Shuran Song | Curriculum Vitae

Department of Computer Science – Columbia University – New York, NY 10027

Personal Website · Google Scholar

Education

Princeton University
Ph.D. in Computer Science 2018

Hong Kong University of Science and Technology
B.Eng. in Computer Engineering 2013

Appointments

Columbia University
Assistant Professor 2019-now

Samsung AI Center
Research Consultant 2021-now

Google Brain
Student Researcher 2018-2019

Awards and Honors

Paper Awards

2022 RSS : **Best Paper Award, Best Student Paper Finalist**, Iterative Residual Policy for Goal-Conditioned Dynamic Manipulation of Deformable Objects

2022 RSS : **Best System Paper Finalist**, DextAIRity: Deformable Manipulation Can be a Breeze

2021 CoRL: **Best System Paper**, FlingBot: The Unreasonable Effectiveness of Dynamic Manipulations for Cloth Unfolding

2021 Japan Factory Automation: **Foundation Paper Award** What are the important technologies for bin picking? Technology analysis of robots in competitions based on a set of performance metrics

2020 TRO: **Best Paper Award**, TossingBot: Learning to Throw Arbitrary Objects with Residual Physics

2020 ICRA: **Best Paper in Automation Finalist**, Form2Fit: Learning Shape Priors for Generalizable Assembly from Disassembly

2019 RSS: **Best System Paper**, TossingBot: Learning to Throw Arbitrary Objects with Residual Physics

2019 CVPR: **Best Paper Finalist**, Neural Illumination: Lighting Prediction for Indoor Environments

2018 IROS: **Best Cognitive Robotics Paper Award Finalist**, Learning Synergies between Pushing and Grasping with Self-supervised Deep Reinforcement

2018 Amazon: **Best Systems Paper Award in Manipulation**, Robotic Pick-And-Place of Novel Objects in Clutter with Multi-Affordance Grasping and Cross-Domain Image Matching

2018 SGP: **Best Dataset Award**, ShapeNet: An Information-Rich 3D Model Repository

Faculty Research Awards

2022: NSF CAREER Award

2022: Microsoft Research Award

2022: Sloan Research Fellows

2022: Google Research Scholar Award

2021: Microsoft Research Faculty Fellows

2021: JP Morgan Faculty Research Award

20/21/22: Amazon Research Award

2021: TRI Young Faculty Researcher Award

2020: Columbia Junior Faculty Award

Awards as Students

2017: Wallace Fellowship
2017: Princeton School of Engineering and Applied Science Award for Excellence
2017: 1st Place Winners (Stow Task) at the worldwide Amazon Robotics Challenge 2017
2016: Siebel Scholar, Class of 2017
2016: 3rd and 4th Place Winners at at the worldwide Amazon Picking Challenge 2016
2015: Facebook Ph.D. Fellowship
2013: Princeton Ph.D. Student Fellowship

Publications (Conference and Journals)

A list of publications is also available on my Google Scholar page.

Huy Ha, Shuran Song
Semantic Abstraction: Open-World 3D Scene Understanding from 2D Vision-Language Models
Conference on Robot Learning (**CoRL**) 2022 Project Webpage

Zeyi Liu, Zhenjia Xu, Shuran Song
BusyBot: Learning to Interact, Reason, and Plan in a BusyBoard Environment
Conference on Robot Learning (**CoRL**) 2022 Project Webpage

Mengda Xu, Manuela Veloso, Shuran Song
ASPiRe: Adaptive Skill Priors for Reinforcement Learning
Neural Information Processing Systems, **NeurIPS** 2022 Project Webpage

Gabriel Ilharco*, Mitchell Wortsman*, Samir Yitzhak Gadre*, Shuran Song, Hannaneh Hajishirzi Simon Kornblith, Ali Farhadi, Ludwig Schmidt
Patching open-vocabulary models by interpolating weights
Neural Information Processing Systems, **NeurIPS** 2022 Project Webpage

Cheng Chi, Benjamin Burchfiel, Eric Cousineau, Siyuan Feng, Shuran Song
Iterative Residual Policy for Goal-Conditioned Dynamic Manipulation of Deformable Objects
Robotics: Science and Systems **(RSS)** 2022
Best Paper Award. Best Student Paper Finalist. Project Webpage

