Stone Tao

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Education

PhD Student in Computer Science and Engineering 2023 –
University of California, San Diego. Advisor: Hao Su
Research Topics/Interests: Reinforcement Learning, Simulation, Embodied AI, Learning from Demonstrations

B.S. Double Major in Computer Science and Cognitive Science, Math Minor 2019 – 2023
University of California, San Diego.

Selected Awards

National Science Foundation Graduate Research Fellowship 2023-2028
UCSD CSE Award for Excellence in Leadership 2023
UCSD CSE Alumni Advisory Board Leadership Excellence Scholarship 2021-2022

Publications / Preprints

ManiSkill-HAB: A Benchmark for Low-Level Manipulation in Home Rearrangement Tasks
International Conference on Learning Representations **(ICLR)** 2025.
Arth Shukla, **Stone Tao**, Hao Su.
arXiv | project page

Policy Decorator: Model-Agnostic Online Refinement for Large Policy Model
International Conference on Learning Representations **(ICLR)** 2025.
Xiu Yuan*, Tongzhou Mu*, **Stone Tao**, Yunhao Fang, Michael Zhang, Hao Su.
arXiv | project page

ManiSkill3: GPU Parallelized Robotics Simulation and Rendering for Generalizable Embodied AI
arXiv 2024.
Stone Tao, Fanbo Xiang, Arth Shukla, Yuzhe Qin, Xander Hinrichsen, Xiaodi Yuan, Chen Bao, Xinsong Lin, Yulin Liu, Tse-kai Chan, Yuan Gao, Xuanlin Li, Tongzhou Mu, Nan Xiao, Arnav Gurha, Zhiao Huang, Roberto Calandra, Rui Chen, Shan Luo, Hao Su.
arXiv | project page

Lux AI Season 3: Multi-Agent Meta Learning at Scale
Neural Information and Processing Systems **(NeurIPS)** 2024 Competitions Track.
Stone Tao, Akarsh Kumar, Bovard Doerschuk-Tiberi, Isabelle Pan, Addison Howard, Hao Su.
competition page

Reverse Forward Curriculum Learning for Extreme Sample and Demonstration Efficiency in RL
International Conference on Learning Representations **(ICLR)** 2024.
Stone Tao, Arth Shukla, Tse-kai Chan, Hao Su.
arXiv | project page

MetaWriter: Exploring the Potential and Perils of AI Writing Support in Scientific Peer Review
26th ACM Conference on Computer-Supported Cooperative Work and Social Computing **(CSCW)** 2024.
Lu Sun, **Stone Tao**, Junjie Hu, Steven Dow.
ACM Digital Library Link

Lux AI Season 2: NeurIPS Edition
Neural Information and Processing Systems **(NeurIPS)** 2023 Competitions Track.
Stone Tao, Qimai Li, Yuhao Jiang, Jiaxin Chen, Xiaolong Zhu, Bovard Doerschuk-Tiberi, Isabelle Pan, Addison Howard.
competition page

Abstract-to-Executable Trajectory Translation for One-Shot Task Generalization
International Conference on Machine Learning **(ICML)** 2023.

Stone Tao, Xiaochen Li, Tongzhou Mu, Zhiao Huang, Yuzhe Qin, Hao Su.
arXiv | project page

ManiSkill2: a Unified Benchmark for Generalizable Manipulation Skills
International Conference on Learning Representations **(ICLR)** 2023
Jiayuan Gu†, Fanbo Xiang†, Xuanlin Li*, Zhan Ling*, Xiqiang Liu*, Tongzhou Mu*, Yihe Tang*, **Stone Tao***, Xinyue Wei*, Yunchao Yao*, Xiaodi Yuan, Pengwei Xie, Zhiao Huang, Rui Chen, Hao Su.
arXiv | project page

Maniskill: Generalizable manipulation skill benchmark with large-scale demonstrations
Neural Information and Processing Systems **(NeurIPS)** 2021 Datasets and Benchmarks Track
Tongzhou Mu*, Zhan Ling*, Fanbo Xiang*, Derek Cathera Yang*, Xuanlin Li*, **Stone Tao**, Zhiao Huang, Zhiwei Jia, Hao Su.
arXiv | project page

Emergent Collective Intelligence From Massive-Agent Cooperation and Competition
Neural Information and Processing Systems **(NeurIPS)** 2022 Deep RL Workshop.
Hanmo Chen*, **Stone Tao***, Jiaxin Chen, Weihan Shen, Xihui Li, Sikai Cheng, Xiaolong Zhu, Xiu Li.
arXiv

Experience

NVIDIA, Incoming Research Intern 2025

Hillbot, Research Scientist Intern, Advisor: Hao Su 2024
- Research on the intersection of simulation, reinforcement learning, imitation learning, and embodied AI
- Business Strategy

UC San Diego: Hao Su Lab, Undergraduate Researcher, Advisor: Hao Su 2020 – 2023
- Research on robotics and embodied AI, particularly tackling long-horizon problems. Leveraging reinforcement learning, few-shot learning, imitation learning, and transformers.
- Research and develop large-scale robotic manipulation benchmarks (ManiSkill2).

UC San Diego: ProtoLab, Undergraduate Researcher, Advisor: Steven Dow 2019 – 2023
- Research at the intersection of AI and HCI, particularly AI-assisted tools and using NLP in systems requiring in-depth synthesis of information such as peer-review systems.
- Developed the Design for San Diego competition's front and backend.

