

JINJIN GU

Curriculum Vitae

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Research Interests

I am committed to interpreting and building **general-purpose, intelligent** machine vision processing systems. I'm interested in **low-level computer vision, image generation models, multi-modal language models, and artificial intelligence agents.**

Education

- 2020 – 2023 **The University of Sydney.**
Doctor of Philosophy, School of Electrical and Computer Engineering.
Advisor: Prof. Wanli Ouyang, Prof. Luping Zhou and Prof. Dong Yuan
Dissertation: Interpretability and Generalization of Deep Low-Level Vision Models.
- 2015 – 2020 **The Chinese University of Hong Kong, Shenzhen.**
Bachelor of Engineering, Computer Science and Engineering.
Advisor: Prof. Junhua Zhao

Selected Publications

[Google Scholar Citations](#): 6900+ (up to Feb. 2024)

Depicting Beyond Scores: Advancing Image Quality Assessment through Multi-modal Language Models.

Zhiyuan You*, Zheyuan Li*, [Jinjin Gu*](#), Zhenfei Yin, Tianfan Xue, Chao Dong

CVPR 2024 **Scaling Up to Excellence: Practicing Model Scaling for Photo-Realistic Image Restoration In the Wild.**

Fanghua Yu*, [Jinjin Gu*](#), Zheyuan Li, Jinfan Hu, Xiangtao Kong, Xintao Wang, Jingwen He, Yu Qiao, Chao Dong

NeurIPS 2023 **Networks Are Slacking Off: Understanding Generalization Problem in Image Deraining.**

[Jinjin Gu](#), Xianzheng Ma, Xiangtao Kong, Yu Qiao, Chao Dong

NeurIPS 2022 **Rethinking Alignment In Video Super-Resolution Transformers.**

Shuwei Shi*, [Jinjin Gu*](#), Liangbin Xie, Xintao Wang, Yujiu Yang, Chao Dong

CVPR 2021 **Interpreting Super-Resolution Networks with Local Attribution Maps.**

[Jinjin Gu](#), Chao Dong, [The first low-level vision interpretation research.](#)

CVPR 2020 **Image Processing Using Multi-Code GAN Prior.**

[Jinjin Gu](#), Yujun Shen, Bolei Zhou

CVPR 2019 **Blind Super-Resolution with Iterative Kernel Correction.**

Jinjin Gu, Hannan Lu, Wangmeng Zuo, Chao Dong

Honors and Awards

- 2023 **Career Advancement Award, Faculty of Engineering**, University of Sydney
- 2023 **WAIC Yunfan, Rising Star Award (15 winners under the age of 30 worldwide)**
- 2022 **Huawei Camera, Academic Rising Star Award, Second Prize**
- 2022 Winner of NTIRE 2022 Efficient SR Challenge, Model Complexity Track, CVPR 2022
- 2019 Winner of NTIRE Real-Image SR Challenge, CVPR 2019
- 2019 **SenseTime Scholarship (Top 29 students selected from across China)**
- 2018 Champion of PIRM SR Challenge, the perceptual track, ECCV 2018
- 2018 Sensetime Outstanding Research Intern
- 2018 Sensetime Research Intern Star

