

RESEARCH INTERESTS

I am broadly interested in designing and building multimedia streaming systems that sustain high-quality user experience across diverse and challenging network conditions. I am also interested in and have been working on leveraging recent advances in generative AI and vision-language models to enhance the reliability and efficiency of multimedia systems.

EDUCATION

University of Illinois Urbana-Champaign

Ph.D. in Computer Science

2022 - 2026 (*expected*)

- Advisor: Prof. Klara Nahrstedt

Shanghai Jiao Tong University

M.S. in Information and Communication Engineering

2019 - 2022

- Advisor: Prof. Ying Cui

Shanghai University

B.S. in Communication Engineering

2015 - 2019

RESEARCH PROJECTS

GenStream: Loss-resilient Video Streaming via Generative Codecs UIUC, 2025.01 -

- Employed and fine-tuned a video tokenizer to improve the compression efficiency and loss-resilience in video streaming.
- Proposed a practical token adaptation approach that integrates both frame-level and packet-level knowledge to handle the dynamics of network conditions.
- Improved Learned Perceptual Image Patch Similarity (LPIPS), by 38%-59% under similar bitrates compared to the existing solutions.

Trinity: QoE Optimization for Cloud VR Gaming Bytedance, 2024.05 - 2024.11

- Proposed and validated an insight that users have varying latency tolerance for different types of actions to bridge the MTP latency gap in cloud VR gaming.
- Developed an end-to-end cloud VR gaming system that supports most latency-sensitive FPS games.
- Conducted extensive user studies to demonstrate the system delivers gaming experiences comparable to, or better than, local streaming.
- Paper submitted to ACM MMSys 2026.

AquaVLM: Improving Situational Awareness Underwater via Mobile VLM UIUC, 2024.09 - 2025.05

- Employed context-aware instruction tuning based on multimodal data to improve comprehension and adaptability of mobile VLM within underwater environments.
- Implemented error-resilient fine-tuning to improve the reliability of message transmission among mobile devices.
- Developed a fully functional prototype system on the iOS platform that consistently maintained an average 90% similarity between the received and original messages over distances of up to 20 meters in real-world experiments.
- Helped with building a VR-based simulation platform for subjective evaluation.
- Paper submitted to ACM MMSys 2026.

AquaScope: Underwater Image Transmission between Mobile Devices UIUC, 2023.08 - 2024.09

- Designed and implemented the first underwater acoustic system that enables reliable image transmission between mobile devices.
- Employed generative image compression and enhanced its bandwidth efficiency and error resilience for underwater communication.
- Implemented reliability-enhancing techniques at the PHY layer to mitigate the impact of underwater transmission errors.
- Implemented a prototype on Android devices and reliably delivered the image under 9 seconds at distances of up to 20 meters.
- Paper submitted to ACM MobiCom 2026.

