Zhu Wang

Post-Doctoral Associate @ NYU · XR, HCI, AI, Robotics

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Summary

I am a post-doctoral researcher working with *Prof. Ken Perlin* at Future Reality Lab, New York University. I received my PhD in Computer Science from NYU. My research interests span several areas including Extended Reality (XR), Computer Graphics (CG), Human-Computer Interaction (HCI), Robotics, and Artificial Intelligence (AI). More specifically, I have been working on: 1. Virtual Reality(VR)-based Human balance assessment and rehabilitation with motion analysis, eye-tracking, and force-sensing technologies; 2. XR-based multi-participant collaboration and communication; 3. Interactions with mobile robots and drones; 4. Data-driven content generation and retrieval. My work has led to publications at top-tier conferences and journals, including SIGGRAPH, VRST, TEI, DIS, PLOS One, Journal of Biomechanics, with one of my publications receiving a Best Paper Award at ACM VRST 2024.

Education

New York University — New York, NY
Ph.D. in Computer Science, Advisor: *Prof. Ken Perlin* — Sep 2015 – May 2021
Dissertation: Virtual Reality for Human Balance Assessment
Committee Members: *Prof. Yi-Jen Chiang*, *Prof. Anat Lubetzky*, *Prof. Davi Geiger*, *Prof. David K.A. Mordecai*

New York University — New York, NY
M.Sc. in Computer Science — Jan 2011 – Dec 2012

Huazhong University of Science and Technology — Wuhan, China
B.Eng. in Computer Science and Technology — Sep 2006 – Jun 2010

Experience

New York University — New York, NY
Postdoctoral Associate, Future Reality Lab — Aug 2021 - Oct 2024

- VR-based healthcare system for human balance assessment and rehabilitation.
- Collaborated with Unity Technologies research team on zero-shot multi-modal 3D asset retrieval.
- Mentor undergraduate and graduate students, and work with them on projects including VR-based terrain generation and interaction with mobile robots and drones.

TURN UP Multimedia Festival — New York, NY & Tucson, AZ
Motion Capture Expert — Dec 2022 - Mar 2023

- Worked with production and dance teams to integrate the dancers' real-time movements from the motion capture system into visual and interactive experiences for audiences in both New York City and Tucson to share the same musical festival.

Microsoft Research — Redmond, WA
Research Intern, Ability Team — May 2020 - Aug 2020

- Designed and implemented XR Evaluation Toolkit, an extensible and flexible framework for XR interaction study reproduction.

Numerati Partners — New York, NY
Affiliated Subject Matter Expert — Apr 2020 - Oct 2020

- Technical peer review and evaluation for an RGB-D scanning solution.

New York University New York, NY
Research Assistant, Future Reality Lab Sep 2015 - May 2021

- Designed VR-based assessment systems to quantify human balance and estimate the risk of falling based on motion capture and machine learning.
- Designed VR-based rehab systems for balance interventions.
- Jointly designed XR and mixed-reality systems for collaborative teaching and learning.
- Conducted validation studies for VR systems and investigated sensory integration for human balance.

New York University New York, NY
Junior Research Scientist, Media Research Lab Mar 2013 - Feb 2014

- Designed and Developed a mixed reality system which is a VR-based tangible system combined with Oculus Rift, Optitrack and a turntable to mimic a game scene for sculpting and object manipulation in 3D space.

Honors & Awards

Best Paper Award,	the 30th ACM Symposium on Virtual Reality Software and Technology	2024
Innovators in Aging Award,	the 2nd Annual Innovators in Aging Competition, NYU	2019
Outstanding Undergraduate,	Huazhong University of Science and Technology, China	2010
Third Prize,	National College Student Information Security Contest, Ministry of Education, China	2009

Publications

* Equal Advising † Equal contribution

Conference

[C.7] Yuhan Wang, Keru Wang, **Zhu Wang** *, Ken Perlin *. *Robotecture: A Scalable Shape-changing Interface Using Actuated Support Beams*. ACM TEI 2025 **(will be publicly available in Dec 2024)**

[C.6] Yushen Hu, Keru Wang, Yuli Shao, Jan Plass, **Zhu Wang** *, Ken Perlin *. *Generative Terrain Authoring with Mid-air Hand Sketching in Virtual Reality*. Proceedings of the 30th ACM Symposium on Virtual Reality Software and Technology (VRST), 2024 Best Paper Award

[C.5] Keru Wang, **Zhu Wang**, Ken Nakagaki, Ken Perlin. *"Push-That-There":Tabletop Multi-robot Object Manipulation via Multimodal 'Object-level Instruction'*.Proceedings of the 2024 ACM Designing Interactive Systems Conference(DIS), 2024

[C.4] Kristofer Schlachter †, Benjamin Ahlbrand †, **Zhu Wang**, Ken Perlin, Valerio Ortenzi. *Zero-shot multi-modal artist-controlled retrieval and exploration of 3d object sets*. ACM Siggraph Asia Technical Communications, 2022