Full Publication List

Papers

* indicates equal contribution, and ☒ indicates corresponding author

- [39] **Low-Res Leads the Way: Improving Generalization for Super-Resolution by Self-Supervised Learning.**
Haoyu Chen, Wenbo Li, Jinjin Gu, Jingjing Ren, Haoze Sun, Xueyi Zou, Youliang Yan, Zhensong Zhang, Lei Zhu
Computer Vision and Pattern Recognition (CVPR), 2024
- [38] **Scaling Up to Excellence: Practicing Model Scaling for Advanced Real-World Image Restoration.**
Fanghua Yu, Jinjin Gu, Zheyuan Li, Jinfan Hu, Xiangtao Kong, Xintao Wang, Jingwen He, Yu Qiao, Chao Dong
Computer Vision and Pattern Recognition (CVPR), 2024
- [37] **Xformer: Hybrid X-Shaped Transformer for Image Denoising.**
Jiale Zhang, Yulun Zhang, Jinjin Gu, Jiahua Dong, Linghe Kong, Guihai Chen, Xiaokang Yang
International Conference on Learning Representations (ICLR), 2024
- [36] **Recursive Generalization Transformer for Image Super-Resolution.**
Zheng Chen, Yulun Zhang, Jinjin Gu, Linghe Kong, Xiaokang Yang
International Conference on Learning Representations (ICLR), 2024
- [35] **Hierarchical Integration Diffusion Model for Realistic Image Deblurring.**
Zheng Chen, Yulun Zhang, Ding Liu, Bin Xia, Jinjin Gu, Linghe Kong, Xin Yuan
Neural Information Processing Systems (NeurIPS), 2023, **Spotlight**
- [34] **Networks Are Slacking Off: Understanding Generalization Problem in Image Deraining.**
Jinjin Gu, Xianzheng Ma, Xiangtao Kong, Yu Qiao, Chao Dong
Neural Information Processing Systems (NeurIPS), 2023
- [33] **Evaluating the Generalization Ability of Super-Resolution Networks.**
Yihao Liu, Hengyuan Zhao, Jinjin Gu, Yu Qiao, Chao Dong
IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2023
- [32] **Snow Removal in Video: A New Dataset and A Novel Method.**
Haoyu Chen, Jingjing Ren, Jinjin Gu, Hongtao Wu, Xuequan Lu, Haoming Cai, Lei Zhu.
International Conference on Computer Vision (ICCV), 2023