RESEARCH PROJECTS (CONT.)	Neural Adaptive Wireless Video Streaming	SJTU, 2022.08 - 2023.08
	<ul style="list-style-type: none"> Optimized the traditional reinforcement learning algorithm for video streaming and improved convergence speed and performance (by 14.4%). Modeled the impacts of lower-layer information in adaptive video streaming, achieving a flexible tradeoff among QoE, training, and inference costs. Leveraged continual learning-based online tuning methods to solve the model mismatch issue for various network environments. Deployed the algorithm on the Tencent online platform for large-scale video streaming. 	
INTERNSHIPS	Bytedance Research Intern @ Multimedia Lab, San Diego, USA	2025.05 - 2025.08
	<ul style="list-style-type: none"> <i>Project: Bandwidth-efficient Cloud VR Streaming</i> Manager: Shu Shi Developed a motion-aware rate adaptation algorithm for cloud VR streaming, achieving 15% reduction in bandwidth without degrading viewers' QoE. Deployed and validated the algorithm in an end-to-end cloud VR streaming system, supported by a comprehensive user study with real-world applications. Extended the system to support multiple rate control modes (CBR, VBR, CQP) and integrated motion vector extraction for rate adaptation optimization. 	
	Bytedance Research Intern @ Multimedia Lab, San Diego, USA	2024.05 - 2024.08
	<ul style="list-style-type: none"> <i>Project: QoE Optimization for Cloud VR Gaming</i> Manager: Shu Shi 	
PUBLICATIONS	DPVR Co., Ltd SDE Intern @ Graphic Group, Shanghai, China	2018.04 - 2019.05
	<ul style="list-style-type: none"> Manager: Ziyi Xu Developed a streaming assistant software for commercial VR headset using C++. 	
	<ol style="list-style-type: none"> Lingzhi Zhao, Yongqiang Gui, Yanyan Suo, Sandesh Dhawaskar Sathyanarayana, Ruixiao Zhang, Shu Shi, and Klara Nahrstedt. Trinity: Exploiting Latency Sensitivity to Improve Quality of Experience on Cloud VR Gaming. <i>ACM MMSys</i>, 2026. Yongqiang Gui, Yanyan Suo, Lingzhi Zhao, and Shu Shi. 360PI: A Practical Performance Index for 360-Degree Video Streaming Systems. <i>ACM MobiCom Workshop, ImmerCom</i>, 2025. Lingzhi Zhao, Qian Zhou, Bo Chen, and Klara Nahrstedt. 360LiveCast: A Low-Latency and Bandwidth-efficient Multicast Framework for Live 360 Video. <i>IEEE MIPR</i>, 2025. Lingzhi Zhao, Ying Cui, Yuhang Jia, Yunfei Zhang, and Klara Nahrstedt. Enhancing Neural Adaptive Wireless Video Streaming via Lower-Layer Information Exposure and Online Tuning. <i>IEEE Trans. Multimedia</i>, 2025. (Short version published in <i>IEEE ICC 2024</i>) Lingzhi Zhao, Ying Cui, Sheng Yang, and Shlomo Shamai (Shitz). An Optimization Framework for General Rate Splitting for General Multicast. <i>IEEE Trans. Wireless Commun.</i>, 2022. (Short version published in <i>IEEE ICC 2022</i>) Lingzhi Zhao, Ying Cui, Zhi Liu, Yunfei Zhang, and Sheng Yang. Adaptive Streaming of 360 Videos with Perfect, Imperfect, and Unknown FoV Viewing Probabilities in Wireless Networks. <i>IEEE Trans. Image Process.</i>, 2021. (Short version published in <i>IEEE GLOBECOM 2020</i>) Chengjun Guo, Lingzhi Zhao, Ying Cui, Zhi Liu, and Derrick Wing Kwan. Power-Efficient Wireless Streaming of Multi-Quality Tiled 360 VR Video in MIMO-OFDMA Systems. <i>IEEE Trans. Wireless Commun.</i>, 2021. Yangchen Li, Lingzhi Zhao, Tianle Wang, Lianghai Ding, and Feng Yang. Knowledge- and Model-Driven Deep Reinforcement Learning for Efficient Federated Edge Learning: Single- and Multi-Agent Frameworks. <i>IEEE Trans. Mach. Learn. Commun. Netw.</i>, 2025. (Short version published in <i>IEEE GLOBECOM 2024</i>) 	

IN SUBMISSION	<ol style="list-style-type: none"> 1. Lingzhi Zhao, Yongqiang Gui, Yanyan Suo, Shu Shi, and Klara Nahrstedt. MARS: Motion-aware Rate Adaptation for Bandwidth-efficient Cloud VR Streaming. <i>ACM MM-Sys</i>, 2026, under review. 2. Beitong Tian*, Lingzhi Zhao*, Bo Chen, Haozhen Zheng, Jingcheng Yang, Mingyuan Wu, Deepak Vasisht, and Klara Nahrstedt. AquaVLM: Improving Underwater Situation Awareness with Mobile Vision Language Models. <i>ACM MMSys</i>, 2026, under review. (*: equal contributions) 3. Beitong Tian*, Lingzhi Zhao*, Bo Chen, Mingyuan Wu, Haozhen Zheng, Deepak Vasisht, Francis Y. Yan, and Klara Nahrstedt. AquaScope: Reliable Underwater Image Transmission on Mobile Devices. <i>ACM MobiCom</i>, 2026, under review. (*: equal contributions) 	
SKILLS	<p>Programming Language: <i>Python, C/C++, Matlab, Java, Swift</i></p> <p>Tools: <i>FFmpeg, Wireshark, Git, Unity, Iperf, NS-3, XCode, VS Code, Andriod Studio, Visual Studio</i></p>	
AWARDS	<ul style="list-style-type: none"> • IEEE ICC Travel Grant • SJTU Outstanding Scholarship 	<p>2024</p> <p>2020, 2021</p>
ACADEMIC SERVICES	<p>Session Chair for: <i>IEEE ICC 2024</i></p> <p>Reviewers for: <i>ACM Multimedia 2025,</i> <i>IEEE ICME 2024, 2025,</i> <i>ACM MobiHoc 2021,</i> <i>IEEE Trans. Wireless Commun.,</i> <i>IEEE Trans. Commun.,</i> <i>IEEE Trans. Green Commun. Netw.,</i></p>	
TEACHING	<ul style="list-style-type: none"> • CS598 Cloud Computing Capstone • EE372 Computing and Communication Theory • ICE7301H, ICE7302H Convex Optimization 	<p>2025 Fall, UIUC</p> <p>2021 Fall, SJTU</p> <p>2020 Fall, SJTU</p>