Wenqi Ren   Associate Professor

CONTACT
INFORMATION

Address: Engineering College Building 2, Sun Yat-sen University, Guangming District, Shenzhen, Guangdong Province, 518107
Phone: (+86) 18810859015
E-mail: rwq.renwenqi@gmail.com   renwq3@mail.sysu.edu.cn
Webpage: https://rwenqi.github.io/

EDUCATION

Tianjin University, Tianjin, China
Ph.D. student, Computer Science   Sep. 2013 - Jun. 2017
- Advisor: Xiaochun Cao

University of California, Merced, CA, USA
Joint-training Ph.D. student, EECS   Sep. 2015 - Sep. 2016.
- Advisor: Ming-Hsuan Yang

Tianjin University of Technology, Tianjin, China
Masters of Science, Computer Science   Sep. 2010 - Mar. 2013.
- Advisor: Yuanquan Wang

Hebei University of Technology, Tianjin, China
Bachelor of Science, Electronic and Information Engineering   Sep. 2006 - Jun. 2010.

RESEARCH
INTERESTS

- **Computer Vision, Image Processing, Machine Learning**
  image restoration, image enhancement, image deblurring, image dehazing, image denoising, image super-resolution, video deblurring, motion estimation, deep learning

PUBLICATIONS

- **Journal Articles**

  1) Wenqi Ren, Jiawei Zhang, Jinshan Pan, Sifei Liu, Jimmy S. Ren, Junping Du, Xiaochun Cao, and Ming-Hsuan Yang, Single Image Deblurring Dynamic Scenes via Spatially Varying Recurrent Neural Networks, IEEE Transactions on Pattern Analysis and Machine Intelligence (**TPAMI**), 2022.

  2) Wenqi Ren, Senyou Deng, Kaihao Zhang, Fenglong Song, and Xiaochun Cao, Fast Ultra High-Definition Video Deblurring via Multi-Scale Separable Network, International Journal of Computer Vision(**IJCV**), 2023.

  3) Wenqi Ren, Jinshan Pan, Hua Zhang, Xiaochun Cao, and Ming-Hsuan Yang, Single Image Dehazing via Multi-Scale Convolutional Neural Networks with Holistic Edges, International Journal of Computer Vision (**IJCV**), 2020.

  4) Wenqi Ren, Jingang Zhang, Xiangyu Xu, Lin Ma, Xiaochun Cao, and Wei Liu, Deep Network for Video Dehazing, IEEE Transactions on Image Processing (**IEEE TIP**), 2019.

  5) Wenqi Ren, Sifei Liu, Lin Ma, Qianqian Xu, Xiangyu Xu, Xiaochun Cao, Junping Du, and Ming-Hsuan Yang, Low-Light Image Enhancement via a Deep Hybrid Network, IEEE Transactions on Image Processing (**IEEE TIP**), 2019.

  6) Wenqi Ren, Xiaochun Cao, Jinshan Pan, Xiaojie Guo, Wangmeng Zuo and Ming-Hsuan Yang, Image Deblurring via Enhanced Low Rank Prior, IEEE Transac-

tions on Image Processing (**IEEE TIP**), 7(25), 3426-3437, 2016.

7) Jinshan Pan♯, Wenqi Ren♯ (♯ indicates equal contribution), Zhe Hu, and Ming-Hsuan Yang, *Learning to Deblur Images with Exemplars*, IEEE Pattern Analysis and Machine Intelligence (**IEEE TPAMI**), 2019

8) Yuning Cui, Wenqi Ren⋆(corresponding author), Xiaochun Cao, Alois Knoll; *Image Restoration via Frequency Selection*, IEEE Pattern Analysis and Machine Intelligence (**IEEE TPAMI**), 2024

9) Jun Luo, Wenqi Ren⋆(corresponding author), Xinwei Gao, Xiaochun Cao, *Multi-Exposure Image Fusion via Deformable Self-Attention*, IEEE Transactions on Image Processing (**IEEE TIP**), 2023

