

Ruizhi Cheng

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EDUCATION	Ph.D. Student in Computer Science George Mason University Advisor: Dr. Bo Han	Aug. 2021 - Present Fairfax, VA, USA
WORKING EXPERIENCE	George Mason University, USA Research Assistant <ul style="list-style-type: none">• Design live interactive volumetric video streaming system.• Design gaze-driven volumetric video streaming system.• Design privacy-preserving biometric-based user authentication system in virtual reality (VR).• Conduct network measurement study on social VR platforms.	Aug. 2021 - Present
PUBLICATIONS	Under Review <ol style="list-style-type: none">9. Ruizhi Cheng, Yuetong Wu, Ashish Kundu, Hugo Latapie, Myungjin Lee, Songqing Chen, Bo Han MetaFL: Federated Learning for User Authentication in Metaverse Submitted to MobiCom, 20238. Ruizhi Cheng, Erdem Murat, Lap-Fai Yu, Songqing Chen, Bo Han Understanding User Experience of Online Education in Metaverse: A Systems Perspective Submitted to UbiComp, 20237. Ruizhi Cheng, Puqi Zhou, Jie Li, Songqing Chen, Bo Han Dissecting User Experience of Social VR: A Tale of Five Popular Platforms Submitted to UbiComp, 20236. Ruizhi Cheng, Songqing Chen, Bo Han Towards Zero-trust Security for the Metaverse Submitted to IEEE Communication, 2023. https://arxiv.org/abs/2302.088855. Nan Wu, Ruizhi Cheng, Songqing Chen, Bo Han PIPE: Privacy-preserving Image-based 6DoF Pose Estimation for Emerging Applications Submitted to MobiSys, 2023 Peer-reviewed Papers <ol style="list-style-type: none">4. Ruizhi Cheng, Nan Wu, Songqing Chen, Bo Han Will Metaverse be NextG Internet? Vision, Hype, and Reality IEEE Network, 20223. Ruizhi Cheng, Nan Wu, Matteo Varvello, Songqing Chen, Bo Han Are We Ready for Metaverse? A Measurement Study of Social Virtual Reality Platforms ACM IMC, 20222. Nan Wu, Ruizhi Cheng, Songqing Chen, Bo Han Preserving Privacy in Mobile Spatial Computing ACM NOSSDAV, 20221. Ruizhi Cheng, Nan Wu, Songqing Chen, Bo Han Reality Check of Metaverse: A First Look at Commercial Social Virtual Reality Platforms Metabuild@IEEE VR, 2022 Best Paper Award	

SELECTED PROJECTS	Live Interactive Volumetric Video Streaming (Ongoing)	
	<ul style="list-style-type: none"> • Build an end-to-end live volumetric content capture, creation, delivery, and rendering system set up at multiple locations. • Transmit high-quality volumetric content with high frame rate and low end-to-end latency in real-time. 	
	Gaze-driven Volumetric Video Streaming (Ongoing)	
	<ul style="list-style-type: none"> • Build a gaze-driven volumetric streaming system on HoloLens 2. • Segment volumetric data into cells and encode them on the server. • Transmit high-quality content near the foveal area and low-quality content to the periphery based on gaze prediction to save bandwidth while maintaining a high quality of experience (QoE). 	
	Privacy-preserving Biometric-based User Authentication in VR (Ongoing)	
	<ul style="list-style-type: none"> • Utilize federated learning (FL), a privacy-preserving distributed machine learning technique, to conduct user authentication while protecting user privacy in social VR. • Re-implement two state-of-the-art FL-based user authentication algorithms, FedAWS (ICML 2020) and FedUV (ICML 2021). • Design a personalized within-client and between-client modality selection algorithm that significantly improves the authentication accuracy from $\sim 75\%$ to $\sim 96\%$. 	
	Network Measurement in Social VR (Ongoing)	
	<ul style="list-style-type: none"> • Conduct an in-depth measurement study on several social VR platforms. • Identify all measured platforms facing scalability issues in terms of throughput, end-to-end latency, and on-device computation resource utilization. • Design social bots to understand the geographic distribution and usage frequency of users. 	
HONORS AND AWARDS	Best Paper Award, Metabuild@IEEE VR	2022
	Student Travel Grant, IEEE VR	2022
	Mason Engineers Week Poster Winner, George Mason University	2022
SERVICES	Conference Reviewer	
	<ul style="list-style-type: none"> • IEEE VR 2022; ACM UbiComp 2022 	
	Journal Reviewer	
	<ul style="list-style-type: none"> • IEEE Network; IEEE Multimedia; SAGE Open 	
TECHNICAL SKILLS	Programming Languages. Python, C++, C#, JAVA	
	Deep Learning Frameworks. Pytorch, Keras	