Jian Wang

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HOMEPAGE https://jianwang-cmu.github.io/

RESEARCH INTERESTS Computational Photography, Generative AI, Computer Vision

EDUCATION Carnegie Mellon University (CMU), Pittsburgh, PA 8/2013 to 8/2018

Ph.D., Electrical and Computer Engineering department

• Thesis: High Resolution 2D Imaging and 3D Scanning with Line Sensors

• Advisors: Prof. Aswin C. Sankaranarayanan, Prof. Srinivasa Narasimhan

University of Science and Technology of China (USTC), Hefei, China

M.S., Pattern Recognition and Intelligent Systems 9/2009 to 7/2013

• Advisor: Prof. Zonghai Chen

Xi'an Jiaotong University (XJTU), Xi'an, China

9/2005 to 7/2009

B.Eng., Automation department B.Ec., Finance department (double major)

Work Experience

Computational Imaging group, Snap Research

8/2018 to present

Manager: Bobby Murphy (from 2024.2), Shree K. Nayar (from 2018.9 to 2024.3),

Guru Krishnan (from 2022.1 to 2024.2)

Title: Research Manager 2/2024 to present Title: Staff Research Scientist 10/2023 to present Title: Senior Research Scientist 3/2022 to 9/2023 Title: Research Scientist 8/2018 to 2/2022

Research scope: The goal of computational photography research is to enhance or extend the capabilities of traditional photography through the use of algorithms and computation. It involves a combination of computer vision, image processing, deep learning, and generative-AI to create new imaging capabilities that go beyond what is possible with traditional cameras and photographic techniques. Key objectives of computational photography include: (1) Enhancing Image/Video Quality, e.g., quality assessment, image/video restoration, video frame interpolation, (2) Image/Video Editing/Manipulation, e.g., matting and compositing, face retouching, and (3) Personalized Image/Video Generation. We are making these advanced photographic techniques more accessible to Snapchat users to transform the way of capturing and sharing images.

(Shree gave a nice keynote about our (unpublished) work in ICCP 2022 which includes my works, video link)

Illumination and Imaging Laboratory, CMU

1/2016 to 7/2018

Advisor: Prof. Srinivasa Narasimhan

Title: Research assistant

Research topics: 3D sensor in the wild

Image Science Lab, CMU

8/2013 to 7/2018

Advisor: Prof. Aswin C. Sankaranarayanan

Title: Research assistant

Research topics: imaging architecture, camera-projector system, light transport

analysis, video compressive sensing

Machine Perception, Google

6/2017 to 12/2017

Mentors: Dr. Jiawen (Kevin) Chen, Dr. Jon Barron

Title: Software Engineering Intern

Research topics: dark flash photography, image denoising

Media Lab, FutureWei Technologies, Inc.

5/2014 to 8/2014

Mentor: Dr. Jinwei Gu Title: Research intern

Research topics: multi-camera system, spatial-temporal graph cuts

Microsoft Research Asia

2/2012 to 2/2013

Mentor: Dr. Yasuyuki Matsushita

Title: Research intern

Research topics: gigapixel 3D camera, photometric stereo

Simulation and Intelligent Control Lab, USTC

9/2009 to 7/2013

Advisor: Prof. Zonghai Chen Title: Research assistant

Research topics: control of intelligent car based on visual sensor, photoelectric

sensor, or electromagnetic sensor, human action recognition, biometrics

TEACHING EXPERIENCE 18792 Advanced Digital Signal Processing, Teaching Assistant
Fall 2016
16823 Physics-based methods in Computer vision, Teaching Assistant
Spring 2016
The National University Freescale Cup Intelligent Car Racing, Coach
Spring 2010 to 2011

STUDENT Advisees DongHun Ryu, Ph.D. student, MIT, Summer intern 2023 Dorian Chan, Ph.D. student, CMU, Summer intern 2023

Wei-Ting Chen, Ph.D. student, Stanford Univ. / NTU, Summer intern 2023 Zhihang Zhong, Ph.D. student, University of Tokyo, Summer intern 2023