Zhenjia Xu, Cheng Chi, Benjamin Burchfiel, Eric Cousineau, Siyuan Feng, Shuran Song
DextAIRity: Deformable Manipulation Can be a Breeze
Robotics: Science and Systems **(RSS)** 2022
Best System Paper Finalist Project Webpage

Jimmy Wu, Xingyuan Sun, Andy Zeng, Shuran Song, Szymon Rusinkiewicz, Thomas Funkhouser
Learning Pneumatic Non-Prehensile Manipulation with a Mobile Blower
Robotics and Automation Letters **(RA-L)**, 2022
Intelligent Robots and Systems **(IROS)**, 2022 Project Webpage

Jingxi Xu, Shuran Song, Matei Ciocarlie
TANDEM: Learning Joint Exploration and Decision Making with Tactile Sensors
Robotics and Automation Letters **(RA-L)**, 2022
Intelligent Robots and Systems **(IROS)**, 2022 Project Webpage

Shubham Agrawal*, Yulong Li*, Jen-Shuo Liu, Steven K. Feiner, Shuran Song
Scene Editing as Teleoperation: A Case Study in 6DoF Kit Assembly
Intelligent Robots and Systems **(IROS)**, 2022 Project Webpage

Samir Yitzhak Gadre, Kiana Ehsani, Shuran Song, Roozbeh Mottaghi
Continuous Scene Representations for Embodied AI
IEEE Conference on Computer Vision and Pattern Recognition **(CVPR)** 2022

Wenji Liu, Kai Bai, Xuming He, Shuran Song, Changxi Zheng, and Xiaopei Liu
FishGym: A High-Performance Physics-based Simulation Framework for Underwater Robot Learning
International Conference on Robotics and Automation **(ICRA)**, 2022 Project Webpage

Zhenjia Xu, Zhanpeng He, Shuran Song
UMPNet: Universal Manipulation Policy Network for Articulated Objects
Robotics and Automation Letters **(RA-L)**, 2022
International Conference on Robotics and Automation **(ICRA)**, 2022 Project Webpage

Xiaolong Li, Yijia Weng, Li Yi, Leonidas Guibas, A. Lynn Abbott, Shuran Song, He Wang
Leveraging SE(3) Equivariance for Self-Supervised Category-Level Object Pose Estimation
Neural Information Processing Systems, **NeurIPS** 2021 Project Webpage

Huy Ha, Shuran Song
FlingBot: The Unreasonable Effectiveness of Dynamic Manipulations for Cloth Unfolding
Conference on Robot Learning (**CoRL** 2021)
Best System Paper Project Webpage

Cheng Chi, Shuran Song
GarmentNets: Category-Level Pose Estimation for Garments via Canonical Space Shape Completion
IEEE International Conference on Computer Vision **(ICCV), 2021**, Project Webpage

Samir Yitzhak Gadre, Kiana Ehsani, Shuran Song
Act the Part: Learning Interaction Strategies for Articulated Object Part Discovery
IEEE International Conference on Computer Vision **(ICCV), 2021**, Project Webpage

Iretiayo Akinola*, Jingxi Xu*, Shuran Song, and Peter Allen
Dynamic Grasping with Reachability and Motion Awareness
International Conference on Intelligent Robots and Systems (IROS) 2021 Project Webpage

Zhenjia Xu, Beichun Qi, Shubham Agrawal, Shuran Song
AdaGrasp: Learning an Adaptive Gripper-Aware Grasping Policy
International Conference on Robotics and Automation **(ICRA)**, 2021 Project Webpage

Jimmy Wu, Xingyuan Sun, Andy Zeng, Shuran Song, Szymon Rusinkiewicz, Thomas Funkhouser
Spatial Intention Maps for Multi-Agent Mobile Manipulatio
International Conference on Robotics and Automation **(ICRA)**, 2021 Project Webpage

Boyuan Chen, Yuhang Hu, Robert Kwiatkowski, Shuran Song, Hod Lipson
Visual Perspective Taking for Opponent Behavior Modeling
International Conference on Robotics and Automation **(ICRA)**, 2021 Project Webpage