- [31] **Dual Aggregation Transformer for Image Super-Resolution.**
Zheng Chen, Yulun Zhang, [Jinjin Gu](#), Linghe Kong, Guihai Chen, Xiaokang Yang, Fisher Yu
International Conference on Computer Vision (ICCV), 2023
- [30] **Crafting Training Degradation Distribution for the Accuracy-Generalization Trade-off in Real-World Super-Resolution.**
Ruofan Zhang, [Jinjin Gu](#) ✉, Haoyu Chen, Chao Dong, Yulun Zhang, Wenming Yang
International Conference on Machine Learning (ICML), 2023
- [29] **Masked Image Training for Generalizable Deep Image Denoising.**
Haoyu Chen*, [Jinjin Gu](#)*, Yihao Liu, Salma Abdel Magid, Chao Dong, Qiong Wang, Hanspeter Pfister, Lei Zhu
Computer Vision and Pattern Recognition (CVPR), 2023
- [28] **DegAE: A New Pretraining Paradigm for Low-level Vision.**
Yihao Liu, Jingwen He, [Jinjin Gu](#), Xiangtao Kong, Yu Qiao, Chao Dong
Computer Vision and Pattern Recognition (CVPR), 2023, **Highlight**
- [27] **Accurate Image Restoration with Attention Retractable Transformer.**
Jiale Zhang, Yulun Zhang, [Jinjin Gu](#), Yongbing Zhang, Linghe Kong, Xin Yuan
International Conference on Learning Representations (ICLR), 2023, **Spotlight**
- [26] **Mitigating Artifacts in Real-World Video Super-Resolution Models.**
Liangbin Xie, Xintao Wang, Shuwei Shi, [Jinjin Gu](#), Chao Dong, Ying Shan
AAAI Conference on Artificial Intelligence (AAAI), 2023
- [25] **Rethinking Alignment In Video Super-Resolution Transformers.**
Shuwei Shi*, [Jinjin Gu](#)*, Liangbin Xie, Xintao Wang, Yujiu Yang, Chao Dong
Neural Information Processing Systems (NeurIPS), 2022
- [24] **Cross Aggregation Transformer for Image Restoration.**
Chen Zheng, Yulun Zhang, [Jinjin Gu](#), Yongbing Zhang, Linghe Kong, Xin Yuan
Neural Information Processing Systems (NeurIPS), 2022, **Spotlight**
- [23] **On the Sparsity of Image Super-Resolution Network.**
Chenyu Dong, Hailong Ma, [Jinjin Gu](#), Ruofan Zhang, Jieming Li, Chun Yuan
Neural Information Processing Systems Workshop (NeurIPSW), 2022
- [22] **Blind Image Super-Resolution: A Survey and Beyond.**
Anran Liu, Yihao Liu, [Jinjin Gu](#), Yu Qiao, Chao Dong
IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2022
- [21] **Efficient Image Super-Resolution using Vast-Receptive-Field Attention.**
Lin Zhou*, Haoming Cai*, [Jinjin Gu](#), Zheyuan Li, Yingqi Liu, Xiangyu Chen, Yu Qiao, Chao Dong
European Conference on Computer Vision Workshop (ECCVW), 2022
- [20] **Super-Resolution by Predicting Offsets: Ultra-Efficient Super-Resolution Neural Network for Rasterized images.**
[Jinjin Gu](#), Haoming Cai, Chenyu Dong, Ruofan Zhang, Yulun Zhang, Wenming Yang, Chun Yuan
European Conference on Computer Vision (ECCV), 2022
- [19] **Rethinking the Pipeline of Demosaicing, Denoising and Super-Resolution.**
Guocheng Qian*, Yuanhao Wang*, Chao Dong, Jimmy S Ren, Wolfgang Heidrich, Bernard Ghanem, [Jinjin Gu](#) ✉
International Conference on Computational Photography (ICCP), 2022, **Oral**
- [18] **AI-Enabled Image Fraud in Scientific Publications.**
[Jinjin Gu](#), Xinlei Wang, Chenang Li, Junhua Zhao, Weijin Fu, Gaoqi Liang, Jing Qiu
Patterns, Cell Press, volume 3, issue 7, 100511, July 08, 2022.
- [17] **Self-Supervised Intensity-Event Stereo Matching.**
[Jinjin Gu](#), Jinan Zhou, Ringo S.W Chu, Yan Chen, Jiawei Zhang, Xuanye Cheng, Song Zhang, Jimmy S. Ren
Journal of Imaging Science and Technology (JIST)

