **SSCNav: Confidence-Aware Semantic Scene Completion for Visual Semantic Navigation**
  Liang, Y., Chen, B., Song, S., IEEE
  IEEE.2021: 13194-13200

- **Act the Part: Learning Interaction Strategies for Articulated Object Part Discovery**
  Gadre, S., Ehsani, K., Song, S., IEEE
  IEEE.2021: 15732-15741

- **GarmentNets: Category-Level Pose Estimation for Garments via Canonical Space Shape Completion**
  Chi, C., Song, S., IEEE
  IEEE.2021: 3304-3313

- **TossingBot: Learning to Throw Arbitrary Objects With Residual Physics** *IEEE TRANSACTIONS ON ROBOTICS*
  Zeng, A., Song, S., Lee, J., Rodriguez, A., Funkhouser, T.
  2020; 36 (4): 1307-1319

- **Grasping in the Wild: Learning 6DoF Closed-Loop Grasping From Low-Cost Demonstrations** *IEEE ROBOTICS AND AUTOMATION LETTERS*
  Song, S., Zeng, A., Lee, J., Funkhouser, T.
  2020; 5 (3): 4978-4985

- **Category-Level Articulated Object Pose Estimation**
  Li, X., Wang, H., Yi, L., Guibas, L., Abbott, A., Song, S., IEEE
  IEEE.2020: 3703–12

- **ClearGrasp: 3D Shape Estimation of Transparent Objects for Manipulation**
  Sajjan, S., Moore, M., Pan, M., Nagaraja, G., Lee, J., Zeng, A., Song, S., IEEE
  IEEE.2020: 3634-3642

- **Learning to See before Learning to Act: Visual Pre-training for Manipulation**
  Lin Yen-Chen, Zeng, A., Song, S., Isola, P., Lin, T., IEEE
  IEEE.2020: 7286-7293

- **Spatial Action Maps for Mobile Manipulation**
  Wu, J., Sun, X., Zeng, A., Song, S.
  edited by Toussaint, M., Bicchi, A., Hermans, T.
  MIT PRESS.2020
- **Form2Fit: Learning Shape Priors for Generalizable Assembly from Disassembly**
  Zakka, K., Zeng, A., Lee, J., Song, S., IEEE
  IEEE.2020: 9404-9410
- **Normalized Object Coordinate Space for Category-Level 6D Object Pose and Size Estimation**
  Wang, H., Sridhar, S., Huang, J., Valentin, J., Song, S., Guibas, L. J., IEEE Comp Soc
  IEEE COMPUTER SOC.2019: 2637–46
- **TossingBot: Learning to Throw Arbitrary Objects with Residual Physics**
  Zeng, A., Song, S., Lee, J., Rodriquez, A., Funkouser, T.
  edited by Bicchi, A., KressGazit, H., Hutchinson, S.
  MIT PRESS.2019
- **DensePhysNet: Learning Dense Physical Object Representations via Multi-step Dynamic Interactions**
  Xu, Z., Wu, J., Zeng, A., Tenenbaum, J. B., Song, S.
  edited by Bicchi, A., KressGazit, H., Hutchinson, S.
  MIT PRESS.2019
- **Im2Pano3D: Extrapolating 360 degrees Structure and Semantics Beyond the Field of View**
  Song, S., Zeng, A., Chang, A. X., Savva, M., Savarese, S., Funkhouser, T., IEEE
  IEEE.2018: 3847–56
- **Neural Graph Matching Networks for Fewshot 3D Action Recognition**
  Guo, M., Chou, E., Huang, D., Song, S., Yeung, S., Li Fei-Fei
  edited by Ferrari, Hebert, M., Sminchisescu, C., Weiss, Y.
  SPRINGER INTERNATIONAL PUBLISHING AG.2018: 673-689
- **Matterport3D: Learning from RGB-D Data in Indoor Environments**
  Chang, A., Dai, A., Funkhouser, T., Halber, M., Niessner, M., Savva, M., Song, S., Zeng, A., Zhang, Y., IEEE
  IEEE.2017: 667–76
- **3DMatch: Learning Local Geometric Descriptors from RGB-D Reconstructions**
  Zeng, A., Song, S., Niessner, M., Fisher, M., Xiao, J., Funkhouser, T., IEEE
  IEEE.2017: 199-208