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Tenure-track Associate Professor and Ph.D. Supervisor
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Summary

Research on image and video coding, with emphasis on learned, generative, and machine-oriented compression and its extension to 3D/multi-view visual data and multimodal models. First author of DVC (CVPR 2019), the first end-to-end deep video compression framework that jointly optimizes all codec components, cited over 1,000 times. Over 5,000 Google Scholar citations; publications include 9 papers in IEEE Transactions on Image Processing, 6 in IEEE TPAMI, and 23 at CVPR, ICCV, ECCV, and ICLR. Recipient of the IEEE CASS VSPC Rising Star Award (2023). Reviewer for IEEE TIP since 2018 and Associate Editor of IEEE T-CSVT since 2025.

Research Interests

- Image and video coding: learned, generative, and ultra-low-bitrate compression; rate control and rate-distortion optimization.
- Compression for machine vision; semantic and generative visual communication.
- 3D and multi-view visual data: 3D Gaussian Splatting, NeRF-based volumetric video, and multi-view video compression.
- Image and video restoration, enhancement, and quality assessment.
- Efficient multimodal large models, including visual token compression for video LLMs.

Academic Appointments

- **Tenure-track Associate Professor and Ph.D. Supervisor**, Department of Electronic Engineering, Shanghai Jiao Tong University, 2022–present.
- **Assistant Professor**, Beijing Institute of Technology, 2020–2022.
- **Visiting Researcher**, University of Sydney, September 2017–March 2019 (with Prof. Wanli Ouyang and Prof. Dong Xu).

Education

- **Ph.D. in Electronic Engineering**, Shanghai Jiao Tong University, 2020.
- **Bachelor's degree**, Ocean University of China, 2014.

Publications

1. Yezheng Zhang, Huanxiong Liang, Chuqin Zhou, **Guo Lu**, Wenjun Zhang. Compressing 3D Gaussian Splatting via Cross-Representation Priors. *IEEE Transactions on Image Processing*, vol. 35, pp. 10347–10360, 2026.
2. Yan Zhao, Zhengxue Cheng, Jiangchuan Li, Donghui Feng, Qunshan Gu, Qi Wang, **Guo Lu**, Li Song. Instance-Adaptive Spatial-Temporal Enhancement for Efficient Video Compression. *IEEE Transactions on Image Processing*, vol. 34, pp. 5776–5791, 2025.
3. Chen Zhu, **Guo Lu**, Bing He, Rong Xie, Li Song. Implicit-Explicit Integrated Representations for Multi-View Video Compression. *IEEE Transactions on Image Processing*, vol. 34, pp. 1106–1118, 2025.
4. Chunyi Li, **Guo Lu**, Donghui Feng, Haoning Wu, Zicheng Zhang, Xiaohong Liu, Guangtao Zhai, Weisi Lin, Wenjun Zhang. MISC: Ultra-Low Bitrate Image Semantic Compression Driven by Large Multimodal Model. *IEEE Transactions on Image Processing*, vol. 34, pp. 335–349, 2025.