10) Weilei Wen, Wenqi Ren⋆(corresponding author), Yinghuan Shi, Yunfeng Nie, Jingang Zhang, Xiaochun Cao, *Video Super-Resolution via a Spatio-Temporal Alignment Network*, IEEE Transactions on Image Processing (**IEEE TIP**), 2022

11) Xiaobin Hu, Wenqi Ren⋆(corresponding author), Jiaolong Yang, Xiaochun Cao, David P Wipf, Bjoern Menze, Xin Tong, Hongbin Zha, *Face Restoration via Plug-and-Play 3D Facial Priors*, IEEE Pattern Analysis and Machine Intelligence (**IEEE TPAMI**), 2022

12) Jun Luo, Wenqi Ren⋆(corresponding author), Tao Wang, Chongyi Li, Xiaochun Cao, *Under-Display Camera Image Enhancement via Cascaded Curve Estimation*, IEEE Transactions on Image Processing (**IEEE TIP**), 2022

13) Siyuan Li, Wenqi Ren⋆(corresponding author), Feng Wang, I. B. Araujo, E. K Tokuda, R. H. Junior, R. M Cesar-Jr, Zhangyang Wang, Xiaochun Cao, *A comprehensive benchmark analysis of single image deraining: Current challenges and future perspectives*, International Journal of Computer Vision (**IJCV**), 2021.

14) Shangquan Sun, Wenqi Ren, Jingzhi Li, Kaihao Zhang, Meiyu Liang, Xiaochun Cao, *Event-aware Video Deraining via Multi-Patch Progressive Learning*, IEEE Transactions on Image Processing (**IEEE TIP**), 2023.

15) Yanyang Yan, Wenqi Ren, Xiaobin Hu, Kun Li, Haifeng Shen, Xiaochun Cao, *SRGAT: Single Image Super-Resolution With Graph Attention Network*, IEEE Transactions on Image Processing (**IEEE TIP**), 2021.

16) Jingang Zhang, Wenqi Ren, Shengdong Zhang, He Zhang, Yunfeng Nie, Zhe Xue, Xiaochun Cao, *Hierarchical Density-Aware Dehazing Network*, IEEE Transactions on Cybernetics, 2021.

17) Kaihao Zhang, Dongxu Li, Wenhan Luo, Wenqi Ren, and Wei Liu, *Enhanced Spatio-Temporal Interaction Learning for Video Deraining: Faster and Better*, IEEE Pattern Analysis and Machine Intelligence (**IEEE TPAMI**), 2023

18) Man Zhou, Keyu Yan, Jinshan Pan, Wenqi Ren, Qi Xie, Xiangyong Cao, *Memory-augmented deep unfolding network for guided image super-resolution*, International Journal of Computer Vision (**IJCV**), 2023

19) Jingchun Zhou, Qian Liu, Qiuping Jiang,Wenqi Ren, Kin-Man Lam, Weishi Zhang, *Underwater camera: Improving visual perception via adaptive dark pixel prior and color correction*, International Journal of Computer Vision (**IJCV**), 2023

20) Hong Mo, Wenqi Ren, Xiong Zhang, Feihu Yan, Zhong Zhou, Xiaochun Cao, Wei Wu, *Attention-Guided Collaborative Counting*, IEEE Transactions on Image Processing (**IEEE TIP**), 2022.

21) Chongyi Li, Saeed Anwar, Junhui Hou, Runmin Cong, Chunle Guo, Wenqi Ren, *Underwater Image Enhancement via Medium Transmission-Guided Multi-Color Space Embedding*, IEEE Transactions on Image Processing (**IEEE TIP**), 2021.

22) Mingye Ju, Can Ding, Wenqi Ren, Yi Yang, Dengyin Zhang, Y Jay Guo, *IDE: Image dehazing and exposure using an enhanced atmospheric scattering model*, IEEE Transactions on Image Processing (**IEEE TIP**), 2021.