Yiqing Liang, Boyuan Chen, Shuran Song
SSCNav: Confidence-Aware Semantic Scene Completion for Visual Semantic Navigation
International Conference on Robotics and Automation **(ICRA)**, 2021 Project Webpage

Zhenjia Xu*, Zhanpeng He*, Jiajun Wu, Shuran Song
Learning 3D Dynamic Scene Representations for Robot Manipulation
Conference on Robot Learning **(CoRL)**, 2020 Project Webpage

Huy Ha*, Shubham Agrawal*, Shuran Song
Fit2Form: 3D Generative Model for Robot Gripper Form Design
Conference on Robot Learning **(CoRL)**, 2020 Project Webpage

Huy Ha, Jingxi Xu, Shuran Song
Learning a Decentralized Multi-arm Motion Planner
Conference on Robot Learning **(CoRL)**, 2020 Project Webpage

Sebastian Hofer, Kostas E. Bekris, Ankur Handa, Juan Camilo Gamboa, Melissa Mozifian, Florian Golemo, Christopher G. Atkeson, Dieter Fox, Ken Goldberg, John Leonard, C. Karen Liu, Jan Peters, Shuran Song, Peter Welinder, Martha White.
Sim2Real in Robotics and Automation: Applications and Challenges.
IEEE Transactions on Automation Science and Engineering 2020.

Chengzhi Mao, Amogh Gupta, Vikram Nitin, Baishakhi Ray, Shuran Song, Junfeng Yang, Carl Vondrick
Multi-task Learning Increases Adversarial Robustness
European Conference on Computer Vision **(ECCV)**, 2020 Paper

Shuran Song, Andy Zeng, Johnny Lee, Thomas Funkhouser
Grasping in the Wild: Learning 6DoF Closed-Loop Grasping from Low-Cost Demonstrations
Robotics and Automation Letters **(RA-L)** 2020
International Conference on Intelligent Robots and Systems(**IROS**) 2020 Project Webpage

Jimmy Wu, Xingyuan Sun, Andy Zeng, Shuran Song, Johnny Lee, Szymon Rusinkiewicz, Thomas Funkhouser
Spatial Action Maps for Mobile Manipulation
Robotics: Science and Systems **(RSS)**, 2020 Project Webpage

Xiaolong Li, He Wang, Li Yi, Leonidas Guibas, A. Lynn Abbott, Shuran Song
Category-Level Articulated Object Pose Estimation
IEEE Conference on Computer Vision and Pattern Recognition **(CVPR)** 2020
Oral presentation Project Webpage

Shreeyak S. Sajjan, Matthew Moore, Mike Pan, Ganesh Nagaraja, Johnny Lee, Andy Zeng, Shuran Song
ClearGrasp: 3D Shape Estimation of Transparent Objects for Manipulation
International Conference on Robotics and Automation, **(ICRA)**, 2020 Project Webpage

Kevin Zakka, Andy Zeng, Johnny Lee, Shuran Song
Form2Fit: Learning Shape Priors for Generalizable Assembly from Disassembly
International Conference on Robotics and Automation, **(ICRA)**, 2020
Best Paper in Automation Finalist Project Webpage

Yen-Chen Lin, Andy Zeng, Shuran Song, Phillip Isola, TY Lin
Learning to See before Learning to Act: Visual Pre-training for Manipulation
International Conference on Robotics and Automation, **(ICRA)**, 2020 Project Webpage

Andy Zeng, Shuran Song, Johnny Lee, Alberto Rodriguez, Thomas Funkhouser
TossingBot: Learning to Throw Arbitrary Objects with Residual Physics
IEEE Transactions on Robotics **(TRO)**, 2020
Robotics: Science and Systems (**RSS**), 2019
Best System Paper Project Webpage

Zhenjia Xu, Jiajun Wu, Andy Zeng, Joshua Tenenbaum, **Shuran Song**
DensePhysNet: Learning Dense Physical Object Representations via Multi-step Dynamic Interactions Robotics: Science and Systems (**RSS**), 2019 Project Webpage

He Wang, Srinath Sridhar, Jingwei Huang, Julien Valentin, **Shuran Song** , Leonidas J. Guibas
Normalized Object Coordinate Space for Category-Level 6D Object Pose and Size Estimation
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**) 2019
Oral presentation Project Webpage

Shuran Song and Thomas Funkhouser.
Neural Illumination: Lighting Prediction for Indoor Environments
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**) 2019
Best Paper Finalist, Oral presentation Project Webpage

Fujita, M., Domae, Y., Noda, A., Garcia Ricardez, G.A., Nagatani, T., Zeng, A., Song, S., Rodriguez, A., Causo, A., Chen, I.M. and Ogasawara, T.

