

# Junyao Shi

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## EDUCATION

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### Doctor of Philosophy (Ph.D.) in Computer Science

University of Pennsylvania, GRASP Lab  
Advisor: Prof. Dinesh Jayaraman

Aug 2021 – Present  
Philadelphia, PA

### Bachelor of Science (B.S.) in Computer Science

Columbia University, magna cum laude

Sep 2017 – May 2021  
New York, NY

## RESEARCH INTERESTS

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I am interested in empowering robots to operate in complex and diverse real-world environments. My work leverages internet-scale video data, human demonstrations, and foundation models for robot learning. My current research focuses on learning robot manipulation skills from large-scale in-the-wild human videos, as well as utilizing large vision and language models to evaluate and synthesize robot policies.

## PUBLICATIONS

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### ZeroMimic: Distilling Robotic Manipulation Skills from Web Videos

Junyao Shi\*, Zhuolun Zhao\*, Tianyou Wang, Jason Yecheng Ma, Dinesh Jayaraman  
International Conference on Robotics and Automation (ICRA), 2025

[[Website](#)] [[Video](#)]

### Don't Yell at Your Robot: Physical Correction as the Collaborative Interface for Language Model Powered Robots

Chuye Zhang\*, Yifei Simon Shao\*, Harshil Parekh, Junyao Shi, Pratik Chaudhari, Vijay Kumar, Nadia Figueroa  
Robotics: Science and Systems (RSS) GenAI-HRI Workshop, 2024

[[arXiv](#)] [[PDF](#)]

### Composing Pre-Trained Object-Centric Representations for Robotics From “What” and “Where” Foundation Models

Junyao Shi\*, Jianing Qian\*, Jason Yecheng Ma, Dinesh Jayaraman

International Conference on Robotics and Automation (ICRA), 2024

[[arXiv](#)] [[PDF](#)] [[Website](#)] [[Video](#)]

Robotics: Science and Systems (RSS) Workshop on Robot Representations (**Spotlight Presentation**), 2023

Robotics: Science and Systems (RSS) Workshop on Generalizable Manipulation Policy Learning, 2023

International Conference on Intelligent Robots and Systems (IROS) Workshop on Robotic Perception and Mapping, 2023

### Maximizing BCI Human Feedback Using Active Learning

Zizhao Wang\*, Junyao Shi\*, Iretoiyo Akinola\*, Peter Allen

International Conference on Intelligent Robots and Systems (IROS), 2020

[[arXiv](#)] [[PDF](#)]

### Deep Reinforcement Learning for Snake Robot Locomotion

Junyao Shi, Tony Dear, Scott David Kelly

International Federation of Automatic Control World Congress (IFAC), 2020

[[Paper](#)]

### Accelerated Robot Learning via Human Brain Signals

Iretoiyo Akinola\*, Zizhao Wang\*, Junyao Shi, Xiaomin He, Pawan Lapborisuth, Jingxi Xu, David Watkins-Valls, Paul Sajda, Peter Allen

International Conference on Robotics and Automation (ICRA), 2020

[[arXiv](#)] [[PDF](#)] [[Website](#)]

## TALKS, POSTERS, AND PRESENTATIONS

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**Invited Talk** NYC Computer Vision Day

ZeroMimic: Distilling Robotic Manipulation Skills from Web Videos

Feb 2025

**Poster** NYC Computer Vision Day

Composing Pre-Trained Object-Centric Representations for Robotics From “What” and “Where” Foundation Models

Apr 2024

**Invited Talk** Columbia University AI4ALL  
*BCI-Assisted Robot Learning*

Jun 2019

**Invited Talk** SIAM Conference on Applications of Dynamical Systems  
*Deep Reinforcement Learning for Snake Robot Locomotion*

May 2019

## RESEARCH AND INDUSTRY EXPERIENCE

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**Ph.D. Student**, University of Pennsylvania Aug 2021 - Present

Working on leveraging human videos and foundation models for robot manipulation. Projects include:

- Utilizing Vision Language Models (VLMs) for robot policy synthesis (In Progress)
- Leveraging vision foundation models for robot policy evaluation (In Progress)
- Distilling robot manipulation skills from large-scale in-the-wild egocentric human videos ([ICRA 2025](#))
- Employing physical correction as the collaborative interface for robots ([RSS GenAI-HRI Workshop 2024](#))
- Composing pre-trained object-centric visual representations for robotics from vision foundation models ([ICRA 2024](#))

**Research Intern**, Horizon Robotics General AI Lab May 2021 – Aug 2021

Worked on vision-language navigation, advised by Dr. Haonan Yu

- Developed a reinforcement learning algorithm leveraging Vision-Language Model (VLM) to provide feedback for visual-language multi-room navigation
- Constructed diverse navigation tasks and scenarios in iGibson to rigorously evaluate and benchmark navigation performance.

**Undergraduate Research Assistant**, Columbia University Oct 2018 – May 2021

Contributed to a wide range of robotics and machine learning research projects across multiple labs, including:

- Brain-signal guided robot reinforcement learning ([ICRA 2020](#), [IROS 2020](#)), advised by Prof. Peter Allen
- Deep reinforcement learning for snake robot locomotion ([IFAC 2020](#)), advised by Dr. Tony Dear, Prof. Scott David Kelly
- Robot furniture assembly via visual subgoal generation, advised by Prof. Hod Lipson, Prof. Shuran Song
- Hierarchical learning of long-horizon grid world navigation from demonstration, advised by Prof. Shuran Song

## HONORS AND AWARDS

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**Theodore R. Bashkow Research Award**, Columbia University 2021

**Magna Cum Laude**, Columbia University 2021

**SEAS Summer Research Award**, Columbia University 2019

**Dean's List**, Columbia University 2017-2021

## SERVICE

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### Reviewer

International Conference on Learning Representations (ICLR) 2025

Robotics: Science and Systems (RSS) GenAI-HRI Workshop 2024

Transactions on Pattern Analysis and Machine Intelligence (TPAMI) 2024

European Conference on Computer Vision (ECCV) 2024

International Conference on Robotics and Automation (ICRA) 2024

International Conference on Intelligent Robots and Systems (IROS) Workshop on Robotic Perception and Mapping 2023

Robotics: Science and Systems (RSS) Workshop on Generalizable Manipulation Policy Learning 2023

International Conference on Computer Vision (ICCV) 2023

### Teaching Assistant

CIS 7000 Real-World Robot Learning, *University of Pennsylvania* Spring 2025

COMS W4701 Artificial Intelligence, *Columbia University* Fall 2019

## MENTORSHIP

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**Tianyou Wang** M.S. Robotics, University of Pennsylvania

**Joshua Smith** M.S. Robotics, University of Pennsylvania

**Chenxi Dong** M.S. Computer and Information Science, University of Pennsylvania  
**Ian Pedroza** B.S. Computer and Information Science / M.S. Robotics, University of Pennsylvania  
**Amy Luo** M.S. Robotics, University of Pennsylvania  
**Zhuolun Zhao** M.S. Robotics, University of Pennsylvania

Member of Technical Staff, Skild AI

## SKILLS

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**Programming Languages** Python, C++, C, C#, Java

**Tools** PyTorch, Tensorflow, ROS, Unity, Mujoco, RLBench, ManiSkill, Genesis