Nuowen Kan

Postdoctoral Researcher · Shanghai Jiao Tong University

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Short Bio

I am a Postdoctoral Researcher at Shanghai Jiao Tong University, advised by Prof. Hongkai Xiong. My research interests include multimeida communication, deep reinforcement learning, deep learning for network optimization. I have published 6 IEEE Transactions and 13 conference papers on these topics, including IEEE T-ON, T-CSVT, T-MM and top conferences NeurIPS, CVPR, ICLR, ICML, ACM MM. I am funded by the China Postdoctoral Innovation Talents Support Program (2024-2026) and NFSC Young Scientists Project (2025-2027). I was awarded with the Top Paper Award (Top 1%, first author) of 2022 ACM Multimedia Conference (CCF-A), the second prize of Chinese Institute of Electronics Scientific and Technological Progress Award (2023), and the first prize of Shanghai Scientific and Technological Progress Award (2022).

Education

Shanghai Jiao Tong University (SJTU) *Shanghai, China*

Ph.D. in Computer Science and Technology *Sep. 2020 - Mar. 2024*

- Advisor: **Prof. Junni Zou**

Shanghai Jiao Tong University (SJTU) *Shanghai, China*

M.Eng. in Electronic and Communication Engineering *Sep. 2017 - Mar. 2020*

- Advisor: **Prof. Hongkai Xiong, IEEE Fellow**

Nanjing University of Aeronautics and Astronautics (NUAA) *Nanjing, China*

B.Eng. in Communication Engineering *Sep. 2013-Jun. 2017*

Work Experience

Shanghai Jiao Tong University *Shanghai, China*

Postdoctoral Researcher *Mar. 2024 - Present*

- Advisor: **Prof. Hongkai Xiong, IEEE Fellow**
- Responsibilities: I am funded by China Postdoctoral Innovative Talents Support Program (Approved in June 2025), the NFSC Young Scientists Project (62401366), China Postdoctoral Science Foundation (2024M751976), and paticipate in the NFSC Key Project (PI: Prof. Chenglin Li).
- Research Topics: Real-Time Communication for Volumetric Videos, High-Performance Computing Network Optimization

Research Grants

Principal Investigator

2024-2026 **China Postdoctoral Innovative Talents Support Program (Approved in June 2025)** *640,000 CNY*
Adaptive Transmission for Volumetric Videos Based on Deep Graph Generation

2025-2027 **NFSC Young Scientists Project (62401366)** *300,000 CNY*
Real-Time Interactive Transmission for Volumetric Videos Based on Graph Diffusion Generative Model

2024-2026 **China Postdoctoral Science Foundation General Project (2024M751976)** *80,000 CNY*
Layered Representation and Progressive Streaming of Immersive Videos Based on Graph Diffusion Model

Co-Investigator

2025-2029 **NFSC Key Project (62431017)** PI: Prof. Hongkai Xiong
AI Sparse Coding and Adaptive Communication Based on Multimedia Large Models: Theory and Technology

2020-2024 **NFSC Key Project (61931023)** PI: Prof. Junni Zou
Artificial Intelligence-Optimized Immersive Video Transmissio: Theory and Technology

2024-2025 **SJTU-Huawei Joint Research Project** PI: Prof. Junni Zou
Topology-Aware Collective Algorithm Synthesizer for High-Performance Computing System

2024-2025 **SJTU-Huawei Joint Research Project** PI: Prof. Chenglin Li
Congestion Control Algorithm for Real-Time Communication Based on Offline Reinforcement Learning

Academic Awards

2025 **China Postdoctoral Innovative Talents Support Program**, China Postdoctoral Science Foundation

2022 **Top 1% Paper Award**, ACM Multimedia 2022 Program co-Chairs (CCF-A) *Rank: 1/6*
Nuowen Kan, *Yuankun Jiang, Chenglin Li, Junni Zou, Wenrui Dai, Hongkai Xiong*

2023 **Second Class Prize**, Chinese Institute of Electronics (CIE) Scientific and Technological Progress Award *Rank: 4/9*
Chenglin Li, Hongkai Xiong, Xuesong Gao, ***Nuowen Kan****, Shibin Su, Jian Liu, Wenrui Dai, Junni Zou, Weiyao Lin*