What are the important technologies for bin picking? Technology analysis of robots in competitions based on a set of performance metrics.
Advanced Robotics, 2019

Michelle Guo, Edward Chou, **Shuran Song**, De-An Huang, Serena Yeung, Li Fei-Fei
Neural Graph Matching Networks for Fewshot 3D Action Recognition
European Conference on Computer Vision (**ECCV**), 2018 Project Webpage

A. Zeng, **S. Song** S. Welker, J. Lee, A. Rodriguez, T. Funkhouser
Learning Synergies between Pushing and Grasping with Self-supervised Deep Reinforcement Learning International Conference on Intelligent Robots and Systems(**IROS**), 2018
Best Cognitive Robotics Paper Award Finalist Project Webpage

Shuran Song, Andy Zeng, Angel X. Chang, Manolis Savva, Silvio Savarese, Thomas Funkhouser.
Im2Pano3D: Extrapolating 360 Structure and Semantics Beyond the Field of View.
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2018.
Oral presentation Project Webpage

Andy Zeng, **Shuran Song**, Kuan-Ting Yu, Elliott Donlon, Francois R. Hogan, Maria Bauza, Daolin Ma, Orion Taylor, Melody Liu, Eudald Romo, Nima Fazeli, Ferran Alet, Nikhil Chavan Dafle, Rachel Holladay, Isabella Morona, Prem Qu Nair, Druck Green, Ian Taylor, Weber Liu, Thomas Funkhouser, Alberto Rodriguez
Robotic Pick-and-Place of Novel Objects in Clutter with Multi-Affordance Grasping and Cross-Domain Image Matching.
International Journal of Robotics Research **(IJRR)**, August 2019
International Conference on Robotics and Automation (**ICRA**), 2018. Project Webpage

Shuran Song, Fisher Yu, Andy Zeng, Angel X. Chang, Manolis Savva, Thomas Funkhouser.
Semantic Scene Completion from a Single Depth Image.
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2017.
Oral presentation Project Webpage

Andy Zeng, **Shuran Song**, Matthias Niessner, Matthew Fisher, Jianxiong Xiao, Thomas Funkhouser
3DMatch: Learning Local Geometric Descriptors from RGB-D Reconstructions.
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2017.
Oral presentation Project Webpage

Yinda Zhang*, **Shuran Song***, Ersin Yumer, Manolis Savva, Joon-Young Lee, Hailin Jin, Thomas Funkhouser
Physically-Based Rendering for Indoor Scene Understanding Using Convolutional Neural Networks. IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2017.
* indicates equal contribution. Project Webpage

Andy Zeng, Kuan-Ting Yu, **Shuran Song**, Daniel Suo, Ed Walker Jr., Alberto Rodriguez and Jianxiong Xiao
Multi-view Self-supervised Deep Learning for 6D Pose Estimation in the Amazon Picking Challenge
International Conference on Robotics and Automation (**ICRA**), 2017. Project Webpage

Angel X. Chang, Angela Dai, Thomas Funkhouser, Maciej Halber, Matthias Niessner, Manolis Savva, **Shuran Song** , Andy Zeng, Yinda Zhang
Matterport3D: Learning from RGB-D Data in Indoor Environments.
IEEE International Conference on 3D Vision (3DV) (**3DV**), 2017. Project Webpage

Shuran Song, Jianxiong Xiao.
Deep Sliding Shapes for Amodal 3D Object Detection in RGB-D Images.
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2016.
Spotlight presentation Project Webpage

Shuran Song, Samuel P. Lichtenberg, Jianxiong Xiao.
SUN RGB-D: A RGB-D Scene Understanding Benchmark Suite.
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2015.
Oral presentation Project Webpage