[C.3] **Zhu Wang**, Liraz Arie, Anat Lubetzky, Ken Perlin. *VRGaitAnalytics: Visualizing Dual Task Cost for VR Gait Assessment*. Proceedings of the 27th ACM Symposium on Virtual Reality Software and Technology, 2021

[C.2] Moshe MH Aharoni, Anat V Lubetzky, **Zhu Wang**, Maya Goldman, Tal Krasovsky. *A Virtual Reality Four-Square Step Test for Quantifying Dynamic Balance Performance in People with Persistent Postural Perceptual Dizziness*. Proceedings of 2019 International Conference on Virtual Rehabilitation (ICVR), 2019

[C.1] Anat V Lubetzky, Jennifer Kelly, **Zhu Wang**, Makan TaghaviDilamani, Marta Gospodarek, Gene Fu, Erin Kuchlewski, Bryan Hujsak. *Head mounted display application for contextual sensory integration training: design, implementation, challenges and patient outcomes*. Proceedings of 2019 International Conference on Virtual Rehabilitation (ICVR), 2019

Journal

[J.4] Anat V Lubetzky, Daphna Harel, Santosh Krishnamoorthy, Gene Fu, Brittani Morris, Andrew Medlin, **Zhu Wang**, Ken Perlin, Agnieszka Roginska, Maura Cosetti, Jennifer Kelly. *Decrease in Head Sway as a Measure of Sensory Integration Following Vestibular Rehabilitation: A Randomized Controlled Trial*. Journal of Vestibular Research, vol.33, no.3, pp.213-226, 2023

[J.3] Anat V Lubetzky, Jennifer L Kelly, Daphna Harel, Agnieszka Roginska, Bryan D Hujsak, **Zhu Wang**, Ken Perlin, Maura Cosetti. *Insight into postural control in unilateral sensorineural hearing loss and vestibular hypofunction*. PLoS ONE, 2022

[J.2] Anat V. Lubetzky, Jennifer Kelly, **Zhu Wang**, Marta Gospodarek, Gene Fu, John Sutera, Bryan D. Hujsak.

Contextual sensory integration training via head mounted display for individuals with vestibular disorders: a feasibility study. Disability and Rehabilitation: Assistive Technology, 17(1), p74–84, 2022

[J.1] Anat V. Lubetzky, **Zhu Wang**, Tal Krasovsky. *Head mounted displays for capturing head kinematics in postural tasks*. Journal of Biomechanics, Volume 86, Pages 175-182, 2019

Short Paper, Workshop, Demo, Preprints

[S.12] Yuhan Wang, Keru Wang, **Zhu Wang**, Ken Perlin. *Generative Terrain Fast Prototyping in Virtual Reality with Freehand Sketching Interface*. ACM SIGGRAPH Asia XR Demo 2024

[S.11] Keru Wang, Pincun Liu, Yushen Hu, Xiaoan Liu, **Zhu Wang**, Ken Perlin. *A Collaborative Multimodal XR Physical Design Environment*. ACM SIGGRAPH Asia XR Demo 2024

[S.10] Yi Wu, Agnieszka Roginska, Keru Wang, **Zhu Wang**, Ken Perlin. *A Spatial Audio System for Co-Located Multi-Participant Extended Reality Experiences*. The 29th International Conference on Auditory Display, 2024

[S.9] Keru Wang, **Zhu Wang**, Ken Perlin. *Asymmetrical VR for Education*. ACM SIGGRAPH Immersive Pavilion, 2023

[S.8] Keru Wang, **Zhu Wang**, Karl Rosenberg, Zhenyi He, Dong Woo Yoo, Un Joo Christopher, Ken Perlin. *Mixed Reality Collaboration for Complementary Working Styles*. ACM SIGGRAPH Immersive Pavilion, 2022

[S.7] **Zhu Wang**, Anat Lubetzky, Ken Perlin. *Walking Balance Assessment with Eye-tracking and Spatial Data Visualization*. ACM Siggraph Immersive Pavilion, 2021

[S.6] **Zhu Wang**, Anat Lubetzky, Charles Hendee, Marta Gospodarek, Ken Perlin. *A Virtual Obstacle Course within Diverse Sensory Environments*. ACM Siggraph Immersive Pavilion, 2020

[S.5] **Zhu Wang**, Anat Lubetzky, Marta Gospodarek, Makan TaghaviDilamani, Ken Perlin. *Virtual Environments for Rehabilitation of Postural Control Dysfunction*. arXiv preprint, 2019

[S.4] Tiago Machado, Ivan Bravi, **Zhu Wang**, Andy Nealen, Julian Togelius. *Shopping for Game Mechanics*. Proceedings of the FDG Workshop, 2016

[S.3] Tao Huang, **Zhu Wang**. *Face detection by improved AdaBoost*. Proceedings of 2nd International Conference on Computer Science and Network Technology (ICCSNT), 2012

[S.2] **Zhu Wang**, Tao Huang, Sha Wen. *A File Integrity Monitoring System Based on Virtual Machine*. Proceedings of 2nd International Conference on Instrumentation, Measurement, Computer, Communication and Control (IMCCC), 2012