23) Siyuan Yao, Hua Zhang, Wenqi Ren, Chao Ma, Xiaoguang Han, Xiaochun Cao, *Robust online tracking via contrastive spatio-temporal aware network*, IEEE Transactions on Image Processing (**IEEE TIP**), 2021.

24) Hong Mo, Wenqi Ren, Yuan Xiong, Xiaoqi Pan, Zhong Zhou, Xiaochun Cao, Wei Wu *Background Noise Filtering and Distribution Dividing for Crowd Counting*, IEEE Transactions on Image Processing (**IEEE TIP**), 2020.

25) Qingbo Wu, Wenqi Ren, Xiaochun Cao, *Learning interleaved cascade of shrinkage fields for joint image dehazing and denoising*, IEEE Transactions on Image Processing (**IEEE TIP**), 2020.

26) Qingbo Wu, Jingang Zhang, Wenqi Ren, Wangmeng Zuo, Xiaochun Cao, *Accurate transmission estimation for removing haze and noise from a single image*, IEEE Transactions on Image Processing (**IEEE TIP**), 2020.

27) Wenhan Yang, Ye Yuan, Wenqi Ren, Jiaying Liu, Walter J Scheirer, Zhangyang Wang, et al., *Advancing image understanding in poor visibility environments: A collective benchmark study*, IEEE Transactions on Image Processing (**IEEE TIP**), 2020.

28) Xiaochun Cao, Wenqi Ren⋆, Wangmeng Zuo, Xiaojie Guo, and Hassan Foroosh, *Scene Text Deblurring Using Text-specific Multi-scale Dictionaries*, IEEE Transactions on Image Processing (**IEEE TIP**), 4(24), 1302-1314, 2015.

29) Boyi Li, Wenqi Ren, Dengpan Fu, Dacheng Tao, Dan Feng, Wenjun Zeng, and Zhangyang Wang, *Benchmarking Single Image Dehazing and Beyond*, IEEE Transactions on Image Processing (**IEEE TIP**), 2019

30) Chongyi Li, Chunle Guo, Wenqi Ren⋆, Runmin Cong, Junhui Hou, Sam Kwong, Dacheng Tao. An Underwater Image Enhancement Benchmark Dataset and Beyond. IEEE Trans. Image Processing (**IEEE TIP**), 2020

31) Qingbo Wu, <u>Wenqi Ren</u>, Xiaochun Cao. Learning Interleaved Cascade of Shrinkage Fields for Joint Image Dehazing and Denoising. IEEE Trans. Image Processing (**IEEE TIP**), 29: 1788-1801, 2020.

32) Qingbo Wu, Jingang Zhang, <u>Wenqi Ren</u>, Wangmeng Zuo, Xiaochun Cao. Accurate Transmission Estimation for Removing Haze and Noise From a Single Image. IEEE Trans. Image Processing (**IEEE TIP**) 29: 2583-2597, 2020.

33) Lerenhan Li, Yunlong Dong, <u>Wenqi Ren</u>, Jinshan Pan, Changxin Gao, Nong Sang, Ming-Hsuan Yang. Semi-Supervised Image Dehazing. IEEE Trans. Image Processing (**IEEE TIP**) 29: 2766-2779, 2020.

34) Siyuan Li, <u>Wenqi Ren</u>, Jiawan Zhang, Jinke Yu, Xiaojie Guo. Single image rain removal via a deep decomposition-composition network. Computer Vision and Image Understanding (**CVIU**) 186: 48-57, 2019.

35) Yanyang Yan, <u>Wenqi Ren</u>, Xiaochun Cao. Recolored Image Detection via a Deep Discriminative Model. IEEE Trans. Information Forensics and Security (**IEEE TIFS**) 14(1): 5-17, 2019.