Pradyumna Chari, Ph.D. student, UCLA, Summer intern 2023

Dasong Li, Ph.D. student, CUHK, Summer intern 2023 Haiwei Chen, Ph.D. student, USC, Summer intern 2023

Wenyan Cong, Ph.D. student, UT Austin, Summer intern 2023 Peihao Wang, Ph.D. student, UT Austin, Spring intern 2023

Yi Zhang, Ph.D. student, CUHK, Spring intern 2023

Dejia Xu, Ph.D. student, UT Austin, Summer intern 2022

Junho Kim, Ph.D. student, Seoul National U, Summer intern 2022 Brevin Tilmon, Ph.D. student, U of Florida, Summer intern 2022 Dong Huo, Ph.D. student, U of Alberta, student collaborator Zhaoyi Wan, Ph.D. student, U of Rochester, student collaborator

Qijia Shao, Ph.D. student, Columbia U, Summer intern 2022

Rui Yu, Ph.D. student, PSU, Summer intern 2022

Zhixiang Wang, Ph.D. student, U of Tokyo, Fall intern 2022

Tiantian Wang, Ph.D. student, UC Merced, Fall intern 2021

Mohammad Shafiei Rezvani Nezhad, Ph.D. student, UCSD, Summer intern 2021

Zhanghao Sun, Ph.D. student, Stanford University, Summer intern 2021

Fangzhou Mu, Ph.D. student, UWMadison, Summer intern 2021, 2022

Sizhuo Ma, Ph.D. student, UWMadison, Summer intern 2020

Akash Kumar Maity, Ph.D. student, Rice U, Summer intern 2020

Byeongjoo Ahn, Ph.D. student, CMU, Summer intern 2020

Yingsi Qin, Undergraduate student, Columbia U, Summer intern 2020

Wenzheng Chen, Ph.D. Student, U of Toronto, Summer intern 2019 Jinhui Xiong, Ph.D. student, KAUST, Summer intern 2019 Vishwanath Saragadam, Ph.D. student, CMU, Summer intern 2018

Publications

- 1. Zhixiang Wang, Baiang Li, **Jian Wang***, Yu-Lun Liu, Jinwei Gu, Yung-Yu Chuang, Shin'ichi Satoh, "Matting by Generation", ACM Special Interest Group on Computer Graphics and Interactive Techniques (**SIGGRAPH**), Denver, CO, July, 2024.
- Longguang Wang, ..., Jian Wang, Yuqi Miao, Baiang Li, Kejie Zhao, ..., "NTIRE 2024 Challenge on Stereo Image Super-Resolution: Methods and Results", in the IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshop (CVPRW), Seattle, Washington, Jun. 2024.
- Yuekun Dai, ..., Jian Wang, Yuqi Miao, Baiang Li, Gang Wei, ..., "MIPI 2024 Challenge on Nighttime Flare Removal: Methods and Results", in the IEEE/CVF Conference on Computer Vision and Pattern Recognition Workshop (CVPRW), Seattle, Washington, Jun. 2024.
- 4. Dong Huo, **Jian Wang**, Yiming Qian, Yee-Hong Yang, "Learning to Recover Spectral Reflectance from RGB Images", IEEE Transactions on Image Processing (**TIP**), 2024.
- 5. Wei-Ting Chen, Gurunandan Krishnan, Qiang Gao, Sy-Yen Kuo, Sizhuo Ma*, **Jian Wang***† († project lead), "DSL-FIQA: Assessing Facial Image Quality via Dual-Set Degradation Learning and Landmark-Guided Transformer", in the IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**), Seattle, Washington, Jun. 2024.
- 6. Wei-Ting Chen, Vong Yu Jiet, Sy-Yen Kuo, Sizhuo Ma*, **Jian Wang***, "RobustSAM: Segment Anything Robustly on Degraded Images", in the IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**), Seattle, Washington, Jun. 2024. (**Highlight**)
- 7. Zhixiang Wang, Yu-Lun Liu, Jia-Bin Huang, Shin'ichi Satoh, Sizhuo Ma, Gurunandan Krishnan, **Jian Wang***, "DisCO: Portrait Distortion Correction with Perspective-Aware 3D GANs", International Journal of Computer Vision (**IJCV**), 2024.
- 8. Tiantian Wang*, Xinxin Zuo[†], Fangzhou Mu[†], **Jian Wang***, Ming-Hsuan Yang, "Towards 4D Human Video Stylization", arXiv 2023.
- 9. Zhihang Zhong, Gurunandan Krishnan, Xiao Sun, Yu Qiao, Sizhuo Ma*, **Jian Wang***, "Clearer Frames, Anytime: Resolving Velocity Ambiguity in Video Frame Interpolation", arXiv, 2023.
- Pradyumna Chari, Sizhuo Ma, Daniil Ostashev, Achuta Kadambi, Gurunandan Krishnan, Jian Wang*, Kfir Aberman, "Personalized Restoration via Dual-Pivot Tuning", arXiv, 2023.
- Mohit Gupta, Jian Wang, Karl Bayer, Shree Nayar, "Light Codes for Fast Two-Way Human-Centric Visual Communication", ACM Transactions on Graphics (TOG), 2023.
- 12. Yi Zhang, Xiaoyu Shi, Dasong Li, Xiaogang Wang, **Jian Wang***, Hongsheng Li*, "A Unified Conditional Framework for Diffusion-based Image Restoration", Conference on Neural Information Processing Systems (**NeurIPS**), 2023.