- [16] **Blueprint Separable Residual Network for Lightweight Image Super-Resolution.**
Zheyuan Li*, Yingqi Liu*, Xiangyu Chen, Haoming Cai, Jinjin Gu, Yu Qiao, Chao Dong
Computer Vision and Pattern Recognition Workshop (**CVPRW**), 2022
Winner, Model Complexity Track in the NTIRE 2022 Efficient SR Challenge, CVPR2022
- [15] **NTIRE 2022 Challenge on Perceptual Image Quality Assessment.**
Jinjin Gu, Haoming Cai, Chao Dong, Jimmy S. Ren, Radu Timofte
Computer Vision and Pattern Recognition Workshop (**CVPRW**), 2022
- [14] **Texture-based Error Analysis for Image Super-Resolution.**
Salma Abdel Magid, Zudi Lin, Donglai Wei, Yulun Zhang, Jinjin Gu, Hanspeter Pfister
Computer Vision and Pattern Recognition (**CVPR**), 2022
- [13] **Reflash Dropout in Image Super-Resolution.**
Xiangtao Kong*, Xina Liu*, Jinjin Gu, Yu Qiao, Chao Dong
Computer Vision and Pattern Recognition (**CVPR**), 2022
- [12] **Electricity-Consumption Data Reveals the Economic Impact and Industry Recovery during the Pandemic.**
Xinlei Wang*, Caomingzhe Si*, Jinjin Gu, Guolong Liu, Wenxuan Liu, Jing Qiu, Junhua Zhao
Scientific Reports, Volume 11 (19960), 2021
- [11] **NTIRE 2021 Challenge on Perceptual Image Quality Assessment.**
Jinjin Gu, Haoming Cai, Chao Dong, Jimmy S. Ren, Shuhang Gu, Radu Timofte
Computer Vision and Pattern Recognition Workshop (**CVPRW**), 2021
- [10] **Interpreting Super-Resolution Networks with Local Attribution Maps.**
Jinjin Gu, Chao Dong
Computer Vision and Pattern Recognition (**CVPR**), 2021
- [9] **PIPAL: a Large-Scale Image Quality Assessment Dataset for Perceptual Image Restoration.**
Jinjin Gu, Haoming Cai, Haoyu Chen, Xiaoxing Ye, Jimmy S. Ren, Chao Dong
European Conference on Computer Vision (**ECCV**), 2020
- [8] **Super Resolution Perception for Improving Data Completeness in Smart Grid State Estimation.**
Gaoqi Liang, Guolong Liu, Junhua Zhao, Yanli Liu, Jinjin Gu, Guang-Zhong Sun, Zhaoyang Dong
Engineering, Volume 6, Issue 7, July 2020, Pages 789-800
- [7] **Super Resolution Perception for Smart Meter Data.**
Guolong Liu, Jinjin Gu, Fushuan Wen, Gaoqi Liang, Junhua Zhao
Information Sciences, Volume 526, July 2020, Pages 263-273.
- [6] **Image Processing Using Multi-Code GAN Prior.**
Jinjin Gu, Yujun Shen, Bolei Zhou
Computer Vision and Pattern Recognition (**CVPR**), 2020
- [5] **Interpreting the Latent Space of GANs for Semantic Image Editing.**
Yujun Shen, Jinjin Gu, Xiaoou Tang, Bolei Zhou
Computer Vision and Pattern Recognition (**CVPR**), 2020
- [4] **Two-phase Hair Image Synthesis by A Self-Enhancing Generative Model.**
Haonan Qiu, Chuan Wang, Hang Zhu, Xiangyu Zhu, Jinjin Gu, Xiaoguang Han
Computer Graphics Forum, Volume 38 (2019), Number 7, In Pacific Graphics (**PG**), 2019, **Oral**
- [3] **Blind Super-Resolution with Iterative Kernel Correction.**
Jinjin Gu, Hannan Lu, Wangmeng Zuo, Chao Dong
Computer Vision and Pattern Recognition (**CVPR**), 2019

- [2] **Suppressing Model Overfitting for Image Super-Resolution Networks.**
 Ruicheng Feng, Jinjin Gu, Chao Dong, Yu Qiao
 Computer Vision and Pattern Recognition Workshop (**CVPRW**), 2019, **Spotlight Winner, the NTIRE Real-Image SR Challenge, CVPR2019**
- [1] **ESRGAN: Enhanced Super-Resolution Generative Adversarial Networks.**
 Xintao Wang, Ke Yu, Shixiang Wu, Jinjin Gu, Yihao Liu, Chao Dong, Chen Change Loy, Yu Qiao
 European Conference on Computer Vision Workshop (**ECCVW**), 2018, **Spotlight Champion, Region 3 in the PIRM2018-SR Challenge, ECCV2018**

Teaching

- 2024.2 – 2024.6 **ELEC5304: Intelligent Visual Signal Understanding.**
 Lecturer, Graduate-level course at the University of Sydney
- 2021.7 – 2021.8 **Introduction to Data Science.**
 Instructor, TechX Academy Bootcamp Summer School

