Bo Chen

Postdoctoral Research Associate

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Research Interests

Networked systems. Immersive computing systems. Machine learning systems. Mobile systems.

Education

University of Illinois at Urbana-Champaign *Urbana, IL*

Postdoctoral Research Associate in Computer Science *Jul. 2022 - Present*

- Advisor: Prof. Klara Nahrstedt

University of Illinois at Urbana-Champaign *Urbana, IL*

PhD in Computer Science *Sep. 2016 - May. 2022*

- Advisor: Prof. Klara Nahrstedt

Shanghai Jiao Tong University *Shanghai, China*

B.E. in Information Engineering *Sep. 2012 - Jun. 2016*

- Advisor: Prof. Xinbing Wang

Publications

[25] **Bo Chen**, Hongpeng Guo, Mingyuan Wu, Zhe Yang, Zhisheng Yan, Klara Nahrstedt, "ImmerScope: Multi-view Video Aggregation at Edge towards Immersive Content Services," **ACM SenSys**, 2024 (To appear)

[24] **Bo Chen**, Zhisheng Yan, Bo Han, Klara Nahrstedt, "NeRFHub: A Context-Aware NeRF Serving Framework for Mobile Immersive Applications," **ACM MobiSys**, 2024

[23] **Bo Chen**, Zhisheng Yan, Yinjie Zhang, Zhe Yang, Klara Nahrstedt, "LiFteR: Unleash Learned Codecs in Video Streaming with Loose Frame Referencing," **USENIX NSDI**, 2024

[22] **Bo Chen**, Mingyuan Wu, Hongpeng Guo, Zhisheng Yan, Klara Nahrstedt, "Vesper: Learning to Manage Uncertainty in Video Streaming," **ACM MMSys**, 2024

[21] **(Best Student Paper Award) Bo Chen**, Zhisheng Yan, Klara Nahrstedt, "Context-aware Image Compression Optimization for Visual Analytics Offloading," **ACM MMSys**, 2022

[20] **(Best Paper Award)** Jounsup Park, Mingyuan Wu, Eric Lee, **Bo Chen**, Klara Nahrstedt, Michael Zink, and Ramesh Sitaraman, "SEAWARE: Semantic Aware View Prediction System for 360-degree Video Streaming", **IEEE ISM**, 2020

[19] Mingyuan Wu, Ruifan Ji, Haozhen Zheng, Jiaxi Li, Beitong Tian, **Bo Chen**, Rui-Xiao Zhang, Jacob Chakareski, Michael Zink, Ramesh Sitaraman, Klara Nahrstedt, "Scene Graph Driven Hybrid Interactive VR Teleconferencing," **ACM Multimedia (Demo)**, 2024

[18] Beitong Tian, Mingyuan Wu, Ruixiao Zhang, Haozhen Zheng, **Bo Chen**, Yaohui Wang, Shiv Trivedi, Shanbo Zhang, Robert Bruce Kaufman, Leah Espenhahn, Gianni Pezzarossi, Mauro Sardela, John Dallesasse, Klara Nahrstedt, "GaugeTracker: AI-Powered Cost-Effective Analog Gauge Monitoring System," **IEEE MIPR**, 2024

[17] Hongpeng Guo, Haotian Gu, Xiaoyang Wang, **Bo Chen**, Eun Kyung Lee, Tamar Eilam, Deming Chen, Klara Nahrstedt, "FedCore: Accelerating Federated Learning with Distributed Coresets," **IEEE ICC**, 2024

[16] **Bo Chen**, Zhisheng Yan, Klara Nahrstedt, "Context-Aware Optimization for Bandwidth-Efficient Image Analytics Offloading," **ACM TOMM**, 2023

[15] Mingyuan Wu, Yuhan Lu, Shiv Trivedi, **Bo Chen**, Qian Zhou, Lingdong Wang, Simran Singh, Michael Zink, Ramesh Sitaraman, Jacob Chakareski, Klara Nahrstedt, "Interactive Scene Analysis for Teleconferencing," **IEEE ISM**, 2023

[14] Yinjie Zhang, Mingyuan Wu, Beitong Tian, Jiaxi Li, **Bo Chen**, Qian Zhou, Klara Nahrstedt, "SAVG360: Saliency-aware Viewport-guidance-enabled 360-degree Video Streaming System," **IEEE ISM**, 2023

