## Jian Wang


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| Contact Information | 229 W 43rd St, 6th floor<br>New York, NY 10036 | 412-315-8973<br>jianwang.cmu@gmail.com |
| Homepage | https://jianwang-cmu.github.io/ | |


**Research Interests** Computational Imaging, Computational Photography, Computer Vision, Signal Processing

**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 Jiao Tong 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: Shree K. Nayar, Guru Krishnan
Title: Lead Research Scientist 10/2023 to present
Title: Senior Research Scientist 3/2022 to 9/2023
Title: Research Scientist 8/2018 to 2/2022
Research topics: computational imaging (e.g., novel sensors/wearables/displays for AR/VR/HCI, physics-based vision, passive/active 3d sensing, creative consumer imaging devices), computational photography (e.g., cool effects, image/video restoration /enhancement, image matting and compositing, image and video editing and generation, novel view synthesis), fundamental research in computer vision, machine learning, deep learning, image processing and signal processing
(Shree gave a nice keynote about our (unpublished) work in ICCP 2022 which includes my works, video link)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

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|---|---|
| 18792 Advanced Digital Signal Processing, Teaching Assistant | Fall 2016 |
| 16823 Physics-based methods in Computer vision, Teaching Assistant | Spring 2016 |
| 18660 Optimization, Teaching Assistant | Spring 2018 |
| The National University Freescale Cup Intelligent Car Racing, Coach | 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. Mohit Gupta, **Jian Wang**, Karl Bayer, Shree Nayar, "Light Codes for Fast Two-Way Human-Centric Visual Communication", ACM Transactions on Graphics

(**TOG**), 2023.

2. 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", arXiv, 2023.

3. Dong Huo, **Jian Wang**, Yiming Qian, Yee-Hong Yang, "Learning to Recover Spectral Reflectance from RGB Images", arXiv, 2023.

4. Yi Zhang, Xiaoyu Shi, Dasong Li, Xiaogang Wang, **Jian Wang***, Hongsheng Li*, "A Unified Conditional Framework for Diffusion-based Image Restoration", NeurIPS, 2023.

5. Zhanghao Sun, Yu Zhang, Yicheng Wu, Dong Huo, Yiming Qian, **Jian Wang*** (* corresponding author), "Structured Light with Redundancy Codes", arXiv, 2022.

6. 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.

7. 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.

8. 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.

9. 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.

10. 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.

11. 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**).

12. **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**).

13. 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.

14. Akash Kumar Maity*, **Jian Wang***, Ashutosh Sabharwal and Shree Nayar (* co-first authors), "RobustPPG: Camera-Based Robust Heart Rate Estimation Using Motion Cancellation", in Biomedical Optics Express (**BOE**), 2022.

15. 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.

16. 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.

17. 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.

18. 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**).

19. 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.

20. 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.

21. 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.

22. 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**)

23. **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**)

24. **Jian Wang**, "High Resolution 2D Imaging and 3D Scanning with Line Sensors", Ph.D. thesis, Carnegie Mellon University. 2018.

25. **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**)

26. 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.

27. 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**)

28. **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**)

29. 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.

30. **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.
31. 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**)
32. **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**)
33. **Jian Wang**, Xiao Liang, Yasuyuki Matsushita, Magnetro Chen, and Bojun Huang, "Gigapixel 3D Camera", Tech-report, https://goo.gl/zVf4x2, 2015.
34. **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.
35. **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

1. Shree K. Nayar, **Jian Wang**, Wenzheng Chen, "Long Distance QR Code Decoding", US patent, 2022.
2. Srinivasa G. Narasimhan, Joseph Bartels, William Whittaker, **Jian Wang**, "Agile Depth Sensing Using Triangulation Light Curtains", US patent, 2022.
3. Srinivasa G. Narasimhan, **Jian Wang**, Aswin C. Sankaranarayanan, Joseph Bartels, William Whittaker, "Programmable Light Curtains", US patent, 2021.
4. Sizhuo Ma, **Jian Wang**, Mohit Gupta, Shree K. Nayar, "Location-guided Scanning of Visual Codes", US patent, 2021.
5. Shree K. Nayar, **Jian Wang**, "Apparatus Having A Viewfinder Mirror Configuration", US patent, 2020.
6. Tianfan Xue, **Jian Wang**, Jiawen Chen, Jonathan T. Barron, "Dark Flash Photography with a Stereo Camera", US patent, 2019.
7. Jinwei Gu, **Jian Wang**, Wei Jiang, "Apparatus and Methods for Video Foreground-Background Segmentation with Multi-View Spatial Temporal Graph Cuts", US patent, 2017.
8. Zonghai Chen, Zhiling Wang, Yuzhou Zhao, Mingwei Guo, **Jian Wang**, "Ground Target Positioning Method Applied into Video Monitoring System", China patent CN102359780 B, 2014.
9. **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 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**) 2015
- Best of the best summer intern good performance award, FutureWei Tech., Inc. 2014
- Award of Excellance, Stars of Tomorrow Internship Program, Microsoft Research Asia 2013
- FutureWei Scholarship (Top 1%) 2010
- Second-Class Award (Top 6.5%) $\times$ 2, in 6th National University Freescale Cup Intelligent Car Racing (as a coach) 2011
- Second-Class Award (Top 8.2%) $\times$ 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 CVPR 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