

Tairan He

✉ tairanhe1999@gmail.com | 🏠 tairanhe.com | 📺 TairanHe | 🎓 Tairan He

Employment

OpenAI

MEMBER OF TECHNICAL STAFF

San Francisco, USA

May 2026 - Present

Education

Carnegie Mellon University

PH.D. IN ROBOTICS

Pittsburgh, USA

Aug. 2023 - Apr. 2026

Shanghai Jiao Tong University

B.ENG. IN COMPUTER SCIENCE

Shanghai, China

Aug. 2018 - Jun. 2023

Research Interests

Core Research Interests: My research primarily lies in the intersection of **robotics**, **large-scale machine learning**, and **general-purpose loco-manipulation**. I am passionate robotic hardware systems, with a focus on **humanoid robots**.

Core research question: How can we build **scalable robot learning** systems that unify **perception**, whole-body **control**, and dexterous **manipulation**, enabling reliable general-purpose robots in **unstructured, real-world environments**?

Honors and Awards (Selected)

- 2024 **NVIDIA Graduate Fellowship**, [\[Link\]](#).
- 2024 **RI Presidential Fellowship**, CMU RI Departmental PhD Fellowships.
- 2024 **Outstanding Student Paper Award Finalist**, Robotics: Science and Systems. [\[Link\]](#)
- 2021 **Microsoft Star of Tomorrow**, top-performing interns at Microsoft.
- 2020 **Shanghai Jiao Tong University Excellent Scholarship**, top 10% students in SJTU.
- 2019 **Zhiyuan Honorary Scholarship**, top 5% students in SJTU.

Publications (*equal contribution)

PREPRINTS

[P3] SONIC: Supersizing Motion Tracking for Natural Humanoid Whole-Body Control.

Zhengyi Luo*, Ye Yuan*, Tingwu Wang*, Chenran Li*, Sirui Chen, Fernando Castañeda, Zi-Ang Cao, Jiefeng Li, David Minor, Qingwei Ben, Xingye Da, Runyu Ding, Cyrus Hogg, Lina Song, Edy Lim, Eugene Jeong, [Tairan He](#), Haoru Xue, Wenli Xiao, Zi Wang, Simon Yuen, Jan Kautz, Yan Chang, Umar Iqbal, Linxi “Jim” Fan, Yuke Zhu
Under review, 2025 [\[Paper\]](#)

[P2] HDMI: Learning Interactive Humanoid Whole-Body Control from Human Videos.

Haoyang Weng, Yitang Li, Nikhil Sobanbabu, Zihan Wang, Zhengyi Luo, [Tairan He](#), Deva Ramanan, Guanya Shi
Under review, 2025 [\[Paper\]](#)

[P1] Emergent Active Perception and Dexterity of Simulated Humanoids from Visual Reinforcement Learning.

Zhengyi Luo*, Chen Tessler*, Toru Lin, Ye Yuan, [Tairan He](#), Wenli Xiao, Yunrong Guo, Gal Chechik, Kris Kitani, Linxi Fan, Yuke Zhu
Under review, 2025 [\[Paper\]](#)

CONFERENCE PROCEEDINGS

[C24] Opening the Sim-to-Real Door for Humanoid Pixel-to-Action Policy Transfer.

Haoru Xue*, [Tairan He](#)*, Zi Wang*, Qingwei Ben, Wenli Xiao, Zhengyi Luo, Xingye Da, Fernando Castañeda, Guanya Shi, Shankar Sastry, Linxi “Jim” Fan, Yuke Zhu
CVPR, 2026. [\[Paper\]](#)

[C23] VIRAL: Visual Sim-to-Real at Scale for Humanoid Loco-Manipulation.

[Tairan He](#)*, Zi Wang*, Haoru Xue*, Qingwei Ben*, Zhengyi Luo, Wenli Xiao, Ye Yuan, Xingye Da, Fernando Castañeda, Shankar Sastry, Changliu Liu, Guanya Shi, Linxi “Jim” Fan, Yuke Zhu
CVPR, 2026. [\[Paper\]](#)

[C22] Self-Improving Vision-Language-Action Models with Data Generation via Residual RL.