Professional Activities

Reviewer

- Conference Conference on Computer Vision and Pattern Recognition (**CVPR**), 2021 – 2024
 European Conference on Computer Vision (**ECCV**), 2020, 2022
 International Conference on Computer Vision (**ICCV**), 2021, 2023
 International Conference on Machine Learning (**ICML**), 2021 – 2024
 Conference on Neural Information Processing Systems (**NeurIPS**), 2020 – 2023
 International Conference on Learning Representations (**ICLR**), 2021 – 2024
 Association for the Advancement of Artificial Intelligence (**AAAI**), 2022 – 2024
 International Joint Conference on Artificial Intelligence (**IJCAI**), 2022
 Winter Conference on Applications of Computer Vision (**WACV**), 2022
- Journal Nature Communication
 IEEE, Transactions on Pattern Analysis and Machine Intelligence (**TPAMI**)
 IEEE, Transactions on Image Processing (**TIP**)
 IEEE, Transactions on Multimedia (**TMM**)
 IEEE, Transactions on Circuits and Systems for Video Technology (**TCSVT**)
 IEEE, Transactions on Cybernetics (**TCYB**)
 IEEE, Transactions on Systems, Man and Cybernetics (**TSMC**)
 IEEE, Transactions on Industrial Informatics (**TII**)
 IEEE, Transactions on Biometrics, Behavior, and Identity Science (**TBIOM**)
 IEEE, Journal of Selected Topics in Signal Processing (**JSTSP**)
 IEEE, Sensors Journal
 IEEE, Signal Processing Letters
 ACM, Transactions on Multimedia Computing, Communications and Applications (**TOMM**)
 Springer, International Journal of Computer Vision (**IJCV**)
 Springer, The Visual Computer (**TVCJ**)
 Elsevier, Computer Vision and Image Understanding (**CVIU**)
 Public Library of Science, **PLoS One**

Event Organizer

- Co-organizer New Trends in Image Restoration and Enhancement workshop (**NTIRE**) @ CVPR 2021
 New Trends in Image Restoration and Enhancement workshop (**NTIRE**) @ CVPR 2022

Talks

Toward Intelligent “Low-level” Vision.

- Invited Talk at University of Electronic Science and Technology of China, 2024.2
 Invited Talk at Huawei, 2024.2

Understanding Generalization Problem in Low-level Vision.

Invited Talk at Huawei, 2023.4

Invited Talk at Shanghai AI Lab, 2023.7

Rethinking Alignment in Video Super-Resolution Transformers.

Invited Talk at Shanghai AI Lab, 2022.9

General Low-Level Vision: Evaluation and Interpretability.

Invited Talk at Long Feng Science Forum from CUHK-Shenzhen, 2022.8

Invited Talk at Huawei, Shanghai, 2022.8

Interpreting Super-Resolution Networks.

Invited Talk at Student Forum on Frontiers of AI (SFFAI), Shenzhen, 2021.9

Invited Talk at Huawei 2012 Lab, Shenzhen, 2021.6

Invited Talk at Kuai Shou, 2022.6

NTIRE 2022 Challenge on Perceptual Image Quality Assessment.

Spotlight talk at NTIRE 2022 Workshop, CVPR 2022. 2022.6.

NTIRE 2021 Challenge on Perceptual Image Quality Assessment.

Spotlight talk at NTIRE 2021 Workshop, CVPR 2021. 2021.6.

Image Processing Applications: Challenges and Opportunities.

Invited talk at Tsinghua Shenzhen International Graduate School, 2021.5.

Interpreting Super-Resolution Networks with Local Attribution Maps.

Invited talk at Extreme Mart, Shenzhen, 2021.3.

Invited talk at CSIG-Guangdong Province CVPR 2021 Online Academic Report, 2021.5.

Invited talk at Tsinghua AI TIME Online Academic Report, 2021.7.

Two-phase Hair Image Synthesis by Self-Enhancing Generative Model.

Oral talk at Pacific Graphics 2019. Korea University, Seoul, Korea, 2019.

Suppressing Model Overfitting for Image Super-Resolution Networks.