[13] Jiaxi Li, Jingwei Liao, **Bo Chen**, Anh Nguyen, Aditi Tiwari, Qian Zhou, Zhisheng Yan, Klara Nahrstedt, "Latency-Aware 360-Degree Video Analytics Framework for First Responders Situational Awareness," **ACM NOSSDAV**, 2023

[12] Wei Luo, **Bo Chen**, "Neural Image Compression with Quantization Rectifier," **ICML 2023 Workshop NCW**, 2023

[11] Ahmed Ali-Eldin, Chirag Goel, Mayank Jha, **Bo Chen**, Klara Nahrstedt, Prashant Shenoy, "CAVE: Caching 360° Videos at the Edge," **ACM NOSSDAV**, 2022

[10] **Bo Chen**, Klara Nahrstedt, "EScALation: a framework for efficient and scalable spatio-temporal action localization," **ACM MMSys**, 2021

[9] **Bo Chen**, Zhisheng Yan, Hongpeng Guo, Zhe Yang, Ahmed Ali-Eldin, Prashant Shenoy, Klara Nahrstedt, "Deep Contextualized Compressive Offloading for Images," AIChallengeIoT, Workshop co-located with **ACM SenSys**, 2021

[8] Ragini Gupta, **Bo Chen**, Shengzhong Liu, Tianshi Wang, Sandeep Singh Sandha, Abel Souza, Klara Nahrstedt, Tarek Abdelzaher, Mani Srivastava, Prashant Shenoy, Jeffrey Smith, Maggie Wigness, Niranjan Suri, "DARTS: Distributed IoT Architecture for Real-Time, Resilient, and AI-Compressed Workflows", ApPLIED, Workshop co-located with **ACM PODC**, 2022

[7] Qian Zhou, **Bo Chen**, Zhe Yang, Hongpeng Guo, Klara Nahrstedt, "360ViewPET: View Based Pose EsTimation for Ultra-Sparse 360-Degree Cameras", **IEEE ISM**, 2021

[6] **Bo Chen**, Ahmed Ali-Eldin, Prashant Shenoy and Klara Nahrstedt, "Real-time Spatio-Temporal Action Localization in 360 Videos", **IEEE ISM**, 2020

[5] **Bo Chen**, Zhisheng Yan, Haiming Jin, Klara Nahrstedt, "Event-driven Stitching for Tile-based 360 Video Live Streaming", **ACM MMSys**, 2019

[4] **Bo Chen**, Klara Nahrstedt, "FIS: Facial Information Segmentation for Video Redaction", **IEEE MIPR**, 2019

[3] **Bo Chen**, Klara Nahrstedt, Carl Gunter, "ReSPonSe: Real-time, Secure, and Privacy-aware Video Redaction System", **ACM MobiQuitous**, 2018

[2] Tarek Elgamal, **Bo Chen**, Klara Nahrstedt, "Teleconsultant: Communication and analysis of wearable videos in Emergency Medical Environments", **ACM Multimedia Demo**, 2017

[1] Qianru Li, **Bo Chen**, Songjun Ma, Luoyi Fu, Xinbing Wang, "Contrastive Topic Discovery via Nonnegative Matrix Factorization", **IEEE ICC**, 2016

Talks

Apr. 2024. **NeRFHub: A Context-Aware NeRF Serving Framework for Mobile Immersive Applications**. Invited talk at UIUC Sys-Net Spring 2024 Retreat.

Mar. 2024. **Advancing Immersive Computing Systems in Age of Machine Learning**. Invited talk at UT Dallas.

Nov. 2023. **Context-aware Image Compression Optimization for Visual Analytics Offloading**. Guest lecture, Advanced Topics in IOT, UIUC.

Feb. 2022. **Optimized Video Compression for Computation Offloading**. Invited talk at University of Chicago.