2022 **First Class Prize**, Shanghai Scientific and Technological Progress Award *Rank: 14/15*
Hongkai Xiong, Yilin Xu, Wenrui Dai, Wei Chen, Xingdong Wang, Junfeng Du, Yi Tang, Lin Zhang, Weiyao Lin, Chenglin Li, Yunfei Zhang, Shaohui Li, ***Nuowen Kan****, Wen Fei*

2024 **Shanghai Super Postdoctoral Incentive Program**, Shanghai Municipal Government

2024 **Outstanding Ph.D. Graduate of Shanghai**, Shanghai Municipal Government

Publications

The authors with * are the corresponding authors of the paper.

I. First-Author and Corresponding-Author Papers

1. RAPT360: Reinforcement Learning-Based Rate Adaptation for 360-Degree Video Streaming with Adaptive Prediction and Tiling *JCR Q1*

Nuowen Kan, Junni Zou*, Chenglin Li*, Wenrui Dai, Hongkai Xiong *IF=11.1*

IEEE Transactions on Circuits and Systems for Video Technology **(TCSVT)**, vol. 32, pp. 1607-1623, Mar. 2022.

2. GDPlan: Generative Network Planning via Graph Diffusion Model *CCF-A*

Nuowen Kan, Sa Yan, Junni Zou*, Wenrui Dai*, Xing Gao, Chenglin Li, Hongkai Xiong *IF=3.6*

IEEE Transactions on Networking **(TON)**, Early Access, Jan. 2025. DOI10.1109/TON.2025.3535518

3. Improving Generalization for Neural Adaptive Video Streaming via Meta Reinforcement Learning *Oral, CCF-A*

Nuowen Kan, Yuankun Jiang, Chenglin Li*, Wenrui Dai, Junni Zou, Hongkai Xiong *Top Paper Award*

ACM International Conference on Multimedia **(ACM MM 2022)**, Lisbon, Portugal, pp. 3006-3016, Oct. 10-14, 2022.

4. Uncertainty-Aware Robust Adaptive Video Streaming with Bayesian Neural Network and Model Predictive Control *Oral, CCF-B*

Nuowen Kan, Chenglin Li*, Caiyi Yang, Wenrui Dai, Junni Zou, Hongkai Xiong

ACM Workshop on Network and Operating Systems Support for Digital Audio and Video **(NOSSDAV 2021)**, Istanbul, Turkey, pp. 18-24, Sep. 28-Oct. 1, 2021.

5. Deep Reinforcement Learning-Based Rate Adaptation for Adaptive 360-Degree Video Streaming *CCF-B*

Nuowen Kan, Junni Zou, Kexin Tang, Chenglin Li, Ning Liu, Hongkai Xiong*

IEEE International Conference on Acoustics, Speech and Signal Processing **(ICASSP 2019)**, Brighton, England, pp. 4030-4034, May 12-17, 2019.

6. Task-Oriented Multi-Bitstream Optimization for Image Compression and Transmission via Optimal Transport *CCF-A*

Sa Yan, **Nuowen Kan***, Chenglin Li*, Wenrui Dai, Junni Zou*, Hongkai Xiong

ACM International Conference on Multimedia **(ACM MM 2024)**, Melbourne, VIC, Australia, pp. 3695-3703, Oct. 28-Nov. 1, 2024.

7. Stabilizing and Accelerating Autofocus with Expert Trajectory Regularized Deep Reinforcement Learning *CCF-A*

Shouhang Zhu, Chenglin Li*, Yuankun Jiang, Li Wei, **Nuowen Kan***, Ziyang Zheng, Wenrui Dai, Junni Zou*, Hongkai Xiong

IEEE/CVF Conference on Computer Vision and Pattern Recognition **(CVPR 2025)**, Nashville, TN, USA, pp. 26440-26450, Jun. 11-15, 2025.

8. A Generalizable and Expressive Meta-Diffusion Policy for RTC Bandwidth Prediction *CCF-B*

Zhiyuan Chen, **Nuowen Kan***, Chenglin Li*, Wenrui Dai, Junni Zou*, Hongkai Xiong

IEEE International Conference on Multimedia and Expo **(ICME 2025)**, Nantes, France, Jun. 30-Jul. 4, 2025.