- **Conference Papers**
  1) <u>Wenqi Ren</u>, Jiaolong Yang, Senyou Deng, David Wipf, Xiaochun Cao, and Xin Tong, Face Video Deblurring using 3D Facial Priors, in IEEE International Conference on Computer Vision, (**IEEE ICCV**), 2019. (Oral)

  2) <u>Wenqi Ren</u>, Lin Ma, Jiawei Zhang, Jinshan Pan, Xiaochun Cao, Wei Liu, and MingHsuan Yang, Gated Fusion Network for Single Image Dehazing, in IEEE Conference on Computer Vision and Pattern Recognition (**IEEE CVPR**), 2018.

  3) <u>Wenqi Ren</u>, Jiawei Zhang, Lin Ma, Jinshan Pan, Xiaochun Cao, Wei Liu, and Ming-Hsuan Yang Deep Non-Blind Deconvolution via Generalized Low-Rank Approximation, Neural Information Processing Systems Conference (**NeurIPS**), 2018

  4) <u>Wenqi Ren</u>, Jinshan Pan, Xiaochun Cao, and Ming-Hsuan Yang, *Video Deblurring via Semantic Segmentation and Pixel-Wise Non-Linear Kernel*, in IEEE International Conference on Computer Vision (**IEEE ICCV**), 2017

  5) <u>Wenqi Ren</u>, Si Liu, Hua Zhang, Jinshan Pan, Xiaochun Cao, and Ming-Hsuan Yang, *Single Image Dehazing via Multi-Scale Convolutional Neural Networks*, in European Conference on Computer Vision (**ECCV**), 2016.

  6) Yuning Cui, <u>Wenqi Ren</u>*(corresponding author), Alois Knoll; *Omni-Kernel Network for Image Restoration*, Association for the Advancement of Artificial Intelligence (**AAAI**), 2024.

  7) Jiangang Wang, Yuning Cui, Yawen Li, <u>Wenqi Ren</u>*(corresponding author), Xiaochun Cao; *Omnidirectional Image Super-Resolution via Bi-Projection Fusion*, in Association for the Advancement of Artificial Intelligence (**AAAI**), 2024

8) Yuning Cui, <u>Wenqi Ren</u>⋆(corresponding author), Sining Yang, Xiaochun Cao, Alois Knoll, *IRNeXt: Rethinking Convolutional Network Design for Image Restoration*, in International Conference on Machine Learning (**ICML**) 2023.

9) Aiping Zhang, <u>Wenqi Ren</u>⋆(corresponding author), Yi Liu, Xiaochun Cao, *Lightweight Image Super-Resolution with Superpixel Token Interaction*, in IEEE International Conference on Computer Vision (**IEEE ICCV**), 2023

10) Yuning Cui, <u>Wenqi Ren</u>⋆(corresponding author), Xiaochun Cao, Alois Knoll, Focal Network for Image Restoration, in IEEE International Conference on Computer Vision (**IEEE ICCV**), 2023

11) Yuning Cui, Yi Tao, Zhenshan Bing, <u>Wenqi Ren</u>⋆(corresponding author), Xinwei Gao, Xiaochun Cao, Kai Huang, Alois Knoll, Selective Frequency Network for Image Restoration, in International Conference on Learning Representations (**ICLR**) 2023.

12) Shangquan Sun, <u>Wenqi Ren</u>⋆(corresponding author), Tao Wang, Xiaochun Cao, *Rethinking Image Restoration for Object Detection*, Neural Information Processing Systems Conference (**NeurIPS**), 2022.