Wenli Xiao*, Haotian Lin*, Andy Peng, Haoru Xue, [Tairan He](#), Yuqi Xie, Fengyuan Hu, Jimmy Wu, Zhengyi Luo, Linxi “Jim” Fan, Guanya Shi, Yuke Zhu

ICLR, 2026. [Paper]

[C21] FALCON: Learning Force-Adaptive Humanoid Loco-Manipulation.

Yuanhang Zhang, Yifu Yuan, Prajwal Gurunath, [Tairan He](#), Shayegan Omidshafiei, Ali-akbar Agha-mohammadi, Marcell Vazquez-Chanlatte, Liam Pedersen, Guanya Shi
L4DC, 2026. [Paper]

[C20] Humanoid Policy ~ Human Policy.

Ri-Zhao Qiu*, Shiqi Yang*, Xuxin Cheng*, Chaitanya Chawla, Jialong Li, [Tairan He](#), Ge Yan, David J. Yoon, Ryan Hoque, Lars Paulsen, Ge Yang, Jian Zhang, Sha Yi, Guanya Shi, Xiaolong Wang
CoRL, 2025 [Paper]

[C19] Sampling-Based System Identification with Active Exploration for Legged Robot Sim2Real Learning.

Nikhil Sobanbabu, Guanqi He, [Tairan He](#), Yuxiang Yang, Guanya Shi
CoRL, 2025 [Paper]

[C18] Hold My Beer: Learning Gentle Humanoid Locomotion and End-Effector Stabilization Control.

Yitang Li, Yuanhang Zhang, Wenli Xiao, Chaoyi Pan, Haoyang Weng, Guanqi He, [Tairan He](#), Guanya Shi
CoRL, 2025 [Paper]

[C17] ASAP: Aligning Simulation and Real-World Physics for Learning Agile Humanoid Whole-Body Skills.

[Tairan He](#)*, Jiawei Gao*, Wenli Xiao*, Yuanhang Zhang*, Zi Wang, Jiashun Wang, Zhengyi Luo, Guanqi He, Nikhil Sobanbab, Chaoyi Pan, Zeji Yi, Guannan Qu, Kris Kitani, Jessica Hodgins, Linxi "Jim" Fan, Yuke Zhu, Changliu Liu, Guanya Shi
RSS, 2025 [Paper]

[C16] HOVER: Versatile Neural Whole-Body Controller for Humanoid Robots.

[Tairan He](#)*, Wenli Xiao*, Toru Lin, Zhengyi Luo, Zhenjia Xu, Zhenyu Jiang, Jan Kautz, Changliu Liu, Guanya Shi, Xiaolong Wang, Linxi "Jim" Fan[†], Yuke Zhu[†]
ICRA, 2025 [Paper]

[C15] Bridging Adaptivity and Safety: Learning Agile Collision-Free Locomotion Across Varied Physics.

Yichao Zhong, Chong Zhang, [Tairan He](#), Guanya Shi
L4DC, 2025 [Paper]

[C14] OmniH2O: Universal and Dexterous Human-to-Humanoid Whole-Body Teleoperation and Learning.

[Tairan He](#)*, Zhengyi Luo*, Xialin He*, Wenli Xiao, Chong Zhang, Kris Kitani, Weinan Zhang, Changliu Liu, Guanya Shi.
CoRL, 2024 [Paper]

[C13] WoCoCo: Learning Whole-Body Humanoid Control with Sequential Contacts.

Chong Zhang*, Wenli Xiao*, [Tairan He](#), Guanya Shi.
CoRL (Oral), 2024 [Paper]

[C12] Learning Human-to-Humanoid Real-Time Whole-Body Teleoperation.

[Tairan He](#)*, Zhengyi Luo*, Wenli Xiao, Chong Zhang, Kris Kitani, Changliu Liu, Guanya Shi
IROS, 2024 (Oral) [Paper]

[C11] Progressive Adaptive Chance-Constrained Safeguards for Reinforcement Learning.

Zhaorun Chen, Binhao Chen, [Tairan He](#), Liang Gong, Chengliang Liu.
IROS, 2024 [Paper]

[C10] Agile But Safe: Learning Collision-Free High-Speed Legged Locomotion.