Zhirong Wu, **Shuran Song**, Aditya Khosla, Fisher Yu, Linguang Zhang, Xiaoou Tang, Jianxiong Xiao.
3D ShapeNets: A Deep Representation for Volumetric Shapes.
IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2015.
Oral presentation Project Webpage

Shuran Song, Jianxiong Xiao.
Sliding Shapes for 3D Object Detection in Depth Images.
Proceedings of the 13th European Conference on Computer Vision (**ECCV**), 2014.
Oral presentation Project Webpage

Yinda Zhang, **Shuran Song**, Ping Tan, Jianxiong Xiao.
PanoContext: A Whole-room 3D Context Model for Panoramic Scene Understanding.
Proceedings of the 13th European Conference on Computer Vision (**ECCV**), 2014.
Oral presentation Project Webpage

Shuran Song, Jianxiong Xiao.
Tracking Revisited using RGBD Camera: Unified Benchmark and Baselines.
Proceedings of 14th IEEE International Conference on Computer Vision (**ICCV**), 2013. Project Webpage

Manuscripts

Angel X. Chang, Thomas Funkhouser, Leonidas Guibas, Pat Hanrahan, Qixing Huang, Zimo Li, Silvio Savarese, Manolis Savva, **Shuran Song**, Hao Su, Jianxiong Xiao, Li Yi, Fisher Yu
ShapeNet: An Information-Rich 3D Model Repository.
arXiv:1512.03012 [cs.CV] Project Webpage

Fisher Yu, Yinda Zhang, **Shuran Song**, Ari Seff, Jianxiong Xiao.
Construction of a Large-scale Image Dataset using Deep Learning with Humans in the Loop.
arXiv:1506.03365 [cs.CV] Project Webpage

Shuran Song, Linguang Zhang, Jianxiong Xiao.
Robot In a Room: Toward Perfect Object Recognition in Closed Environments.
arXiv:1507.02703 [cs.CV] Project Webpage

Teaching

Columbia COMS 4733: Computational Aspects of Robotics
Columbia COMS 6998: Topics in Robot Learning
Princeton COS429: Computer Vision – Teaching Assistant and Guest Lecturer
Princeton COS126: General Computer Science – Teaching Assistant
HKUST ELEC125: Introduction to Electro-Robot Design – Teaching Assistant
HKUST ELEC121: A System View of Communications: from Signals to Packets – Teaching Assistant

Academic Service

Diversity, Equity, and Inclusion (DEI) Chairs: CVPR 2022
Workshop Chair: Robotics: Science and System (RSS) 2022
Co-director: AI4All in Columbia University, 2022
Program committee: Grace Hopper Celebration of Women
Area Chair: CoRL 2022, CVPR 2020,2021
Program Committee: Siggraph Asia 2020, Siggraph 2021
Mentor: Women in Machine Learning Workshop (WiML) in NeurIPS.
Mentor: Women in Computer Vision Workshop (WiCV) in CVPR.
Conference Reviewer: CoRL, RSS, IROS, ICRA, ECCV, ICCV, CVPR, 3DV, CVIU, IVC, NIPS, PAMI, IJCV, Siggraph, Siggraph Asia, IJRR, Multimedia, Neurocomputing

Funding

Individual share 4.5M+ (total 7M+)
NSF: CAREER: Active Scene Understanding By and For Robot Manipulation (PI, $600,000)
NSF: NRI: Hierarchical Representation Learning for Robot Assistants (PI, $500,000 = 33% total)
NSF: FMRG: Adaptable and Scalable Robot Teleoperation for Human-in-the-Loop Assembly (PI, $2M =50% of total)
NSF: FMNet: NYC Future Manufacturing Collective (co-PI, $15,623 = 3% total)
TRI: Learning Sequential Interactions for Dynamic Cloth Manipulation (PI $750,000)
Sloan Research Fellowship: (PI $75,000)
Microsoft Research Fellowship: (PI $200,000)
JP Morgan Research Award: (PI $75,000)
Amazon Robotics Gift: (PI $120,000)
Amazon Research Award: (PI $80,000)
Google Research Scholar : (PI $60,000)
Google Research Award Gift : (PI $200,000)