5. Jinyang Guo, Dong Xu, **Guo Lu**. CBANet: Toward Complexity and Bitrate Adaptive Deep Image Compression Using a Single Network. *IEEE Transactions on Image Processing*, vol. 32, pp. 2049–2062, 2023.
6. Tong Tang, Ling Li, Xiaoyu Wu, Ruizhi Chen, Haochen Li, **Guo Lu**, Limin Cheng. TSA-SCC: Text Semantic-Aware Screen Content Coding with Ultra Low Bitrate. *IEEE Transactions on Image Processing*, vol. 31, pp. 2463–2477, 2022.
7. Zhenghao Chen, Shuhang Gu, **Guo Lu**, Dong Xu. Exploiting Intra-Slice and Inter-Slice Redundancy for Learning-Based Lossless Volumetric Image Compression. *IEEE Transactions on Image Processing*, vol. 31, pp. 1697–1707, 2022.
8. **Guo Lu**, Xiaoyun Zhang, Wanli Ouyang, Dong Xu, Li Chen, Zhiyong Gao. Deep Non-Local Kalman Network for Video Compression Artifact Reduction. *IEEE Transactions on Image Processing*, vol. 29, pp. 1725–1737, 2020.
9. **Guo Lu**, Xiaoyun Zhang, Li Chen, Zhiyong Gao. Novel Integration of Frame Rate Up Conversion and HEVC Coding Based on Rate-Distortion Optimization. *IEEE Transactions on Image Processing*, vol. 27, no. 2, pp. 678–691, 2018.
10. Chunyi Li, Xiaoyue Ling, Farong Wen, Haoyang Li, **Guo Lu**, Weisi Lin, Xiao-Ping Zhang, Guangtao Zhai, Wenjun Zhang. Image Quality Assessment for Machine-oriented Communication. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, to appear, 2026.
11. Yuan Tian, Xiaoyue Ling, Cong Geng, Qiang Hu, **Guo Lu**, Guangtao Zhai. SMC++: Masked Learning of Unsupervised Video Semantic Compression. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 48, no. 2, pp. 1992–2011, 2026.
12. Yuan Tian, **Guo Lu**, Yichao Yan, Guangtao Zhai, Li Chen, Zhiyong Gao. A Coding Framework and Benchmark towards Low-Bitrate Video Understanding. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 46, no. 8, pp. 5852–5872, 2024.
13. Zhihao Hu, Dong Xu, **Guo Lu**, Wei Jiang, Wei Wang, Shan Liu. FVC: An End-to-End Framework towards Deep Video Compression in Feature Space. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 2022.
14. **Guo Lu**, Xiaoyun Zhang, Wanli Ouyang, Li Chen, Zhiyong Gao, Dong Xu. An End-to-End Learning Framework for Video Compression. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, vol. 43, no. 10, pp. 3292–3308, 2021.
15. Hongwen Zhang, Jie Cao, **Guo Lu**, Wanli Ouyang, Zhenan Sun. Learning 3D Human Shape and Pose from Dense Body Parts. *IEEE Transactions on Pattern Analysis and Machine Intelligence*, 2020.
16. Chuqin Zhou, Xiaoyue Ling, Yunuo Chen, Jincheng Dai, **Guo Lu**, Wenjun Zhang. Dual-Representation Image Compression at Ultra-Low Bitrates via Explicit Semantics and Implicit Textures. *IEEE Transactions on Circuits and Systems for Video Technology*, early access, 2026.
17. Junhao Du, Chuqin Zhou, Yunuo Chen, **Guo Lu**. Large Language Model for Lossless Image Compression with Visual Prompts. *IEEE Transactions on Circuits and Systems for Video Technology*, early access, 2026.
18. **Guo Lu**, Xingtong Ge, Tianxiong Zhong, Qiang Hu, Jing Geng. Preprocessing Enhanced Image Compression for Machine Vision. *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 34, no. 12, pp. 13556–13568, 2024.
19. Chen Zhu, **Guo Lu**, Huanbang Chen, Donghui Feng, Shen Wang, Yan Zhao, Rong Xie, Li Song. A Character Position-Aware Compression Framework for Screen Text Image. *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 34, no. 9, pp. 8821–8835, 2024.
20. Wang Shen, Ming Cheng, **Guo Lu**, Guangtao Zhai, Li Chen, M. Salman Asif, Zhiyong Gao. Spatial Temporal Video Enhancement Using Alternating Exposures. *IEEE Transactions on Circuits and Systems for Video Technology*, vol. 32, pp. 4912–4926, 2022.
21. Yunuo Chen, Chuqin Zhou, Jiangchuan Li, Xiaoyue Ling, Bing He, Jincheng Dai, Li Song, **Guo Lu**. Next-frame Decoding for Ultra-Low-Bitrate Image Compression with Video Diffusion Priors. *ECCV*, 2026.
22. Junhao Du, Jialong Xue, Anqi Li, Jincheng Dai, **Guo Lu**. Unified Spatiotemporal Token Compression for Video-LLMs at Ultra-Low Retention. *CVPR*, 2026.
23. Yunuo Chen, Bing He, Zezheng Lyu, Hongwei Hu, Qunshan Gu, Yuan Tian, **Guo Lu**. Adaptive Learned Image Compression with Graph Neural Networks. *CVPR*, 2026.
24. Yunuo Chen, Zezheng Lyu, Bing He, Hongwei Hu, Qi Wang, Yuan Tian, Li Song, Wenjun Zhang, **Guo Lu**. Content-Aware Mamba for Learned Image Compression. *ICLR*, 2026.
25. Yunuo Chen, Zezheng Lyu, Bing He, Ning Cao, Gang Chen, **Guo Lu**, Wenjun Zhang. Knowledge Distillation for Learned Image Compression (Oral). *ICCV*, 2025.
26. Chunyi Li, Yuan Tian, Xiaoyue Ling, Zicheng Zhang, Haodong Duan, Haoning Wu, Ziheng Jia, Xiaohong Liu, Xiongkuo Min, **Guo Lu**, Weisi Lin, Guangtao Zhai. Image Quality Assessment: From Human to Machine Preference (Highlight). *CVPR*, 2025.