[Tairan He](#)*, Chong Zhang*, Wenli Xiao, Guanqi He, Changliu Liu, Guanya Shi.
RSS, 2024 (Outstanding Student Paper Award Finalist - Top 3) [Paper]

[C9] Safe Deep Policy Adaptation.

Wenli Xiao*, [Tairan He](#)*, John Dolan, Guanya Shi.
ICRA, 2024 [Paper]

[C8] State-wise Safe Reinforcement Learning: A Survey.

Weiye Zhao, [Tairan He](#), Rui Chen, Tianhao Wei, Changliu Liu.
IJCAI (Survey Track), 2023. [Paper]

[C7] Probabilistic Safeguard for Reinforcement Learning Using Safety Index Guided Gaussian Process Models.

Weiye Zhao*, [Tairan He](#)*, Changliu Liu.
L4DC, 2023. [Paper]

[C6] Visual Imitation Learning with Patch Rewards.

Minghuan Liu, [Tairan He](#), Weinan Zhang, Shuicheng Yan, Zhongwen Xu.
ICLR, 2023. [Paper]

[C5] Safety Index Synthesis via Sum-of-Squares Programming.

Weiye Zhao*, [Tairan He](#), Tianhao Wei, Simin Liu, Changliu Liu.
ACC, 2023. [Paper]

[C4] AutoCost: Evolving Intrinsic Cost for Zero-violation Reinforcement Learning.

[Tairan He](#), Weiye Zhao, Changliu Liu.
AAAI, 2023. [Paper]

[C3] Reinforcement Learning with Automated Auxiliary Loss Search.

[Tairan He](#), Yuge Zhang, Kan Ren, Minghuan Liu, Che Wang, Weinan Zhang, Yuqing Yang, Dongsheng Li.
NeurIPS, 2022. [Paper]

[C2] Model-free Safe Control for Zero-Violation Reinforcement Learning.

Weiye Zhao, Tairan He, Changliu Liu.

CoRL, 2021. [Paper]

[C1] Energy-Based Imitation Learning.

Minghuan Liu, Tairan He, Minkai Xu, Weinan Zhang.

AAMAS, 2021 (Oral) [Paper]

Research Experience

NVIDIA

Santa Clara, USA

RESEARCH INTERN AT [GEAR LAB](#), ADVISED BY [JIM FAN](#) AND [YUKE ZHU](#)

Jun. 2024 - Apr. 2026

- **Research Topics:** humanoid whole-body control, dexterous bimanual manipulation.

Carnegie Mellon University

Pittsburgh, USA

PHD STUDENT, ADVISED BY [PROF. GUANYA SHI](#) AND [PROF. CHANGLIU LIU](#)

Aug. 2023 - Apr. 2026

- **Research Topics:** reinforcement learning, humanoid teleoperation, agile legged robots.

Carnegie Mellon University

Pittsburgh, USA

VISITING INTERN, AT [INTELLIGENT CONTROL LAB](#), ADVISED BY [PROF. CHANGLIU LIU](#)

Feb. 2022 - Jan. 2023

- **Research Topics:** safe reinforcement learning, safe control, control theory.

Microsoft Research

Shanghai, China

RESEARCH INTERN, ADVISED BY [KAN REN](#) AND [YUGE ZHANG](#)

Mar. 2021 - Dec. 2021

- **Research Topics:** auto ML, reinforcement learning.

Shanghai Jiao Tong University

Shanghai, China

RESEARCH ASSISTANT AT [APEX LAB](#), ADVISED BY [PROF. WEINAN ZHANG](#)

Jul. 2019 - Jan. 2023

- **Research Topics:** reinforcement learning, imitation learning.

Academic Services

Reviewer ICML, ICLR, NeurIPS, RSS, ICRA, IROS, CoRL, Humanoids, CDC, L4DC, AAAI, TRO, TFR, IJRR, RAL, ICCV, CVPR
2021-Present

Teaching Assistant CMU 16-831 Introduction to Robot Learning [Link] 2024

Teaching Assistant CMU 16-264 Humanoids [Link] 2024

Skills

Programming Python, C++, \LaTeX , JAVA, Node.js, SQL, Linux, MATLAB, PHP

Frameworks PyTorch, Tensorflow, NumPy, Flask, MySQL, Git, Anaconda, OpenCV, ROS1, ROS2.