13) Senyou Deng, <u>Wenqi Ren</u>⋆(corresponding author), Yanyang Yan, Tao Wang, Fenglong Song, and Xiaochun Cao, *Multi-Scale Separable Network for Ultra-High-Definition Video Deblurring*, in IEEE International Conference on Computer Vision (**IEEE ICCV**), 2021

14) Zhuoran Zheng, <u>Wenqi Ren</u>⋆(corresponding author), Xiaochun Cao, Tao Wang, and Xiuyi Jia, *UHD Image HDR Reconstruction via Collaborative Bilateral Learning*, in IEEE International Conference on Computer Vision, (IEEE **ICCV**), 2021

15) Xiaobin Hu, <u>Wenqi Ren</u>⋆(corresponding author), Kaicheng Yu, Kaihao Zhang, Xiaochun Cao, Wei Liu, and Bjoern Menze, *Pyramid Architecture Search for Real-time Image Deblurring*, in IEEE International Conference on Computer Vision, (IEEE **ICCV**), 2021

16) Zhuoran Zheng, <u>Wenqi Ren</u>⋆(corresponding author), Xiaochun Cao, Xiaobin Hu, Tao Wang, Fenglong Song, Xiuyi Jia, *Ultra-High-Definition Image Dehazing via Multi-Guided Bilateral Learning*, in IEEE Conference on Computer Vision and Pattern Recognition (**IEEE CVPR**), 2021.

17) Zhenbo Song, Zhenyuan Zhang, Kaihao Zhang, Wenhan Luo, Zhaoxin Fan, <u>Wenqi Ren</u>, Jianfeng Lu, *Robust Single Image Reflection Removal Against Adversarial Attacks*, in IEEE Conference on Computer Vision and Pattern Recognition (**IEEE CVPR**), 2023.

18) Yuning Cui, Yi Tao, <u>Wenqi Ren</u>, Alois Knoll, *Dual-domain Attention for Image Deblurring*, Association for the Advancement of Artificial Intelligence (**AAAI**), 2023

19) Xiaobin Hu, Shuo Wang, Xuebin Qin, Hang Dai, <u>Wenqi Ren</u>, Donghao Luo, Ying Tai, Ling Shao, *High-resolution iterative feedback network for camouflaged*

object detection, Association for the Advancement of Artificial Intelligence (**AAAI**), 2023

20) Chun-Le Guo, Qixin Yan, Saeed Anwar, Runmin Cong, Wenqi Ren, Chongyi Li, *Image Dehazing Transformer with Transmission-Aware 3D Position Embedding*, in IEEE Conference on Computer Vision and Pattern Recognition (IEEE **CVPR**), 2022.

21) Dongxu Li, Chenchen Xu, Kaihao Zhang, Xin Yu, Yiran Zhong, Wenqi Ren, Hanna Suominen, Hongdong Li *Arvo: Learning all-range volumetric correspondence for video deblurring*, in IEEE Conference on Computer Vision and Pattern Recognition (**IEEE CVPR**), 2021.

22) Xiong Zhang, Hongmin Xu, Hong Mo, Jianchao Tan, Cheng Yang, Lei Wang, Wenqi Ren, *Dcnas: Densely connected neural architecture search for semantic image segmentation*, in IEEE Conference on Computer Vision and Pattern Recognition (**IEEE CVPR**), 2021.

23) Kaihao Zhang, Wenhan Luo, Björn Stenger, Wenqi Ren, Lin Ma, Hongdong Li, *Every Moment Matters: Detail-Aware Networks to Bring a Blurry Image Alive*, in ACM International Conference on Multimedia (**ACMMM**), 2020. (Oral)

24) Xiaobin Hu, Wenqi Ren⋆(corresponding author), John LaMaster, Xiaochun Cao, Xiaoming Li, Zechao Li, Bjoern Menze, Wei Liu, *Face super-resolution guided by 3d facial priors*, in European Conference on Computer Vision (**ECCV**), 2020. (Spotlight)

25) Kaihao Zhang, Wenhan Luo, Wenqi Ren, Jingwen Wang, Fang Zhao, Lin Ma, Hongdong Li, *Beyond Monocular Deraining: Stereo Image Deraining via Semantic Understanding*, in European Conference on Computer Vision (**ECCV**), 2020.

