

Xincheng Huang

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RESEARCH STATEMENT

My research in Human-Computer Interaction develops immersive and intelligent AR/VR systems using neural scene representations (NeRF, Gaussian Splatting) and AI models (LLMs, VLMs). I focus on natural telepresence: efficient photorealistic capture, interactive shared surfaces and 3D object exchange, and AI-driven spatial understanding for adaptive collaboration. My work has been published at top Human-Computer Interaction and AR/VR venues such as UIST, CHI, IMWUT/Ubicomp, and IEEE TVCG.

EDUCATION

Doctor of Philosophy in Computer Science Sept 2021 – Aug 2027
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

Working on 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. *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

Top-tier publications in HCI and AR/VR appear in ACM/IEEE conference proceedings such as CHI, UIST, Ubicomp, IEEEVR, and ISMAR. Ubicomp has a hybrid structure with journal papers appearing in IMWUT. IEEEVR and ISMAR accept top submissions (~10%) to the journal-track and publish them to IEEE TVCG.

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>

Patents

Xincheng Huang, Dieter Frehlich, Ziyi Xia, Peyman Gholami, Robert Xiao. (2025). Mixed Reality System for Real-Time AR/VR Telepresence. Patent Application filed September, 2025. Patent pending.

Xincheng Huang, James Riddell, Ailin Saggau-Lyons, Robert Xiao. (2024). System and apparatus for video display on a portable display device. Patent Application filed October, 2024. Patent pending.

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/DEMOS

“**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 (45 papers in various journals and conferences)

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

Received Excellent Review Recognitions for CHI 2025-2026, UIST 2025-2026, 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 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 *First prize* and the *Best technology innovation award* 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.