[S.1] **Zhu Wang**. *Real-time Simulation of Infrared Scene*. Proceedings of International Conference on Image Analysis and Signal Processing (IASP), 2012

Teaching

Guest Lecture — New York University

- FMTVUT-1153 Introduction to Visual Effects for Animated and Live Action Films — Spring 2023
- CSCI-UA.0380-001 Interactive Computing — Fall 2022
- CSCI-GA.3033-097 Special Topics in Virtual Reality — Spring 2022
- CSCI-GA.2274-001 Advanced Computer Graphics — Fall 2017

Teaching Assistant — New York University

- CSCI-GA.3033-097 Special Topics in Virtual Reality — Spring 2022
- CSCI-GA.2250-002 Operating Systems — Spring 2018
- CSCI-GA.2274-001 Advanced Computer Graphics — Spring 2022
- CSCI-GA.2274-001 Advanced Computer Graphics — Fall 2017
- CSCI-GA.3033-097 Computer Graphics — Fall 2015

Mentorship

Yi Wu, Ph.D. in Music Technology, NYU — Spring 2024 – Present

Sean(xiaoan) Liu, Master's in Interactive Telecommunications Program, NYU — Spring 2024 – Present

Alex(Pincun) Liu, Bachelor's in Computer Science, NYU — Fall 2023 – Present

Yushen Hu, Bachelor's in Computer Science, NYU	Fall 2022 – Present
Keru Wang, Ph.D. in Computer Science, NYU	Fall 2021 – Present
Simone Sun, Master's in Integrated Design and Media, NYU	Fall 2023 - Spring 2024
Brayton Lordianto, Bachelor's in Computer Science, NYU	Fall 2023 – Spring 2024
Yuhan Wang, Bachelor's in Interactive Media Arts, NYU Shanghai	Spring 2023 – Spring 2024
Jennifer Xie, Bachelor's in Computer Science, NYU	Spring 2022 - Fall 2022
Karl Rosenberg, Ph.D. in Computer Science, NYU	Fall 2021 – Spring 2022
Cleo Xiao, Master's in Integrated Design and Media, NYU	Fall 2023
Yuewen Yang, Master's in Computer Science, NYU	Spring 2023
Steven Yoo, Master's in Integrated Design and Media, NYU	Fall 2021 – Fall 2022
Rufei Sheng, Master's in Urban Science and Progress, NYU	Spring 2019 – Fall 2019

VIP-GY 500X/VIP-UY300X NYU Vertically Integrated Projects — New York University
Mentored 2-4 undergraduate/graduate students each semester — Fall 2021 - Present

Invited Talks and Presentations

Sound Design for Multi-Participant Extended Reality Experiences — 2024
Panelist, AES Show 2024

Enhancing HCI through Spatial Computing — 2024
University of New Mexico (Host: Leah Buechley)

Panel Discussion on Mixed Reality Collaboration for Complementary Working Styles — 2022
Panelist, SIGGRAPH Now (Host: Derek Ham)

Introduction to Metaverse Research and Applications — 2022
Invited Talk, Metaverse Applications and Research Session, Toronto Youth STEM & Innovation Conference

Human Balance Assessment Using Pressure-Sensing Technology — 2019
The Center of Health and Rehabilitation Research Showcase, NYU

Virtual Reality Rehabilitation for Fall Prevention — 2018
Presentation and demo, NYU Tech Summit

Virtual Environments, Floor Sensors and Head Sensors for Assessment of Postural Control Dysfunction — 2018
Presentation and demo, InsurTech Science and Engineering Expo

Tangible Mixed Reality — 2013
Presentation and demo, NY Tech Meetup

Skills

Expertise	Computer Graphics, Human-Computer Interaction, Spatial Computing, Computational Geometry, Computer Vision, Machine Learning, Robotics, Motion Capture
Tools	Pytorch, OpenCV, Unity3D, ROS, Unreal, WebGL, WebXR
Programming	Python, Java, JavaScript, C#, C++/C
Languages	Chinese (Mandarin), English

Academic Service

Program Committee

IEEE	VR Workshop(2025), ICVR (2022)
ACM	ETRA (2022-2024)

Reviewer

IEEE	VR (2022-2024), ISMAR (2022 - 2024)
ACM	CHI (2021-2022), UIST (2018-2019), CSCW (2022), UbiComp/ISWC (2021-2024), TEI (2023), AutomotiveUI

	(2021), IDC (2021), ISS (2022)
Journal	BioMedical Engineering OnLine (2022)
Others	ChinaVis (2021), IASDR (2021), WCVR (2024), EICS PACM (2023)

Reference

Prof. Ken Perlin
Professor, Department of Computer Science, New York University
Director, Future Reality Lab, New York University

Prof. Anat Lubetzky
Associate Professor, Department of Physical Therapy, New York University
Director, Physical Therapy Sensorimotor Lab, New York University

Prof. David K.A. Mordecai
President, Risk Economics, Inc.
Adjunct Professor, School of Law, New York University
Adjunct Professor, School of Business, University of Chicago
Visiting Scholar, Courant Institute of Mathematical Sciences, New York University