9. A Server-Side Optimized Hybrid Multicast-Unicast Strategy for Multi-User Adaptive 360-Degree Video Streaming *Oral*

Nuowen Kan, Chengming Liu, Junni Zou*, Chenglin Li, Hongkai Xiong

IEEE International Conference on Image Processing **(ICIP 2019)**, Taipei, pp. 141-145, Sep. 22-25, 2019.

II. Other Papers

10. Learnable Non-uniform Quantization With Sampling-based Optimization for Variable-Rate Learned Image Compression *JCR Q1*

Shaohui Li, Wenrui Dai*, **Nuowen Kan**, Chenglin Li, Junni Zou, Hongkai Xiong *IF=11.1*

IEEE Transactions on Circuits and Systems for Video Technology **(TCSVT)**, Early Access, 2025. DOI: 10.1109/TCSVT.2025.3546765

11. Task-Adapted Learnable Embedded Quantization for Scalable Human-Machine Image Compression *JCR Q1*

Shaohui Li, Shuoyu Ma, Wenrui Dai*, **Nuowen Kan**, Fan Cheng, Chenglin Li, Junni Zou, Hongkai Xiong *IF=11.1*

IEEE Transactions on Circuits and Systems for Video Technology **(TCSVT)**, vol. 35, pp. 4768-4783, May 2025.

12. Successor Feature-Based Transfer Reinforcement Learning for Video Rate Adaptation With Heterogeneous QoE Preferences *JCR Q1*

Kexin Tang, **Nuowen Kan**, Yuankun Jiang, Chenglin Li*, Wenrui Dai, Junni Zou, Hongkai Xiong *IF=9.7*

IEEE Transactions on Multimedia **(TMM)**, vol. 26, pp. 5340-5357, Nov. 2023.

13. Multi-user Adaptive Video Delivery over Wireless Networks: A Physical Layer Resource-Aware Deep Reinforcement Learning Approach *JCR Q1*

Kexin Tang, **Nuowen Kan**, Junni Zou, Chenglin Li*, Xiao Fu, Mingyi Hong, Hongkai Xiong *IF=11.1*

IEEE Transactions on Circuits and Systems for Video Technology **(TCSVT)**, vol. 31, pp. 798-815, Feb. 2021.

14. Doubly Robust Augmented Transfer for Meta-Reinforcement Learning *CCF-A*

Yuankun Jiang, **Nuowen Kan**, Chenglin Li*, Wenrui Dai*, Junni Zou*, Hongkai Xiong

Advances in Neural Information Processing Systems **(NeurIPS 2023)**, New Orleans, LA, USA, pp. 77002-77012, Dec. 10-16, 2023.

15. Improving Generalization in Federated Learning with Model-Data Mutual Information Regularization: A Posterior Inference Approach *CCF-A*

Hao Zhang, Chenglin Li*, **Nuowen Kan**, Ziyang Zheng, Wenrui Dai, Junni Zou, Hongkai Xiong

Advances in Neural Information Processing Systems **(NeurIPS 2024)**, Red Hook, NY, USA, pp. 136646-136678, Dec. 10-15, 2024.

16. Noise Conditional Variational Score Distillation *CCF-A*

Xinyu Peng, Ziyang Zheng*, Yaoming Wang, Han Li, **Nuowen Kan**, Wenrui Dai*, Chenglin Li, Junni Zou, Hongkai Xiong

International Conference on Machine Learning **(ICML 2025)**, Vancouver, Canada, Jul. 13-19, 2025.

17. On Disentangled Training for Nonlinear Transform in Learned Image Compression *Spotlight, CCF-A*

Han Li, Shaohui Li*, Wenrui Dai*, Maida Cao, **Nuowen Kan**, Chenglin Li, Junni Zou, Hongkai Xiong

International Conference on Learning Representation **(ICLR 2025)**, Singapore, Apr. 24-28, 2025.

18. Multiuser Video Streaming Rate Adaptation: A Physical Layer Resource-Aware Deep Rinforcement Learning Approach

Kexin Tang, **Nuowen Kan**, Junni Zou*, Xiao Fu, Mingyi Hong, Hongkai Xiong

IEEE Visual Communications and Image Processing **(VCIP 2019)**, Sydney, NSW, Australia, pp. 798-815, Dec. 1-4, 2019.

