Xincheng Huang

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RESEARCH STATEMENT

My research focuses on enhancing the reality and interactivity in AR/VR telepresence. For more realistic telepresence, I explore novel immersive media that promise photo-realistic fidelity, from the more common 360-degree video to the emerging differentiable rendering techniques such as NeRF and Gaussian Splatting. As I adapt them to AR/VR telepresence, I design and create novel interactive techniques that facilitate co-presence and natural collaborative awareness. My research has led to publications at UIST, CHI, Ubicomp, and TVCG. I hope my endeavor will make future telepresence experience more natural, seamless, and enjoyable.

EDUCATION

Doctor of Philosophy in Computer Science Sept 2021 – present
University of British Columbia, Vancouver, BC
Advisor: Dr. Robert Xiao

Master of Science in Computer Science and Engineering Aug 2019 – April 2021
University of Michigan, Ann Arbor, MI
Advisors: Dr. Nikola Banovic and Dr. Alanson Sample

Bachelor of Science in Computer Science Aug 2015 – May 2019
New York University Shanghai, China
Graduated with Magna Cum Laude, and a secondary major in Interactive Media Arts

RESEARCH EXPERIENCE

Graduate Research Assistant. *University of British Columbia, Vancouver, BC* Sept 2021 - present
X Lab. Advised by Dr. Robert Xiao
Enhancing the multi-modal interactivity of remote shared experience in AR/VR. So far, I have contributed to physical surface sharing [J.3] between dissimilar remote environments, efficient 360° Video streaming in VR with 5G and Edge-Computing [J.2, P.1], enriched interactivity in remote 360° Video Telepresence [C.1], and Immersive Telepresence with Gaussian Splatting [C.3].

Research Assistant. *University of Michigan, Ann Arbor, MI* Mar 2020 – April 2021
Computational HCI Lab. Advised by Dr. Nikola Banovic and Dr. Alanson Sample
Conducted a research project as the first author on inferring assembly structures from user behaviors [J.1]. This work utilized UHF-RFID sensing to profile the movement data of building blocks during assembly tasks, and then inferred the structures being built in real-time given the movement profile with Markov Chain Monte Carlo.

Research Assistant. *University of Michigan, Ann Arbor, MI* Jan 2020 – April 2020, Jan 2021 – April 2021
Secure Cloud Manufacturing Group. Advised by Dr. Kira Barton
Created an educational Virtual Manufacture Space in VR for the Detroit Area Pre-college Engineering Program (DAPCEP). Presented two iterations of the project, based on VR and WebGL, on DAPCEP 2020 and DAPCEP 2021.

Undergraduate Research Assistant. *New York University, New York City, NY* Jan 2018 – Dec 2018
New York University – Guggenheim. Conserving Computer-based Art Initiative. Advised by Prof Deena Engel
Conducted code analysis for a software-based art: *Color Panel*, by John F. Simon Jr. 1998. Compiled the results of code analysis and suggestions for conservation in a 20-page report archived by the Guggenheim Museum.

PUBLICATIONS

Conference Proceedings (Refereed)

[C.4] Neil Xu Fan, Xincheng Huang, and Robert Xiao. 2025. *TangiAR*: Markerless Tangible Input for Immersive Augmented Reality with Everyday Objects. In *31st ACM Symposium on Virtual Reality Software and Technology (VRST '25), November 12–14, 2025, Montreal, QC, Canada*. ACM, New York, NY, USA, 11 pages. https://doi.org/10.1145/3756884.3766028. **(Acceptance rate: 27%, To Appear)**

[C.3] Xincheng Huang*, Dieter Frehlich*, Ziyi Xia, Peyman Gholami, and Robert Xiao. 2025. GaussianNexus: Room-Scale Real-Time AR/VR Telepresence with Gaussian Splatting. In *The 38th Annual ACM Symposium on User Interface Software and Technology (UIST' 25). September 28-October 1, 2025, Busan, Korea.* ACM, New York, NY, USA, 18 pages. https://doi.org/10.1145/3746059.3747693. **(Acceptance rate: 22%, To Appear)**

[C.2] Ziyi Xia, Xincheng Huang, Sidney S Fels, and Robert Xiao. 2025. HaloTouch: Using IR Multi-Path Interference to Support Touch Interactions with General Surfaces. In *Proceedings of the 2025 CHI Conference on Human Factors in Computing Systems (CHI '25)*. Association for Computing Machinery, New York, NY, USA, Article 548, 1–17. https://doi.org/10.1145/3706598.3714179. **(Acceptance rate: 24.9%)**

[C.1] Xincheng Huang*, Michael Yin*, Ziyi Xia, Robert Xiao. 2024. VirtualNexus: Enhancing 360-Degree Video AR/VR Collaboration with Environment Cutouts and Virtual Replicas. In *The 37th Annual ACM Symposium on User Interface Software and Technology (UIST '24), October 13–16, 2024, Pittsburgh, PA, USA*. ACM, New York, NY, USA, 12 pages. https://doi.org/10.1145/3654777.3676377. **(Acceptance rate: 24%)**

Journal Articles (Refereed)

[J.4] Bu Li, Xincheng Huang, and Robert Xiao. 2025. VibRing: A Wearable Vibroacoustic Sensor for Single-Handed Gesture Recognition. *Proc. ACM Hum.-Comput. Interact*. 9, 4, Article EICS006 (June 2025), 25 pages. https://doi.org/10.1145/3733052.