Robots Kinova, Rosbot, Unitree Go1, Unitree Go2, Unitree H1, Unitree G1, Fourier GR-1

Project Portfolio (Selected)

SJTU Anonymous Forum

Shanghai, China

FOUNDER & DEVELOPER. [ANDROID CODE] / [IOS CODE] / [FAREWELL VIDEO]

Feb. 2020 - Apr. 2021

- Developed a care-free forum platform for SJTU students to share and talk using anonymous identities.
- More than **10000+** users used this app in the SJTU campus.

Invited Talks

[T3] Scalable Sim-to-Real Learning for General-Purpose Humanoid Skills.

UPenn GRASP Lab, 2025 [Link]

[T2] Learning Humanoid Generalist Agility by Unifying Cognitive and Physical Intelligence.

UCL MLLM Seminar, OpenDriveLab, Tsinghua IIIS, SJTU Navigation Seminar, Guest Lecture at USC CS699, 2024

[T1] Bridging Safety, Agility and Generalization for Learning-Based Robotic Control.

TechBeat, 2024 [Link]

Press Coverage (Selected)

[M15] "NVIDIA Research Showcases the Future of Robotics at RSS"

by Diego Farinha, NVIDIA Blogs, 2025 [Link]

[M14] "Robots With Moves Like Ronaldo, LeBron and Kobe"

by Mallory Lindahl, CMU Robotics News, 2025 [Link]

- [M13] “NVIDIA Introduces HOVER, a 1.5 M Parameter Neural Network for Humanoid Robotics”**
by Siddharth Jindal, *Analytics India Magazine*, 2025 [\[Link\]](#)
- [M12] “NVIDIA AI Releases HOVER: A Breakthrough AI for Versatile Humanoid Control in Robotics”**
by Jean-marc Mommessin, *MARKTECHPOST*, 2024 [\[Link\]](#)
- [M11] “NVIDIA Advances Robot Learning and Humanoid Development With New AI and Simulation Tools”**
by Spencer Huang, *NVIDIA Blog*, 2024 [\[Link\]](#)
- [M10] “Interview with OmniH2O Project Initiator Tairan He: Exploring a Feasible Path from Humanoid Robot Teleoperation to Embodied Intelligence”**
by Shuwei Rao, *AI Tech Comments*, 2024 [\[Link\]](#)
- [M9] “Human-to-humanoid robot designed by young uni student can chop vegetables, clean and create art”**
by Almara Abgarian, *NEED TO KNOW*, 2024 [\[Link\]](#)
- [M8] “System Enables Human-to-Humanoid Robot Operation”**
by Scarlett Evans, *IoT World Today*, 2024 [\[Link\]](#)
- [M7] “Swift and Secure: CMU Researchers Develop Collision-Free, High-Speed Robots”**
by Mallory Lindahl, *CMU Robotics News*, 2024 [\[Link\]](#)
- [M6] “Human to Humanoid: Your Weekly Selection of Awesome Robot Videos”**
by Evan Ackerman, *IEEE Spectrum*, 2024 [\[Link\]](#)
- [M5] “System Enables Human-to-Humanoid Robot Operation”**
by Scarlett Evans, *IoT World Today*, 2024 [\[Link\]](#)
- [M4] “Human-to-humanoid Robot Full-body Teleoperation Unlocked in Real-time”**
by Jijo Malayil, *Interesting Engineering*, 2024 [\[Link\]](#)
- [M3] “A scalable reinforcement learning-based framework to facilitate the teleoperation of humanoid robots”**
by Ingrid Fadelli, *Tech Xplore*, 2024 [\[Link\]](#)
- [M2] “CMU’s Agile Robot Dog is Half the Size of Spot, Can Avoid Obstacles at High-Speed”**
by Jackson Chung, *TechEBlog*, 2024 [\[Link\]](#)
- [M1] “Video Friday: Agile but Safe: Your Weekly Selection of Awesome Robot Videos”**
by Evan Ackerman, *IEEE Spectrum*, 2024 [\[Link\]](#)