19. Server-Side Rate Adaptation for Multi-User 360-Degree Video Streaming

Chengming Liu, **Nuowen Kan**, Junni Zou*, Qin Yang, Hongkai Xiong

IEEE International Conference on Image Processing **(ICIP 2018)**, Athens, Greece, pp. 3264-3268, Oct. 7-10, 2018.

III. Papers Under Review

1. MERINA+: Improving Generalization for Neural Video Adaptation via Information-Theoretic Meta-Reinforcement Learning

Nuowen Kan, Chenglin Li, Yuankun Jiang, Wenrui Dai, Junni Zou, Hongkai Xiong, Laura Toni

IEEE Transactions on Circuits and Systems for Video Technology **(TCSVT)**, on Major Revision.

2. MetaBand: Learning A Meta-Policy for RTC Bandwidth Estimation with Data-Efficient Offline Reinforcement Learning

Nuowen Kan, Ruisong Yan, Chenglin Li, Shaohui Li, Wenrui Dai, Junni Zou, Hongkai Xiong

Submitted to IEEE Transactions on Circuits and Systems for Video Technology **(TCSVT)**.

3. Topology Optimization With Ricci Curvature Based Measurement for Communication Network Planning

Xingyu Zhou, **Nuowen Kan***, Yiheng Jiang, Junni Zou, Wenrui Dai, Chenglin Li, Hongkai Xiong

Submitted to IEEE Transactions on Networking **(TON)**.

4. QoE-Diffuser: A Generative Bitrate Adaptation for Video Streaming with Heterogeneous QoE Preferences via Diffusion Model

Jinhao Yi, **Nuowen Kan***, Chenglin Li, Wenrui Dai, Junni Zou, Hongkai Xiong

Submitted to IEEE Transactions on Multimedia **(TMM)**.

5. Point Cloud Attribute Compression With Geometry-Aware Lifting-Based Multiscale Networks

Xin Li, Shaohui Li, Wenrui Dai, Han Li, **Nuowen Kan**, Chenglin Li, Junni Zou, Hongkai Xiong

IEEE Transactions on Circuits and Systems for Video Technology **(TCSVT)**, on Major Revision.

Granted Patents

Adaptive Bitrate Allocation Method *Chinese Patent*

Chenglin Li, **Nuowen Kan**, Wenrui Dai, Shaohui Li, Junni Zou, Hongkai Xiong

ZL 202110796984.9, granted on 2022.05.17

Server-Side Adaptive Bitrate Allocation Method and System for Multi-User 360-Degree Video Streaming *Chinese Patent*

Junni Zou, **Nuowen Kan**, Kexin Tang, Chenglin Li, Hongkai Xiong

ZL 201810211169.X, granted on 2020.06.05

Server-Side Adaptive Bitrate Transmission Method and System for Multi-User 360-Degree Video Streaming *Chinese Patent*

Junni Zou, **Nuowen Kan**, Chenglin Li, Hongkai Xiong

ZL 201910445463.1, granted on 2020.06.02

A Physical Unclonable Function Response Error Correction Circuit Based on SRAM Memory *Chinese Patent*

Nuowen Kan, Weiqiang Liu

ZL 201610654990.X, granted on 2019.04.02

Academic Activities

2025 **Website Chair**, The 8th Chinese Conference on Pattern Recognition and Computer Vision

Since 2022 **Invited Reviewer**, Top-tier conferences: NeurIPS, ACM MM, IEEE ICC, IEEE Globecom

Since 2021 **Invited Reviewer**, Top-tier journals: IEEE JSAC, IEEE T-CSVT, IEEE T-MC

2017 **Conferenec volunteer**, The 9th International Conference on Image and Graphics

Other Awards

2022 **First Class**, Huawei Scholarship of Shanghai Jiao Tong University

2019 **First Class**, SMICS MengNing Scholarship of Shanghai Jiao Tong University

2016 **First Class**, National Encourage Scholarship

2015 **First Prize**, FPGA Application System Design Invitational Competition, Jiangsu Province