Lux AI Challenge, Co-Founder 2021 –
- Lead the research, development, and design of creative, accessible, and inclusive AI competitions.
- Past competitions have accumulated over 1,600+ teams, 1,000+ github stars, 30,000+ submissions, 10,000,000+ matches run, and had one of the most diverse group of participants ever. Enabled competitors to research novel deep RL and IL methods to a unique large-scale multi-agent problem.
- Currently working on a season 3 competition in collaboration with Kaggle.

QuantCo, ML Engineer Intern, Advisor: T. Ben Thompson 2021
- Researched high-precision and accurate function approximation using neural nets and decision trees. Help automatically migrate slow, complex, hand-built computations in old systems to new systems.
- Developed OCR+NLP tools for analysis of insurance documents.

LaunchDarkly, Software Engineer Intern 2020
- Worked full stack on feature workflows, semantic patches, and conflict handling to enable state independent scheduling of feature flagging, a feature requested by LaunchDarkly's largest business customers.

Selected Open Source Projects

ManiSkill ⋆1100+ 2021 –
GPU parallelized robotics simulation with state-of-the-art state simulation speed and the fastest visual simulation speeds (10-1000x faster compared to other simulators). Designed to be pythonic and abstract away most GPU

memory management code to make building and training on robotics tasks a breeze.
haosulab/ManiSkill

Lux AI Challenge ⋆1300+ 2021 –
Code for the Lux AI Challenge, including the AI environments and visualizers.
Lux-AI-Challenge

Reinforcement Learning Gym and Library in Typescript ⋆20+ 2021
Implements a gym interface and algorithms like PPO and DQN in Typescript for reinforcement learning on browsers and Node.js.
stonet2000/rl-ts

Leadership

Co-Founder of the Lux AI Challenge 2021 –
Initiated the original project concept and invited others to co-found the non-profit organization and competition. Successfully some of the largest multi-agent AI competitions in collaboration with Kaggle. Raised over $130,000 in funds for the competition.

Founding President of ACM AI at UC San Diego 2020 – 2022
Founded the largest organization on AI at UC San Diego, seeking to cultivate a community of AI enthusiasts as well as lower the barriers for learning AI. Grew the organization from zero to 1000+ members in 2 years, working with my board to develop social events, workshops, seminars, and competitions.

Presentations / Talks

Scaling Embodied AI via Simulation and Sim-integrated Robot Learning
Institute for AI Industry Research (AIR), Tsinghua University 2024

ManiSkill3: Scalable Simulation+Rendering for Generalizable Embodied AI
CVPR 2024 Embodied AI Workshop 2024
Echo AI Talk 2024

Lux AI Season 2 and Reinforcement Learning
Kaggle Podcast 2023
Youtube recording

AI Competition Design For Multi-Agent Environments / Games
Kaggle Podcast 2022
Learning in Foundation Environments (LIFE) 2022
Slides

Current/Past Student Mentees

Xander Hinrichsen (BS UC San Diego ⟶ MS UC San Diego) 2024 – now
Sid Bharthulwar (BS Harvard) 2024 – now
Rebecca Chen (BS UC San Diego) 2024 – now
Nan Xiao (MS UC San Diego) 2024 – now
Arnav Gurha (BS UC San Diego) 2024 – now
Arth Shukla (BS UC San Diego) 2023 – now
Kevin Chan (BS UC San Diego) 2022 – 2024
Doris Zhang (BS UC San Diego) 2022 – 2024

Teaching

UC San Diego: CSE 276F Machine Learning for Robotics (Co-Instructor) 2024 Spring
Taught 4 lectures covering off policy RL, exploration in RL, learning from demonstrations, and model based RL. Wrote homework material covering robotics, robotics simulation, reinforcement learning, and robot learning. Held office hours.

UC San Diego: CSE 291 Machine Learning for Robotics 2023 Winter
Wrote various course materials and Google Colab notebooks covering robotics, robotics environments, reinforcement learning, and imitation learning.

UC San Diego: CSE 12 Basic Data Structures and Object-Oriented Design 2020 Spring
Held office hours and wrote unit tests for grading homework automatically in Java.

Service

Challenge Organization
Robotics: ManiSkill Challenge 2021 (ICLR 2022 Generalizable Policy Learning in the Physical World Workshop), ManiSkill2 Challenge (CVPR 2023 Embodied AI Workshop)
Multiagent Games/RL: Lux AI Season 1, Lux AI Season 2 (NeurIPS 2023 Competitions), Lux AI Season 3 (NeurIPS 2024 Competitions)

Peer Review
AI/ML: ICLR, ICML, NeurIPS, CoLLas
Robotics: IROS, ICRA
Computer Vision/Graphics: SIGGRAPH

Other Awards

UCSD Undergraduate Provost Honors List 2019-2023
MIT Battlecode (AI Competition) Finalist 2019-2021
Made finals 3 times in a row (2019-2021), placing 1st out of all soloists and 5th overall in 2020, competing against over 600 teams of high school to graduate students. Won the Five Rings adaptive strategy award for spearheading an influential strategy in 2021.

Skills

Programming Languages: Python, Typescript/Javascript, C/C++, Go, Java, SQL

AI: Reinforcement Learning, 2D/3D Computer Vision, Deep Learning, Tree Learners, Embodied AI

Frameworks: Jax, Pytorch, Tensorflow, Pandas, scikit-learn, Node.js, React, MongoDB, Express.js

Tools: Docker, Google Cloud, Jupyter Notebook/Lab, Git, Adobe Photoshop, Figma

Interests

Languages: English, Chinese

Sports: Fencing (Saber), Fencing Coaching

Music: Violin, Viola