Zhengyi (Zen) Luo

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Research Interests

Fields: Computer Vision, Robotics, Machine Learning
Topics: Embodied AI, Humanoid Control, Human Pose Estimation, Physics Simulation

Education

Carnegie Mellon University — *Advisor: Prof. **Kris Kitani***
Ph.D. in Robotics, Robotics Institute, School of Computer Science — *Aug 2021-May 2025*

Carnegie Mellon University — *Advisor: Prof. **Kris Kitani***
M.S. in Robotics (MSR), Robotics Institute, School of Computer Science, GPA: 4.24/4.33 — *Aug 2019-Aug 2021*

University of Pennsylvania — *Advisor: Prof. **Kostas Daniilidis***
B.S.E. in Computer Science, School of Engineering and Applied Science, GPA: 3.94/4.00 — *Aug 2015-May 2019*

Employment

NVIDIA Generalist Embodied Agent Research — *May 2025-Present*
Senior Research Scientist — *PI: Dr. **Jim Fan** and Prof. **Yuke Zhu***

NVIDIA Generalist Embodied Agent Research — *Sept 2024-May 2025*
Research Scientist Intern — *PI: Dr. **Jim Fan** and Prof. **Yuke Zhu***

Meta Platforms, Inc., Reality Labs — *Sept 2022-Aug 2024*
Visiting Researcher — *PI: Dr. **Weipeng Xu***

NVIDIA Toronto Artificial Intelligence Lab — *May 2022-Aug 2022*
Research Scientist Intern — *PI: Prof. **Sanja Fidler***

Apple Inc., Technology Development Group (AR/VR) — *May 2019-Aug 2019*
3D Software Engineer Intern — *PI: **Novaira Masood***

Apple Inc., Technology Development Group (AR/VR) — *May 2018-Aug 2018*
3D Software Engineer Intern — *PI: **Novaira Masood***

Awards

Ph.D. Thesis: *Learning Universal Humanoid Control* (CMU-RI-TR-25-35) — *May 2025*
Meta AI Mentorship Program — *Sept 2023*
Qualcomm Innovation Fellowship — *Sept 2022*
PennApps XVII (the world's largest college hackathon), 1/160, Grand Prize — *Jan 2018*

Publications and Manuscripts

∗ indicates equal contribution

[1] SONIC: Supersizing Motion Tracking for Natural Humanoid Whole-Body Control
Zhengyi Luo†, Ye Yuan†, Tingwu Wang†, Chenran Li†, Fernando Castañeda†, Sirui Chen∗, Zi-Ang Cao∗, Jiefeng Li∗, David Minor∗, Qingwei Ben∗, Jinhyung Park∗, David Sami∗, Zi Wang∗, Xingye Da∗, Runyu Ding, Cyrus Hogg, Lina Song, Edy Lim, Eugene Jeong, Tairan He, Haoru Xue, Wenli Xiao, Simon Yuen, Jan Kautz, Yan Chang, Umar Iqbal, Linxi "Jim" Fan, Yuke Zhu
Science Robotics, vol. 11, no. 117, eaed4592, 2026

[2] 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
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2026

[3] 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**, Ye Yuan, Xingye Da, Fernando

Castañeda, Guanya Shi, Shankar Sastry, Linxi "Jim" Fan, Yuke Zhu
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2026

[4] BFM-Zero: A Promptable Behavioral Foundation Model for Humanoid Control Using Unsupervised Reinforcement Learning
Yitang Li*, **Zhengyi Luo***, Tonghe Zhang, Cunxi Dai, Anssi Kanervisto, Andrea Tirinzoni, Haoyang Weng, Kris Kitani, Mateusz Guzek, Ahmed Touati, Alessandro Lazaric, Matteo Pirotta, Guanya Shi
International Conference on Learning Representations (ICLR), 2026

[5] PLD: 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
International Conference on Learning Representations (ICLR), 2026

[6] PDC: 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 "Jim" Fan, Yuke Zhu
1st Workshop on Humanoid Agents, CVPR 2025, ***(Best Paper Award)***

[7] 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 Fan, Yuke Zhu
IEEE International Conference on Robotics and Automation (ICRA), 2025

[8] CLoSD Closing the Loop between Simulation and Diffusion for multi-task character control
Guy Tevet, Sigal Raab, Setareh Cohan, Daniele Reda, **Zhengyi Luo**, Xue Bin Peng, Amit H. Bermano, Michiel van de Panne
In Submission

[9] SMPLOlympics: Sports Environments for Physically Simulated Humanoids
Zhengyi Luo*, Jiashun Wang*, Kangni Liu*, Haotian Zhang, Chen Tessler, Jingbo Wang, Ye Yuan, Jinkun Cao, Zihui Lin, Fengyi Wang, Jessica Hodgins, Kris Kitani
1st Workshop on Humanoid Agents, CVPR 2025

[10] Omnigrasp: Grasping Diverse Objects with Simulated Humanoids
Zhengyi Luo*, Jinkun Cao*, Sammy Christen, Alexander Winkler, Kris Kitani, Weipeng Xu
Annual Conference on Neural Information Processing Systems (NeurIPS), 2024

[11] OmniH2O: Universal and Dexterous Human-to-Humanoid Whole-Body Teleoperation and Learning
Tairan He*, **Zhengyi Luo***, Xialin He*, Wenli Xiao, Chong Zhang, Weinan Zhang, Kris Kitani, Changliu Liu Guanya Shi
Conference on Robot Learning (CORL), 2024