^{*}means equal contribution, co-first author, co-corresponding author, corresponding author, or my student advisees (Summer interns)

- 13. Junho Kim, Young Min Kim, Yicheng Wu, Ramzi Zahreddine, Weston A Welge, Gurunandan Krishnan, Sizhuo Ma*, **Jian Wang***, "Privacy-Preserving Visual Localization with Event Cameras", arXiv, 2022.
- 14. Zhanghao Sun, Yu Zhang, Yicheng Wu, Dong Huo, Yiming Qian, **Jian Wang*** (* corresponding author), "Structured Light with Redundancy Codes", arXiv, 2022.
- Rui Yu, Jian Wang, Sizhuo Ma, Sharon X. Huang, Gurunandan Krishnan, Yicheng Wu, "Be Real in Scale: Swing for True Scale in Dual Camera Mode", International Symposium on Mixed and Augmented Reality (ISMAR), Sydney, Australia, Oct. 2023.
- 16. Qijia Shao*, Jian Wang*, Bing Zhou, Vu An Tran, Gurunandan Krishnan, Shree Nayar, "N-euro Predictor: A Neural Network Approach for Smoothing and Predicting Motion Trajectory", Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies, The ACM international joint conference on pervasive and ubiquitous computing (IMWUT/UbiComp), Cancun, Mexico, Oct. 2023.
- 17. Sizhuo Ma, **Jian Wang**, Wenzheng Chen, Suman Banerjee, Mohit Gupta, Shree Nayar, "QfaR: Location-Guided Scanning of Visual Codes from Long Distances", in the 29th Annual International Conference on Mobile Computing and Networking (**MobiCom**), Madrid, Spain, Oct. 2023.
- 18. Brevin Tilmon, Zhanghao Sun, Sanjeev Koppal, Yicheng Wu, Georgios Evangelidis, Ramzi Zahreddine, Gurunandan Krishnan, Sizhuo Ma*, **Jian Wang***, "Energy-Efficient Adaptive 3D Sensing", in the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), Vancouver, Canada, Jun. 2023.
- Dong Huo*, Jian Wang*, Yiming Qian, Yee-Hong Yang (* equal contribution),
 "Glass Segmentation with RGB-Thermal Image Pairs", IEEE Transactions on
 Image Processing (TIP), 2023.
- 20. Fangzhou Mu, Jian Wang*, Yicheng Wu*, Yin Li* (* co-corresponding authors), "3D Photo Stylization: Learning to Generate Stylized Novel Views from a Single Image", in the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), New Orleans, Louisiana, Jun. 2022 (Oral).
- 21. **Jian Wang**, Zhanghao Sun, Dejia Xu, Mr./Ms. Cool * (* call for collaborators), "Transparent Camera", presented as a poster in IEEE Conference on Computational Photography (**ICCP**), Pasadena, CA, Aug. 2022 (**Best Poster Award**).
- 22. Zhaoyi Wan, Dejia Xu, Zhangyang Wang, **Jian Wang***, Jiebo Luo* (* co-corresponding authors), "Cloud2Sketch: Augmenting Clouds with Imaginary Sketches", in ACM Multimedia (**MM**), Lisbon, Portugal, Oct. 2022.
- 23. Akash Kumar Maity*, **Jian Wang***, Ashutosh Sabharwal and Shree Nayar (* cofirst authors), "RobustPPG: Camera-Based Robust Heart Rate Estimation Using Motion Cancellation", in Biomedical Optics Express (**BOE**), 2022.
- 24. Zhanghao Sun*, **Jian Wang***, Yicheng Wu, Shree Nayar (* co-first authors), "Seeing Far in the Dark with Patterned Flash", in European Conference on Computer Vision (**ECCV**), Tel-Aviv, Israel, Oct. 2022.
- 25. Xiong Dun*, Qiang Fu*, Haotian Li*, Tiancheng Sun*, **Jian Wang***, Qilin Sun* (* co-first authors), "(Survey) Recent Progress in Computational Imaging", Journal of Image and Graphics, 2022.