Spotlight talk at NTIRE 2019 Workshop, CVPR 2019. Long Beach, California, USA, 2019

New Trends On Single Image Super-Resolution.

Invited talk at the Chinese University of Hong Kong, Shenzhen. Shenzhen, China, 2019

ESRGAN: Enhanced Super-Resolution Generative Adversarial Networks.

Spotlight talk at PIRM 2018 Workshop, ECCV 2018. TUM, Munich, Germany, 2018

Other Work Experience

- 2022.7 – 2023.12 **Shanghai AI Laboratory**, *Research Assistant*, Shanghai.
Supervisor: Prof. Chao Dong
- 2021.4 – 2022.7 **Shenzhen Institute of Artificial Intelligence and Robotics for Society (AIRS)**,
Research Assistant, Part-time, Shenzhen.
Advisor: Prof. Junhua Zhao.
- 2020.2 – 2020.8 **Applied Research Center, PCG, Tencent.**, *Research Intern*, Shenzhen.
Supervisor: Dr. Ying Shan.
- 2019.11 – 2022.4 **Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences**,
Research Assistant, Shenzhen.
Advisor: Prof. Chao Dong.
- 2019.4 – 2019.11 **The Chinese University of Hong Kong**, *Research Assistant*, Hong Kong.
Advisor: Prof. Bolei Zhou
- 2017.11 – 2019.5 **SenseTime Research**, *Research Intern*, Shenzhen.
Supervisor: Prof. Chao Dong, Prof. Liang Lin and Dr. Jimmy S. Ren

2017.6 – 2017.8 **Shanghai Jiao Tong University**, *Research Assistant*, Shanghai.
Advisor: Prof. Xiaolin Wu.

Mentoring Experience

Visiting Students and RAs

Kaiwen Zhu (coming PhD at SJTU), 2023–now

Boyang Zheng (Undergraduate at SJTU), 2023–now.

Keda Tao (Undergraduate at XJTU), 2023–now.

Fanghua Yu (coming PhD at CUHK), 2023–now.

Zhiyuan You (PhD at CUHK), 2023–now.

Jinfan Hu (PhD at SIAT), 2023–now.

Xina Liu (PhD at University of Macau), 2023–now

Zheyuan Li (PhD at University of Macau), 2023–now.

Haoyu Chen (PhD at HKUST, Guangzhou), 2019–now. ECCV 2020, CVPR 2023, ICML 2023, ICCV 2023

Zheng Chen (Master at SJTU), 2022–now. NeurIPS 2022, ICCV 2023, NeurIPS 2023

Jiale Zhang (Master at SJTU), 2022–2023. ICLR 2023

Shuwei Shi (now PhD at The University of Tokyo), 2021–2022. NeurIPS 2022

Ruofan Zhang (Master at Tsinghua University (Shenzhen)), 2021–2022. ICML 2023

Chenyu Dong (Master at Tsinghua University (Shenzhen)), 2021–2022. NeurIPS 2023 Workshop

Ringo S.W. Chu (SenseTime), 2021–2022

Jinan Chen (Master at CMU), 2021–2022

Haoming Cai (now PhD at University of Maryland, College Park), 2019–2022. ECCV 2020

Contact of Referee

Chao Dong, Ph.D.

Professor, Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences
Shanghai AI Laboratory

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Google Scholar: <https://scholar.google.com/citations?user=OSDCBOUAAAAJ&hl=en>

Wanli Ouyang, Ph.D.

Professor, Shanghai AI Laboratory

✉ Email: ouyangwanli@pjlab.org.cn

Google Scholar: https://scholar.google.com/citations?user=pw_OZ_UAAAAJ&hl=en

Junhua Zhao, Ph.D.

Associate Professor, The Chinese University of Hong Kong, Shenzhen

✉ Email: zhaojunhua@cuhk.edu.cn

Google Scholar: <https://scholar.google.com/citations?user=M2oDRWEAAAAJ&hl=en>