[12] Learning Human-to-Humanoid Real-Time Whole-Body Teleoperation
Tairan He*, **Zhengyi Luo***, Wenli Xiao, Chong Zhang, Kris Kitani, Changliu Liu Guanya Shi
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2024, ***(Oral Presentation)***

[13] Real-Time Simulated Avatar from Head-Mounted Sensors
Zhengyi Luo, Jinkun Cao, Rawal Khirodkar, Alexander Winkler, Jing Huang, Kris Kitani, Weipeng Xu
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2024

[14] PACER+: On-Demand Pedestrian Animation Controller in Driving Scenarios
Jingbo Wang*, **Zhengyi Luo***, Ye Yuan, Yixuan Li, Bo Dai
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2024

[15] Ego-Exo4D: Understanding Skilled Human Activity from First- and Third-Person Perspectives
K Grauman et al.
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2024

[16] Universal Humanoid Motion Representations for Physics-Based Control
Zhengyi Luo, Jinkun Cao, Josh Merel, Alexander Winkler, Jing Huang, Kris Kitani, Weipeng Xu
International Conference on Learning Representations ((ICLR)), 2023, ***(spotlight)***

[17] Perpetual Humanoid Control for Real-time Simulated Avatars
Zhengyi Luo, Jinkun Cao, Alexander Winkler, Kris Kitani, Weipeng Xu

International Conference on Computer Vision (ICCV), 2023

[18] Learning Human Dynamics in Autonomous Driving Scenarios
Jingbo Wang, Ye Yuan, **Zhengyi Luo**, Kevin Xie, Dahua Lin, Umar Iqbal, Sanja Fidler, Sameh Khamis
International Conference on Computer Vision (ICCV), 2023

[19] Trace and Pace: Controllable Pedestrian Animation via Guided Trajectory Diffusion
Davis Rempe*, **Zhengyi Luo***, Xue Bin Peng, Ye Yuan, Kris Kitani, Karsten Kreis, Sanja Fidler, Or Litany
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2023

[20] Embodied Scene-aware Human Pose Estimation
Zhengyi Luo*, Shun Iwase*, Ye Yuan, Kris Kitani
Annual Conference on Neural Information Processing Systems (NeurIPS), 2022

[21] Transform2Act: Learning a Transform-and-Control Policy for Efficient Agent Design
Ye Yuan, Yuda Song, **Zhengyi Luo**, Wen Sun, Kris Kitani
International Conference on Learning Representations (ICLR), 2022, ***(Oral Presentation)***

[22] Dynamics-Regulated Kinematic Policy for Egocentric Pose Estimation
Zhengyi Luo, Ryo hachiuma, Ye Yuan, Kris M. Kitani
Annual Conference on Neural Information Processing Systems (NeurIPS), 2021

[23] 3D Human Motion Estimation via Motion Compression and Refinement
Zhengyi Luo, S. Alireza Golestaneh, Kris M. Kitani
Asian Conference on Computer Vision (ACCV), 2020, ***(Oral Presentation)***

[24] Learning Shape Representations for Clothing Variations in Person Re-Identification
Yu-Jhe Li, **Zhengyi Luo**, Xinshuo Weng, Kris M. Kitani
arXiv:2003.07340, 2020

[25] Cross-Domain 3D Equivariant Image Embeddings
Carlos Esteves, Avneesh Sud, **Zhengyi Luo**, Kostas Daniilidis, Ameesh Makadia
International Conference on Machine Learning (ICML), 2019

[26] Cloud Chaser: Real Time Deep Learning Computer Vision on Low Computing Power Devices
Zhengyi Luo, Austin Small, Liam Dugan, Stephen Lane
The Eleventh International Conference on Machine Vision (ICMV), 2018

[27] The rural–urban stress divide: Obtaining geographical insights through Twitter
Kokil Jaidka, Sharath Chandra Guntuku, Jane H Lee, **Zhengyi Luo**, Anneke Buffone, Lyle H Ungar
Computers in Human Behavior, 2020: 106544

Professional Services

Conference Reviewer: ICML, ICLR, NeurIPS, CVPR, ICCV, ECCV, Siggraph, Siggraph Asia
Journal Reviewer: IJCV, TMM

Teaching Experience

Teaching Assistant

Computer Vision (16-720A), CMU	Instructors: Deva Ramanan	*Spring 2022*
Computer Vision (16-720B), CMU	Instructors: Kris Kitani	*Fall 2021*
Computer Vision (16-720B), CMU	Instructors: Kris Kitani & Srinivasa Narasimhan	*Fall 2020*
Deep Learning (CIS-700), UPenn	Instructor: Konrad Kording	*Spring 2019*
Data Structures and Algorithms (CIS-121), UPenn	Instructor: Rajiv Gandhi	*Fall 2016 & Spring 2017*

Skills & Interests

Programming Languages: Python, C++, C, Swift, Java, C#, Javascript, SQL, OCaml, MATLAB
Platforms & Tools: PyTorch, TensorFlow, Mujoco, Bullet, Spacy, Unity3D, Hololens, xcode, Raspberry Pi, Android Studio, Git
Interests: Sci-Fi, Biographies, Cooking , Cycling, Tech Gadgets
Organizations: Eta Kappa Nu (IEEE-HKN), UPenn Lambda Chapter; Tau Beta Pi, UPenn Delta Chapter