- 26. Xuefeng Bao, Qiang Zhang, Natalie Fragnito, **Jian Wang**, Nitin Sharma, "A Clustering-based Method for Estimating Pennation Angle from B-mode Ultrasound Images", in Wearable Technologies, 2022.
- 27. Jinhui Xiong*, Jian Wang*, Wolfgang Heidrich, Shree Nayar (* co-first authors), "Seeing in Extra Darkness Using a Deep-red Flash", in the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2021 (Oral).
- Xu Liu, Chengtao Li, Jian Wang, Jingbo Wang, Boxin Shi, Xiaodong He, "Group Contextual Encoding for 3D Point Clouds", in the Thirty-fourth Conference on Neural Information Processing Systems (NeurIPS), Dec. 2020.
- Xu Liu, Jiayan Cao, Qianqian Bi, Jian Wang, Boxin Shi, Yicheng Wei, "Dense Point Diffusion for 3D Object Detection", in International Conference on 3D Vision (3DV), Nov. 2020.
- Vishwanath Saragadam*, Jian Wang, Mohit Gupta, Shree Nayar (* Summer intern), "Micro-baseline Structured Light", in International Conference on Computer Vision (ICCV), Seoul, South Korea, Oct. 2019.
- 31. Joseph Bartels, **Jian Wang**, William Whittaker, Srinivasa G. Narasimhan, "Agile Triangulation Light Curtains", in International Conference on Computer Vision (**ICCV**), Seoul, South Korea, Oct. 2019. (**Oral**)
- 32. **Jian Wang**, Tianfan Xue, Jonathan T. Barron, Jiawen Chen, "Stereoscopic Dark Flash for Low-light Photography", in IEEE Conference on Computational Photography (**ICCP**), Tokyo, Japan, May 2019. (**Oral**)
- Jian Wang, "High Resolution 2D Imaging and 3D Scanning with Line Sensors", Ph.D. thesis, Carnegie Mellon University. 2018.
- 34. **Jian Wang**, Joseph Bartels, William Whittaker, Aswin C. Sankaranarayanan, Srinivasa G. Narasimhan, "Programmable Triangulation Light Curtains", in European Conference on Computer Vision (**ECCV**), Munich, Germany, Oct. 2018. (**Oral**)
- 35. Zhuo Hui, Kalyan Sunkavalli, Joon-Young Lee, Sunil Hadap, **Jian Wang** and Aswin C. Sankaranarayanan, "Reflectance Capture Using Univariate Sampling of BRDFs", in International Conference on Computer Vision (**ICCV**), Oct. 2017.
- 36. Vishwanath Saragadam, **Jian Wang**, Xin Li, Aswin C. Sankaranarayanan, "Compressive Spectral Anomaly Detection", in IEEE Conference on Computational Photography (**ICCP**), Stanford, CA, May 2017. (**Oral**)
- 37. **Jian Wang**, Aswin C. Sankaranarayanan, Mohit Gupta, and Srinivasa G. Narasimhan, "Dual structured Light 3D Using A 1D Sensor", in European Conference on Computer Vision (**ECCV**), Amsterdam, The Netherlands, Oct. 2016. (**Oral**)
- 38. Aswin C. Sankaranarayanan, **Jian Wang**, and Mohit Gupta, "Radon Transform Imaging: Low Cost Video Compressive Sensing at Extreme Resolutions", in SPIE Sensing and Analysis Technologies for Biomedical and Cognitive Applications, Baltimore, MD, Apr. 2016.
- 39. **Jian Wang**, Yasuyuki Matsushita, Boxin Shi, and Aswin C. Sankaranarayanan, "Photometric Stereo with Small Angular Variations", in International Conference on Computer Vision (**ICCV**), Santiago, Chile, Dec. 2015.
- 40. Suhas Lohit, Kuldeep Kulkarni, Pavan Turaga, Jian Wang, and Aswin C. Sankaranarayanan, "Reconstruction-free Inference on Compressive Measurements", in 4th IEEE International Workshop on Computational Cameras and Displays (CCD), Boston, MA, Jun. 2015. (Oral, Best paper award)

