

RESEARCH INTERESTS	Actively interested in leveraging generative AI and vision-language models (VLMs) to enhance multimedia system reliability and efficiency. Specialized in designing and optimizing multimedia streaming systems for diverse and challenging environments.	
EDUCATION	University of Illinois Urbana-Champaign	
	<i>Ph.D. in Computer Science</i>	2022 - 2026 (<i>expected</i>)
	• Advisor: Prof. Klara Nahrstedt	
	Shanghai Jiao Tong University	
	<i>M.S. in Information and Communication Engineering</i>	2019 - 2022
	• Advisor: Prof. Ying Cui	
	Shanghai University	
	<i>B.S. in Communication Engineering</i>	2015 - 2019
SKILLS	Languages: <i>Python, C++, MATLAB, Swift, Java, C#, Rust</i> (Video) Systems & Dev.: <i>FFmpeg, DASH, NVCodec, Wireshark, iperf3, tc, Git, NS-3; Unity, Xcode, Android Studio, VS Code, Visual Studio</i> ML: <i>PyTorch, Tokenizers, Transformers, Instruction Tuning</i>	
SELECTED PROJECTS	GenStream: Loss-resilient Real-time Video Streaming via Generative Codecs	<i>UIUC, 2025.01 -</i>
	<ul style="list-style-type: none"> Optimized a real-time video tokenizer pipeline on a single RTX 4090 GPU, achieving 50%-78% bandwidth savings versus H.264/H.265 and prior neural codecs at comparable quality. Proposed a practical token adaptation approach that integrates both frame-level and packet-level knowledge to handle the dynamics of network conditions. Improved perceptual quality (LPIPS) by 38%–59% under matched target bitrates and loss patterns compared with state-of-the-art streaming baselines. 	
	AquaVLM: VLM-empowered Cooperative Communication for Mobile Systems	<i>UIUC, 2024.09 - 2025.05</i>
	<ul style="list-style-type: none"> Optimized MobileVLMV2 to generate context-specific conversations in the underwater environment via instruction tuning based on multimodal data. Implemented error-resilient fine-tuning to improve the reliability of message transmission over lossy mobile communication links. Built an end-to-end iOS prototype integrating on-device inference (LLMFarm) with a chirp-based physical-layer transmission protocol. Consistently maintained an average 90% similarity between the received and original messages over distances of up to 20 meters in real-world experiments. Contributed to a VR simulation platform for controlled subjective user studies. Paper submitted to ACM MMSys 2026. 	
	AquaScope: Image Transmission on Mobile Devices via Generative Compression	<i>UIUC, 2023.08 - 2024.09</i>
	<ul style="list-style-type: none"> Implemented the first underwater acoustic system on Android devices that reliably delivered the image at distances of up to 20 meters. Optimized generative image compression (TiTok and VQGAN) to enhance its bandwidth efficiency (40%) and error resilience via token clustering and fine-tuning. Implemented robust time synchronization method at the PHY layer to mitigate the impact of underwater transmission errors. Achieved superior compression efficiency compared to PNG, JPEG, and traditional neural network-based compression; reduced BER from 19% to below 2% on average compared with state-of-the-art systems. Paper submitted to ACM Mobisys 2026. 	

INDUSTRIAL EXPERIENCES

Bytedance | Research Intern @ Multimedia Lab, San Diego, USA 2025.05 - 2025.08

- Project: **Bandwidth-efficient Cloud VR Streaming** (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 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

- Project: **QoE Optimization for Cloud VR Gaming** (Manager: Shu Shi)
- Proposed and validated that users exhibit different latency tolerance across action types (head, hand, and body motion) using an open-source FPS VR game.
- Developed a partial panoramic streaming method that adapts viewport coverage to motion-to-photon (MTP) latency for head motion.
- Adopted a cloud-edge cooperative rendering architecture with a delayed-rendering strategy for hand motion to bridge the latency gap.
- Reduced bandwidth consumption and GPU utilization by 60% and 40%, respectively, compared with existing VR streaming systems.
- Integrated the algorithm into an end-to-end cloud VR gaming prototype and ran extensive user studies, demonstrating QoE comparable to local streaming.

DPVR Co., Ltd | SDE Intern @ Graphic Group, Shanghai, China 2018.04 - 2019.05

- Manager: Ziyi Xu
- Developed a streaming assistant software for commercial VR headset using C++.

PUBLICATIONS

1. **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. *ACM MMSys*, 2026.
2. Yongqiang Gui, Yanyan Suo, **Lingzhi Zhao**, and Shu Shi. 360PI: A Practical Performance Index for 360-Degree Video Streaming Systems. *ACM MobiCom Workshop, ImmerCom*, 2025.
3. **Lingzhi Zhao**, Qian Zhou, Bo Chen, and Klara Nahrstedt. 360LiveCast: A Low-Latency and Bandwidth-efficient Multicast Framework for Live 360 Video. *IEEE MIPR*, 2025.
4. **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. *IEEE Trans. Multimedia*, 2025. (Short version published in *IEEE ICC 2024*)
5. **Lingzhi Zhao**, Ying Cui, Sheng Yang, and Shlomo Shamai (Shitz). An Optimization Framework for General Rate Splitting for General Multicast. *IEEE Trans. Wireless Commun.*, 2022. (Short version published in *IEEE ICC 2022*)
6. **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. *IEEE Trans. Image Process.*, 2021. (Short version published in *IEEE GLOBECOM 2020*)

IN SUBMISSION

1. **Lingzhi Zhao**, Yongqiang Gui, Yanyan Suo, Shu Shi, and Klara Nahrstedt. MARS: Motion-aware Rate Adaptation for Bandwidth-efficient Cloud VR Streaming. *ACM MM-Sys*, 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. *ACM MMSys*, 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. *ACM MobiSys*, 2026, under review. (*: equal contributions)