

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	<b>University of Illinois Urbana-Champaign</b> <i>Ph.D. in Computer Science</i>	2022 - 2026 ( <i>expected</i> )	
	• Advisor: Prof. Klara Nahrstedt		
	<b>Shanghai Jiao Tong University</b> <i>M.S. in Information and Communication Engineering</i>	2019 - 2022	
	• Advisor: Prof. Ying Cui		
	<b>Shanghai University</b> <i>B.S. in Communication Engineering</i>	2015 - 2019	
SKILLS	<b>Languages:</b> Python, C++, MATLAB, Swift, Java, C#, Rust <b>(Video) Systems &amp; Dev.:</b> FFmpeg, DASH, NVCodec, Wireshark, iperf3, tc, Git, NS-3; Unity, Xcode, Android Studio, VS Code, Visual Studio <b>ML:</b> PyTorch, Tokenizers, Transformers, Instruction Tuning		
SELECTED PROJECTS	<b>GenStream: Loss-resilient Real-time Video Streaming via Generative Codecs</b> 2025.01 -		UIUC,
	• 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.		
	<b>AquaVLM: VLM-empowered Cooperative Communication for Mobile Systems</b> 2024.09 - 2025.05		UIUC,
	• 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.		
	<b>AquaScope: Image Transmission on Mobile Devices via Generative Compression</b> 2023.08 - 2024.09		UIUC,
	• 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 MMSys*, 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 MobiCom*, 2026, under review. (\*: equal contributions)

AWARDS	<ul style="list-style-type: none"> <li>• IEEE ICC Travel Grant</li> <li>• SJTU Outstanding Scholarship</li> </ul>	2024 2020, 2021
ACADEMIC SERVICES	<p><b>Session Chair for:</b> <i>IEEE ICC 2024</i></p> <p><b>Reviewers for:</b> <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"> <li>• CS598 Cloud Computing Capstone</li> <li>• EE372 Computing and Communication Theory</li> <li>• ICE7301H, ICE7302H Convex Optimization</li> </ul>	2025 Fall, UIUC 2021 Fall, SJTU 2020 Fall, SJTU