- 41. **Jian Wang**, Mohit Gupta, and Aswin C. Sankaranarayanan, "LiSens A Scalable Architecture for Video Compressive Sensing", in IEEE Conference on Computational Photography (**ICCP**), Houston, Texas, Apr. 2015. (**Oral**)
- Jian Wang, Xiao Liang, Yasuyuki Matsushita, Magnetro Chen, and Bojun Huang, "Gigapixel 3D Camera", Tech-report, https://goo.gl/zVf4x2, 2015.
- 43. **Jian Wang**, Zhiling Wang, and Zonghai Chen, "Gender Recognition Based on Hand Waving Action", Journal of University of Science and Technology of China, vol. 42 (2), pp. 92-98, 2012.
- 44. **Jian Wang**, Xiaowei Zhang, Jin Yang, Xin Zan, and Xiaoyong Liu, "Design of Control Algorithms for Smart Car Based on Vision", Microcomputer & Its Applications, vol. 29, pp. 74-77, 2010.

Patents

- Jian Wang, Sizhuo Ma, Brevin Tilmon, Gurunandan Krishnan, Yicheng Wu, Ramzi Zahreddine, Georgios Evangelidis, "Energy Efficient Adaptive 3D Sensing", US patent, 2023.
- 2. **Jian Wang**, Zhixiang Wang, Gurunandan Krishnan Gorumkonda, "Selfie Perspective Undistortion by 3D Face GAN Inversion", US patent, 2023.
- 3. **Jian Wang**, Karl Bayer, Shree K. Nayar, "Fast Data Accessing System Using Optical Beacons", US patent, 2023.
- 4. **Jian Wang**, Haiwei Chen, Gurunandan Krishnan, "Fast Selfie Perspective Undistortion", US patent, 2023.
- 5. **Jian Wang**, Zhihang Zhong, Wenyan Cong, Sizhuo Ma, Gurunandan Krishnan, "Human Video Frame Interpolation in Latent Space", US patent, 2023.
- 6. **Jian Wang**, Sizhuo Ma, Pradyumna Chari, Gurunandan Krishnan, "Smart Selfie Correction", US patent, 2023.
- Shree K. Nayar, Jian Wang, Gurunandan Krishnan, Karl Bayer, Sizhuo Ma, Bing Zhou, Peihao Wang, Yi Zhang, "AR Mirror with Camera Behind Display", US patent, 2023.
- 8. Rui Yu, **Jian Wang**, Sizhuo Ma, Sharon X. Huang, Gurunandan Krishnan, Yicheng Wu, "Object Scale Utilizing Away-Facing Images", US patent, 2023.
- Shree K. Nayar, Jian Wang, Wenzheng Chen, "Long Distance QR Code Decoding", US patent, 2022.
- 10. Srinivasa G. Narasimhan, Joseph Bartels, William Whittaker, **Jian Wang**, "Agile Depth Sensing Using Triangulation Light Curtains", US patent, 2022.
- 11. **Jian Wang**, Shanghang Zhang, "Short-Wave Infrared Imaging System Based on Linear Pixel Array and 2D Spatial Light Modulator", China patent CN212628122U, 2021.
- Srinivasa G. Narasimhan, Jian Wang, Aswin C. Sankaranarayanan, Joseph Bartels, William Whittaker, "Programmable Light Curtains", US patent, 2021.
- 13. Sizhuo Ma, **Jian Wang**, Mohit Gupta, Shree K. Nayar, "Location-guided Scanning of Visual Codes", US patent, 2021.
- Shree K. Nayar, Jian Wang, "Apparatus Having A Viewfinder Mirror Configuration", US patent, 2020.