Grants & Awards

2022 **Best Student Paper Award**, ACM Multimedia Systems Conference

2020 **Best Paper Award**, IEEE International Symposium on Multimedia

2019 **SIGMM Travel Grant**, ACM Multimedia Systems

Research & Working Experience

University of Illinois at Urbana-Champaign (Postdoc) *Urbana, IL*

Advisor: Prof. Klara Nahrstedt *Jul. 2022 - Present*

- Project: "miVirtualSeat: Semantics-aware Content Distribution for Immersive Meeting Environments"
- Project: "Augmented 360 Video for Situation Awareness in Firefighting"
- Project: "Clowder Open Source Customizable Research Data Management"

University of Illinois at Urbana-Champaign (Ph.D.) *Urbana, IL*
Advisor: Prof. Klara Nahrstedt *Sep. 2016 - May. 2022*
- Dissertation: "Learning-based Saliency-aware Compression Framework"

Facebook (Internship) *Menlo Park, CA*
Advisor: Luke Wang *May. 2020 - Aug. 2020*
- Project: "A network device query system based on Elasticsearch"

AT&T Research Lab (Internship) *Bedminster, NJ*
Co-Advisors: Dr. Shu Shi, Prof. Bo Han *May. 2019 - Aug. 2019*
- Project: "A novel transport protocol for latency-sensitive applications in LTE networks"

Teaching Experience

2024 **UIUC CS 537 Advanced Topics in IOT**, Teaching Assistant

2023 **UIUC CS 537 Advanced Topics in IOT**, Teaching Assistant

2022 **UIUC CS 537 Advanced Topics in IOT**, Teaching Assistant

2020 **UIUC CS 438 Communication Networks**, Teaching Assistant

Grant Writing Experience

I helped with the writing of the following proposals.

2024 **Resilient, Bandwidth-efficient, and Low-latency Immersive Video Streaming**, PIs: Klara Nahrstedt and Bo Han

2024 **Video Analytics at Scale via Collaborative AI**, PIs: Klara Nahrstedt and Zhisheng Yan

Professional Involvement

2025 **ACM MMSys**, TPC Member

2024 **NSF Workshop on Sustainable Computing for Sustainability**, Publication Chair

2024 **ACM MMSys**, TPC Member

2024 **ACM MM, IEEE ICCCN, ACM TOMM, IEEE TMM**, Reviewer

2023 **IEEE SECON**, Publication Chair

2023 **SEC, ImmerCom**, TPC Member

2023 **ACM MM, ACM MMSys, ACM TOMM**, Reviewer

Mentoring

Sep. 2024 - Present	**Lingzhi Zhao, PhD**, Project in Progress: “Low-cost Underwater Conversation with Large Language Vision Models”	*UIUC*
Sep. 2024 - Present	**Revan Ji, Master**, Project in Progress: “Video Streaming with 3D Gaussian Splatting”	*UIUC*
May. 2024 - Present	**Ben Civjan, Master**, Project in Progress: “Energy-efficient Frame Filtering at Edge”	*UIUC*
May. 2024 - Present	**Jiaxi Li, PhD**, Project in Progress: “Energy-efficient Video Analytics”	*UIUC*
Sep. 2023 - Sep. 2024	**Lingzhi Zhao, PhD**, Paper in Submission: “Reliable Underwater Image Transmission Using Mobile Devices”	*UIUC*
Sep. 2023 - Jul. 2024	**Cody Wang, Master**, Paper in Submission: “Cost-Effective Tracking of Chemical Containers with Magnets”	*UIUC*
Sep. 2023 - Jul. 2024	**Wei Luo, Master**, Paper in Submission: “Discovering vulnerable sketches with manufactured network traffic”	*Princeton University*
Sep. 2023 - Sep. 2024	**Nan Wu, Ph.D.**, Paper in Submission: “Photo-realistic volumetric video streaming with neural-based content representation”	*George Mason University*
Jun. 2023 - Dec. 2023	**Revan Ji, Undergraduate**, Project Finished: “Efficient neural rendering of human face with a mixture of volume and mesh”	*UIUC*
Sep. 2022 - Dec. 2023	**Aditi Tiwari, Master**, Project Finished: “Action-based search in 360-degree videos”	*UIUC*
Sep. 2022 - May. 2023	**Jiaxi Li, Master**, Paper Accepted in NOSSDAV23: “Latency-aware 360-degree video analytics framework for first responders situational awareness”	*UIUC*
Oct. 2022 - May. 2023	**Jingwei Liao, Ph.D.**, Paper in Submission: “Viewport polyhedron-based 360-degree image compression”	*George Mason University*
Sep. 2022 - May. 2023	**Wei Luo, Master**, Paper Accepted in Neural Compression Workshop at ICML 2023: “Neural image compression with quantization rectifier”	*Princeton University*
Oct. 2021 - May. 2022	**Wei Luo, Undergraduate**, Senior Thesis: “Learning feature saliency towards better compression”	*UIUC*