

Xincheng Huang

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RESEARCH STATEMENT

I am generally interested in creating novel AR/VR interactive techniques combining differential rendering techniques (e.g., Gaussian Splatting, NeRF) and AI (e.g., LLMs, VLMs). For my Ph.D. thesis, I focused on enhancing the *reality*, *interactivity*, and *collaborative awareness* in AR/VR telepresence. For realism, I investigated hyper-realistic scene representations (e.g., 360° video, NeRF, Gaussian Splatting) and spatial alignment across heterogeneous environments. For interactivity, I enable users to navigate remote spaces and share 2D and 3D physical objects across distance. My work also draws on groupware and proxemics literature to guide design on collaborative awareness. My research has led to publications at UIST, CHI, Ubicomp, and TVCG.

EDUCATION

Doctor of Philosophy in Computer Science University of British Columbia, Vancouver, BC <i>Advisor: Dr. Robert Xiao</i>	Sept 2021 – Aug 2027
Master of Science in Computer Science and Engineering University of Michigan, Ann Arbor, MI <i>Advisors: Dr. Nikola Banovic and Dr. Alanson Sample</i>	Aug 2019 – April 2021
Bachelor of Science in Computer Science New York University Shanghai, China <i>Graduated with Magna Cum Laude, and a secondary major in Interactive Media Arts</i>	Aug 2015 – May 2019

RESEARCH EXPERIENCE

Graduate Research Assistant. <i>University of British Columbia, Vancouver, BC</i> <i>X Lab. Advised by Dr. Robert Xiao</i>	Sept 2021 - present
Enhancing the naturalness of spatial telepresence. I have enabled physical surface sharing [J.3] between dissimilar environments, enhanced 360° Video streaming efficiency in VR with 5G and Edge-Computing [J.2, P.1], enriched interactivity in remote 360° Video Telepresence [C.1], and dynamic telepresence with Gaussian Splatting [C.3].	
Research Assistant. <i>University of Michigan, Ann Arbor, MI</i> <i>Computational HCI Lab. Advised by Dr. Nikola Banovic and Dr. Alanson Sample</i>	Mar 2020 – April 2021
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. <i>University of Michigan, Ann Arbor, MI</i> <i>Secure Cloud Manufacturing Group. Advised by Dr. Kira Barton</i>	Jan 2020 – April 2020, Jan 2021 – April 2021
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. <i>New York University, New York City, NY</i> <i>New York University – Guggenheim. Conserving Computer-based Art Initiative. Advised by Prof Deena Engel</i>	Jan 2018 – Dec 2018
Conducted code analysis for a software-based art: <i>Color Panel</i> , 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] 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%)

[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](https://doi.org/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. <https://doi.org/10.1145/3756884.3770539>

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

Ritik Vatsal, master’s student at *UBC*, currently a lab member at *UBC*
Dieter Frehlich, undergrad at *UBC*, currently a lab member at *UBC*
Junkai (Kelvin) Ding, undergrad at *UBC*, then master’s at *the Northeastern University*
James Riddell, undergrad at *UBC*, then master’s at *the University of Waterloo*
Keylonnie Miller, undergrad at *Umich*, then *Facebook*

INVITED PRESENTATIONS/DEMONSTRATIONS

“**Together from Afar: Toward More Natural Spatial Telepresence**”. University of Texas at Dallas, USA. Hosted by Prof. Jin Ryong Kim, October 31st, 2025.

“**Together from Afar: Toward More Natural Spatial Telepresence**”. Tsinghua University, Beijing, China. Hosted by Prof. Xin Yi, October 20th, 2025.

“**VirtualNexus: Enhancing 360-Degree Video AR/VR Collaboration with Environment Cutouts and Virtual Replicas**”. Live demo at the 2nd *Beyond Connectivity Research Summit* by Rogers Communications Inc. Vancouver, Canada, July 2024.

“**Virtual Reality Telepresence: 360-Degree Video Streaming with Edge-Compute Assisted Static Foveated Compression**”. Live demo at the 1st *Beyond Connectivity Research Summit* by Rogers Communications Inc. Vancouver, Canada, June 2023.

ACADEMIC SERVICE

Program Committee: CHI 2025 Late-Breaking Work

Session Chair: UIST 2025

External Reviewer (44 papers in various journals and conferences)

UIST 2023, 2025, CHI 2023-2026, IMWUT 2024-2025, IEEEVR 2025-2026, ISMAR 2024-2025, TVCG 2025, SUI 2024-2025, VRST 2024-2025, EICS 2025, CHI Play 2024-2025, IMX 2025

Received Excellent Review Recognitions for CHI 2025-2026, UIST 2025, CHI Play 2024

Student Volunteer: ISS 2024

AWARDS

MITACS Accelerate	2023-2024
Conducting Project <i>Rich, Immersive AR/VR communication</i> in collaboration with <i>Rogers Communications Canada Inc.</i> with a Mitacs Accelerate award with 30000 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 <i>First prize</i> and the <i>Best technology innovation award</i> in ENACTUS social innovation competition of East China, and an 80000 CNY (~12000 USD) grant from the Chinese Charity Association (Shenzhen).	

SKILLS

Programming: Experienced with C#, Python, Java, C/C++, OpenGL, HLSL; Familiar with Node.js and React.js.
AR/VR Development: Proficient in Unity, Mixed Reality Tool Kit, and XR Interaction Toolkit. Experienced with Meta Quest and Microsoft HoloLens development.
Machine Learning & AI: Experienced with PyTorch and generative AI APIs (e.g., ChatGPT, Gemini).
Prototyping: Experienced with Arduino, Raspberry Pi, Processing.js, and p5.js.
Design Software: Experienced with Adobe Photoshop, Premiere Pro, and Illustrator. Familiar with Maya, Cinema4D, and Blender.