27. Donghui Feng, Zhengxue Cheng, Shen Wang, Ronghua Wu, Hongwei Hu, **Guo Lu**, Li Song. Linear Attention Modeling for Learned Image Compression. *CVPR*, 2025.
28. Yuan Tian, **Guo Lu**, Guangtao Zhai. Free-VSC: Free Semantics from Visual Foundation Models for Unsupervised Video Semantic Compression. *ECCV*, 2024.
29. Xinjie Zhang, Xingtong Ge, Tongda Xu, Dailan He, Yan Wang, Hongwei Qin, **Guo Lu**, Jing Geng, Jun Zhang. GaussianImage: 1000 FPS Image Representation and Compression by 2D Gaussian Splatting. *ECCV*, 2024.
30. Xingtong Ge, Jixiang Luo, Xinjie Zhang, Tongda Xu, **Guo Lu**, Dailan He, Jing Geng, Yan Wang, Jun Zhang, Hongwei Qin. Task-Aware Encoder Control for Deep Video Compression. *CVPR*, 2024.
31. Yiwei Zhang, **Guo Lu**, Yunuo Chen, Shen Wang, Yibo Shi, Jing Wang, Li Song. Neural Rate Control for Learned Video Compression. *ICLR*, 2024.
32. Yuan Tian, **Guo Lu**, Guangtao Zhai, Zhiyong Gao. Non-Semantics Suppressed Mask Learning for Unsupervised Video Semantic Compression. *ICCV*, 2023.
33. Guanbo Pan, **Guo Lu**, Zhihao Hu, Dong Xu. Content Adaptive Latents and Decoder for Neural Image Compression. *ECCV*, 2022.
34. **Guo Lu**, Tianxiong Zhong, Jing Geng, Qiang Hu, Dong Xu. Learning Based Multi-Modality Image and Video Compression. *CVPR*, 2022.
35. Zhenghao Chen, **Guo Lu**, Zhihao Hu, Shan Liu, Wei Jiang, Dong Xu. LSVC: A Learning-based Stereo Video Compression Framework. *CVPR*, 2022.
36. Zhihao Hu, **Guo Lu**, Jinyang Guo, Shan Liu, Wei Jiang, Dong Xu. Coarse-to-Fine Deep Video Coding with Hyperprior-Guided Mode Prediction. *CVPR*, 2022.
37. Yuan Tian, **Guo Lu**, Xiongkuo Min, Zhaohui Che, Guangtao Zhai, Guodong Guo, Zhiyong Gao. Self-Conditioned Probabilistic Learning of Video Rescaling. *ICCV*, 2021.
38. Zhihao Hu, **Guo Lu**, Dong Xu. FVC: A New Framework towards Deep Video Compression in Feature Space. *CVPR*, 2021.
39. Zizheng Que, **Guo Lu**, Dong Xu. VoxelContext-Net: An Octree Based Framework for Point Cloud Compression. *CVPR*, 2021.
40. **Guo Lu**, Chunlei Cai, Xiaoyun Zhang, Li Chen, Wanli Ouyang, Dong Xu, Zhiyong Gao. Content Adaptive and Error Propagation Aware Deep Video Compression. *ECCV*, 2020.
41. Zhihao Hu, Zhenghao Chen, Dong Xu, **Guo Lu**, Wanli Ouyang, Shuhang Gu. Improving Deep Video Compression by Resolution-Adaptive Flow Coding. *ECCV*, 2020.
42. **Guo Lu**, Wanli Ouyang, Dong Xu, Xiaoyun Zhang, Chunlei Cai, Zhiyong Gao. DVC: An End-to-End Deep Video Compression Framework. *CVPR*, 2019.
43. **Guo Lu**, Wanli Ouyang, Dong Xu, Xiaoyun Zhang, Zhiyong Gao, Ming-Ting Sun. Deep Kalman Filtering Network for Video Compression Artifact Reduction. *ECCV*, 2018.