- 15. Tianfan Xue, **Jian Wang**, Jiawen Chen, Jonathan T. Barron, "Dark Flash Photography with a Stereo Camera", US patent, 2019.
- 16. Jinwei Gu, **Jian Wang**, Wei Jiang, "Apparatus and Methods for Video Foreground-Background Segmentation with Multi-View Spatial Temporal Graph Cuts", US patent, 2017.
- Zonghai Chen, Zhiling Wang, Yuzhou Zhao, Mingwei Guo, Jian Wang, "Ground Target Positioning Method Applied into Video Monitoring System", China patent CN102359780 B, 2014.
- 18. **Jian Wang**, Zhiling Wang, Yuzhou Zhao, Mingwei Guo, Zonghai Chen, "Real-time Identity Recognition and Authentication Method for Self-service Equipment System of Bank", China patent CN102364527 A, 2012.

INVITED TALKS

- Towards A Better Camera Texas Tech University, 2023.9
- Computational Imaging/Photography Research at Snap Research Purdue University, 2022.11; New York University, 2022.12; GAMES204 online course, 2022.12

Honors and Awards

- Best Teaser Award, in The ACM international joint conference on Pervasive and Ubiquitous Computing and The ACM International Symposium on Wearable Computing (UbiComp / ISWC)
- Best Poster Award, in IEEE Conference on Computational Photography (ICCP)
 2022
- Liang Ji-Dian Fellowship

2016

- Best paper award, in 4th IEEE International Workshop on Computational Cameras and Displays (CCD)
- Best of the best summer intern good performance award, FutureWei Tech., Inc. 2014
- Award of Excellance, Stars of Tomorrow Internship Program, Microsoft Research Asia
- FutureWei Scholarship (Top 1%)

2010

- Second-Class Award (Top 6.5%) × 2, in 6th National University Freescale Cup Intelligent Car Racing (as a coach) 2011
- Second-Class Award (Top 8.2%) × 2 and Excellent Paper Award (Top 3.7%), in 5th National University Freescale Cup Intelligent Car Racing (as a coach) 2010
- First-Class Award (Top 5.6%) and Excellent Paper Award (Top 4.2%), in 4th National University Freescale Cup Intelligent Car Racing 2009

Professional Service

- Area chair for NeurIPS 2024, CVPR 2024, ICLR 2024, CVPR 2023
- Co-organizer of ICCV 2023 workshop "3D Vision and Modeling Challenges in eCommerce"
- Reviewer for conferences NeurIPS 2023, ECCV 2022, ICCP 2022, CVPR 2022, CVPR 2021, ICCP 2021, WACV 2021, ECCV 2020, CVPR 2020, ICCP 2020, ICCV 2019, CVPR 2019, ICCP 2019, PRCV 2019, CCD 2018, ICIP, ICASSP
- Outstanding reviewer for CVPR 2021
- Reviewer for journals IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI), International Journal of Computer Vision (IJCV), IEEE Transactions on Image Processing (T-IP), IEEE Transactions on Computational Imaging, IEEE Computer Graphics and Applications, IEEE Transactions on Circuits and Systems for Video Technology (T-CSVT), IPSJ Transactions on Computer Vision and Applications
- Program Committee member for ICCP 2022, CVPR Workshop on Computational Cameras and Displays (CCD) 2018
- Volunteer for ICCP 2018, 2016