[J.3] Xincheng Huang and Robert Xiao. 2023. SurfShare: Lightweight Spatially Consistent Physical Surface and Virtual Replica Sharing with Head-mounted Mixed-Reality. *Proc. ACM Interact. Mob. Wearable Ubiquitous Technol*. 7, 4, Article 162 (December 2023), 24 pages. https://doi.org/10.1145/3631418.

[J.2] Xincheng Huang, James Riddell, and Robert Xiao. 2023. "Virtual Reality Telepresence: 360-Degree Video Streaming with Edge-Compute Assisted Static Foveated Compression", in *IEEE Transactions on Visualization and Computer Graphics*, doi: 10.1109/TVCG.2023.3320255. **(Acceptance rate: 20%)**

[J.1] Xincheng Huang, Keylonnie L. Miller, Alanson P. Sample, and Nikola Banovic. 2023. StructureSense: Inferring Constructive Assembly Structures from User Behaviors. *Proc. ACM Interact. Mob. Wearable Ubiquitous Technol*. 6, 4, Article 204 (December 2022), 25 pages. https://doi.org/10.1145/3570343.

Posters/Demo (Reviewed/Juried)

[P.1] Dieter Frehlich*, Xincheng Huang*, Junkai Ding, Robert Xiao. 2025. MultiSphere: Latency Optimized Multi-User 360° VR Telepresence with Edge-Assisted Viewport Adaptive IPv6 Multicast. In *31st ACM Symposium on Virtual Reality Software and Technology (VRST '25), November 12–14, 2025, Montreal, QC, Canada.* ACM, New York, NY, USA, 2 pages. (**To appear**)

TEACHING AND MENTORING

Graduate Teaching Assistant Sept 2022 – Dec 2022
University of British Columbia, Vancouver, BC
CPSC 554X – Machine Learning and Signal Processing.
Duties: grading and responding to student questions.

Learning Assistant Feb 2019 – May 2019
New York University Shanghai, Shanghai, China
CSCI-SHU 101 Introduction to Computer Science.
Duties: holding tutoring office hours, conducting review sessions, and facilitating class activities. Received award for "Excellent Tutoring" and "Most Appointed Office Hour".

Mentoring
At the University of British Columbia (UBC), Vancouver, BC
Ritik Vatsal, currently a lab member at *UBC*
Dieter Frehlich, currently a lab member at *UBC*
Junkai (Kelvin) Ding, then master's at *the Northeastern University*
James Riddell, then master's at *the University of Waterloo*

At the University of Michigan (Umich), Ann Arbor, MI
Keylonnie Miller, undergraduate student at *Umich*, then *Facebook*

ACADEMIC SERVICE

Program Committee: CHI 2025 Late-Breaking Work

Session Chair: UIST 2025

External Reviewer (38 papers in various journals and conferences)
UIST 2023, 2025, CHI 2023-2025, IMWUT 2024-2025, IEEEVR 2025, ISMAR 2024-2025, TVCG 2025, SUI 2024-2025, VRST 2024-2025, EICS 2025, CHI Play 2024-2025, IMX 2025
Received Excellent Review Recognitions for UIST 2025, CHI 2025, CHI Play 2024

Student Volunteer: ISS 2024

AWARDS

MITACS Accelerate 2023-2024
Conducting Project *Rich, Immersive AR/VR communication* in collaboration with *Rogers Communications Canada Inc.* with a Mitacs Accelerate award with 60000 CAD.

Latin Award, Magna Cum Laude 2019
Awarded to top 15% of the graduated class at New York University Shanghai

Dean's List for Academic Year 2015 – 2016, 2016 – 2017, 2017 – 2018, 2018 – 2019
Awarded to top 30% for each academic year at New York University Shanghai

LEADERSHIP

ENACTUS NYU Shanghai, *Vice President* 2016 - 2017

Led the NYU Shanghai's branch of ENACTUS, a world-wide social entrepreneurial student organization. Participated in the user interviews, product design, and prototyping for our project: "A Third Eye: A Digital Blind Crutch". Won the *First prize* and the *Best technology innovation* a*ward* in ENACTUS social innovation competition of East China, and an 80000 CNY (~12000 USD) grant from the Chinese Charity Association (Shenzhen).