Professional Service

Editorial

- Associate Editor, *IEEE Transactions on Circuits and Systems for Video Technology* (T-CSVT), 2025–present.
- Guest Editor, *IEEE Journal on Emerging and Selected Topics in Circuits and Systems* (JETCAS), Special Issue on "When Large Models Meet Video Coding: Synergies, Systems, and Hardware Challenges," 2026.
- Guest Editor, *IEEE T-CSVT* Special Issue on Learned Visual Data Compression for both Human and Machine, 2022.
- Guest Editor, *International Journal of Computer Vision* (IJCV) Special Issue on Video Understanding and Video Compression, 2021.

Reviewing

- Reviewer, *IEEE Transactions on Image Processing*, 2018–present.

Conference / society roles

- Area Chair, ICLR, 2026, 2027.
- Area Chair, NeurIPS, 2025, 2026 (Top AC in 2026).
- Senior Program Committee Member, AAAI, 2022, 2027.
- IEEE VSPC Technical Committee Member, 2025.

- Technical Program Chair, ICASSP Satellite Event, Suzhou, China, 2025.

Tutorials, workshops, and challenges

- Challenge Organizer, Challenge on Ultra-Low Bitrate Image Compression, ECCV 2026.
- Challenge Organizer, Ultra-low Bitrate Video Compression, VCIP 2025.
- Tutorial Organizer, ACM Multimedia Tutorial on Deep Learning for Visual Data Compression, 2021.
- Tutorial Organizer, CVPR Tutorial on Learning for Visual Data Compression, 2021.
- Tutorial Organizer, VCIP Tutorial on Learned Image and Video Compression with Deep Neural Networks, 2020.
- Tutorial Organizer, IEEE AVSS Tutorial on Deep Learning for Video Compression and Understanding, Taipei, 2019.

Honors and Awards

- ICML Gold Reviewer Award, 2026.
- Stanford/Elsevier World's Top 2% Scientists, 2025–2026.
- IEEE WCSP Best Paper Award, 2025.
- VCIP Best Student Paper Runner-up, 2024.
- China Association for Science and Technology Youth Talent Support Program, 2024.
- IEEE CASS Visual Signal Processing and Communications (VSPC) Rising Star Award, 2023.
- Excellent Doctoral Dissertation Award, China Society of Image and Graphics (CSIG), 2022.
- Top Creativity Award, IEEE VCIP Grand Challenge "Practical End-to-end Image Compression," 2022.
- Excellent Doctoral Dissertation Award, Shanghai Jiao Tong University, 2020.

Selected Research Funding

- National Natural Science Foundation of China, Young Scientists Fund (Type B, formerly Excellent Young Scientists Fund), PI, 2026.
- National Natural Science Foundation of China, General Program, "Key Technologies for Immersive Video Coding Based on Neural Radiance Fields," PI, January 2025–December 2028.
- National Natural Science Foundation of China, Young Scientists Fund, "Adaptive Intelligent Video Compression Coding Algorithms," PI, January 2022–December 2024.
- National Natural Science Foundation of China, Key Program, "Theory and Methods of Screen Mixed-Content Coding Based on Multi-Agent Collaborative Learning," Lead of Participating Institution, January 2024–December 2027.
- Ministry of Science and Technology of China, National Key R&D Young Scientists Project, "Intent-Driven Intelligent Simplified Coding and Transmission Mechanisms," Lead of Participating Institution.
- Huawei Technologies, University–Industry Collaboration Project, "Video Coding Algorithm Research," PI, November 2022–November 2023.

Teaching

- *Video Coding and Communication* (undergraduate), 2022–present.
- *Multimedia Networking* (graduate), 2022–present.