26) Ben Niu, Weilei Wen, Wenqi Ren, Xiangde Zhang, Lianping Yang, Shuzhen Wang, Kaihao Zhang, Xiaochun Cao, Haifeng Shen, *Single image super-resolution via a holistic attention network*, in European Conference on Computer Vision (**ECCV**), 2020.

27) Jie Gui, Xiaofeng Cong, Yuan Cao, Wenqi Ren, Jun Zhang, Jing Zhang, Dacheng Tao, *A Comprehensive Survey on Image Dehazing Based on Deep Learning*, in International Joint Conference on Artificial Intelligence (**IJCAI**) 2021.

28) Yuanjie Shao, Lerenhan Li, Wenqi Ren, Changxin Gao, Nong Sang, *Domain adaptation for image dehazing*, in IEEE Conference on Computer Vision and Pattern Recognition (**IEEE CVPR**), 2020.

29) Siyuan Li, I. B. Araujo, Wenqi Ren⋆, Zhangyang Wang, E. K. Tokuda, R. Hirata, R. Cesar, Jiawan Zhang, Xiaojie Guo, and Xiaochun Cao, Single Image Deraining: A Comprehensive Benchmark Analysis, in IEEE Conference on Computer Vision and Pattern Recognition (**IEEE CVPR**), 2019.

30) Zhe Xue, Junping Du, Dawei Du, Wenqi Ren, Siwei Lyu. Deep Correlated Predictive Subspace Learning for Incomplete Multi-View Semi-Supervised Clas-

sification. (**IJCAI**) 2019.

31) Xiangyu Xu, Deqing Sun, Sifei Liu, Wenqi Ren, Yujin Zhang, Ming-Hsuan Yang, and Jian Sun, *Rendering Portraitures from Monocular Camera and Beyond, in European Conference on Computer Vision*, (**ECCV**), 2018.

32) Yanyang Yan, Wenqi Ren, Yuanfang Guo, Rui Wang, and Xiaochun Cao, *Image Debluring via Extreme Channels Prior*, in IEEE Conference on Computer Vision and Pattern Recognition (**IEEE CVPR**), 2017.

33) Hua Zhang, Si Liu, Changqing Zhang, Wenqi Ren, Rui Wang, and Xiaochun Cao, *SketchNet: Sketch Classification with Web Images*, in IEEE Conference on Computer Vision and Pattern Recognition (**IEEE CVPR**), 2016.

PROFESSIONAL ACTIVITIES

Area Chair
- CVPR 2023/2024
- ICLR 2024

Senior Programme Committee
- AAAI 2022/2023/2024
- IJCAI 2023/2024

Reviewer
- CVPR/ICCV/ECCV/NIPS/AAAI/IJCAI/BMVC/ACCV
- TPAMI, IJCV, TNNLS, TIP, TMM, TCSVT, CVIU

Talk
- ICCV 2019 oral presentation
- ECCV 2016 Tutorial: Discriminative Learning of Deep CNN Models for Image Restoration
- PCM 2017: Deep Video Dehazing, Best Paper Finalist.

AWARDS

Outstanding Youth Project, NSFC, 2023.
Chinese highly cited scholar, Elsevier, 2022.
Excellent PhD Thesis, China Computer Federation (CCF), 2019.
Star Track Program, MSRA, 2018.
Excellent PhD Thesis Candidate, CAAI, 2018.
Tencent Rhino-Bird Elite Graduate, Tencent, 2017.
Best Poster, VALSE, 2017.
Doctoral Consortium Award, CVPR, 2017.
National Scholarship, Tianjin University, 2016.
Academic Quality Prize, Tianjin University, 2016.
China Scholarship Council Fellowship, Tianjin University, 2015.
Best Paper, Tianjin Conference on Computer Science for Postgraduate Students, 2015.

REFERENCES

Xiaochun Cao
Institute of Information Engineering, Chinese Academy of Sciences
E-mail: caoxiaochun@iie.ac.cn

Ming-Hsuan Yang
University of California, Merced
E-mail: mhyang@ucmerced.edu