

Xincheng Huang

Phone: 734-263-4841 | Email: xchuang@cs.ubc.ca | Website: <https://xincheng.me>

RESEARCH INTERESTS

My current research focuses on bridging the physical and virtual worlds in remote AR/VR collaboration. To do so, I create novel interactive techniques in Mixed Reality by combining state-of-the-art technologies from machine learning and sensing. From sharing a slice of physical surfaces to fully immersive environments, I hope my endeavor will make future telepresence and remote collaboration more seamless and natural. My research along this target has led to publications to IMWUT, TVCG, and UIST. Recently, I have been trying to incorporate emerging technologies such as neural rendering and generative AI into remote collaboration.

EDUCATION

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

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

New York University Shanghai, Shanghai, China Aug 2015 – May 2019
B.S. with double major in Computer Science and Interactive Media Arts
Graduated with Magna Cum Laude

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 explored physical surface sharing [J3], 360° Video VR telepresence systems with 5G mmW MEC assistance [J2], and enhancing the interactivity in remote 360° Video AR/VR collaboration [C1].

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 [J1]. 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

- [C1] 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>.
- [J3] 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>.
- [J2] 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).
- [J1] 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>.
- [T2] Zhanghao Chen*, Xincheng Huang*. 2019. 3D Point Cloud Registration Algorithms for the Telewindow. *Undergraduate thesis for Computer Science at New York University Shanghai. Advised by Dr. Olivier Marin and Prof. Michael Naimark.*
- [T1] Xincheng Huang. 2019. Immersive Strategies: A First-Person Perspective Chess Game in VR. *Undergraduate thesis for Interactive Media Arts at New York University Shanghai. Advised by Dr. Alison De Fren.*

(*: equal contribution)

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”.

Undergraduate Mentoring

Dieter Frehlich, undergraduate student at *University of British Columbia*

Junkai (Kelvin) Ding, undergraduate student at *University of British Columbia*

James Riddell, undergraduate student at *University of British Columbia*, then M.S. at *University of Waterloo*

Keylonnie Miller, undergraduate student at *University of Michigan*, then *Facebook*

ACADEMIC SERVICE

Reviewed 13 papers in various journals and conferences:

UIST 2023, CHI 2023-2025, IMWUT 2024, ISMAR 2024, SUI 2024, VRST 2024, CHI Play 2024

PROFESSIONAL EXPERIENCE

Assistant Software Engineer, PwC Service Deliver Center, Shanghai <i>SAP Department. Developed SAP-based APIs for financial reports, material, and storage management using ABAP and OpenSQL.</i>	July 2018 – Oct 2018
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AWARDS

MITACS Accelerate Conducting Project <i>Rich, Immersive AR/VR communication</i> in collaboration with <i>Rogers Communications Canada Inc.</i> with a Mitacs Accelerate award with 60000 CAD.	2023-2024
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Latin Award, Magna Cum Laude, New York University Shanghai <i>Awarded to top 15% of the graduated class</i>	2019
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Dean's List for Academic Year, NYU Shanghai <i>Awarded to top 30% for each academic year</i>	2015 – 2016, 2016 – 2017, 2017 – 2018, 2018 – 2019
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University Recognition Award, NYU Shanghai	2017 – 2018
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LEADERSHIP

ENACTUS NYU Shanghai, Vice President 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).	2016 - 2017
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