

# JIMMY SIJIE REN

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Research Director  
AI Sensing and Imaging Group, SenseTime Research  
Adjunct Faculty  
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## Research Interests

Recent focus is to apply machine learning and deep learning methods in the context of image processing, computational photography and computational imaging to create paradigm shifting imaging technologies. I am also broadly interested in topics such as super-resolution, deblurring, stereo matching, inverse problems, etc.

Areas: Computer Vision, Machine Learning, Computational Photography, Computational Imaging

## Work Experiences

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| <b>SenseTime Research, Hong Kong</b><br>AI Sensing and Imaging Group<br>– Research Director, Senior Research Scientist | Apr. 2015 - now       |
| <b>Lenovo Labs, Hong Kong</b><br>Image and Visual Computing Lab<br>– Staff Researcher                                  | Sep. 2013 - Mar. 2015 |
| <b>Ericsson R&amp;D Centre, Shanghai</b><br>Multimedia Solutions<br>– Software Engineer                                | Jul. 2007 - Aug. 2009 |
| <b>Intel R&amp;D Centre, Shanghai</b><br>Software Solution Group<br>– Intern   | Jun. 2006 - Dec. 2006 |

## Academic Appointments

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| <b>Shanghai Jiao Tong University, Shanghai</b><br>Qing Yuan Research Institute<br>– Adjunct Faculty                 | July. 2020 - now      |
| <b>Tsinghua University, Shenzhen</b><br>Shenzhen School of Graduate Studies<br>– External Graduate Research Advisor | Sep. 2017 - Aug. 2020 |

## Education

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| <b>The City University of Hong Kong</b><br>Ph.D. in Information Systems<br>– Thesis: Learning Decisions with Unlabeled Data for Business Intelligence<br>– Advisor: Stephen Shaoyi Liao | Sep. 2009 – Aug. 2013 |
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## Awards and Honors

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| SenseTime Research dean's project            | 2020 |
| SenseTime 5-year service award               | 2020 |
| First prize of Lenovo research idea platform | 2015 |
| Best new employee, Lenovo Group Limited      | 2014 |
| CMCRC scholarships for graduate studies      | 2010 |

Full graduate studies scholarship of Hong Kong UGC	2009-2013
Best performance of the year, Ericsson China R&D	2008
First class scholarship award of ECNU	2007

## Product Shipped

[Multi-Frame Image Super-Resolution \(2018-now\)](#): A high performance AI-based super resolution solution for mobile phones. Commercialized since 2018 and currently in its third generation. Our solution is widely adopted by mainstream Chinese smartphone OEMs such as Vivo, Xiaomi, Transsion, etc.

[Video Super-Resolution and Enhancement \(2019-now\)](#): A systematic resolution and image quality enhancement solution for videos. It efficiently processes and produces high quality 4k and 8k videos on mainstream devices. Currently commercially adopted by several live podcast and gaming companies.

[Real-time Stereo Camera Solution \(2017-2019\)](#): A pioneering deep learning based real-time stereo solution for mobile devices. Various visual effects including Bokeh and Re-focus were realized based on this. Our solution was adopted by Oppo and Vivo due to its high performance and high efficiency.

[Identification Photo Restoration \(2015-2016\)](#): A state-of-the-art restoration algorithm for removing strong and random visual artifacts on identification photos. It greatly helped the face recognition system to increase its accuracy.

## Journal Publications

1. S. Lin, J. Zhang, J. Chen, Y. Wang, Y. Liu, **J.S. Ren**. "Cross-spectral Stereo Matching for Facial Disparity Estimation in The Dark." *Computer Vision and Image Understanding*, Volume 200, 103046 (**CVIU**), 2020
2. J. Pan, J. Dong, Y. Liu, J. Zhang, **J.S. Ren**, J. Tang, Y.W. Tai, M.H. Yang. "Physics-Based Generative Adversarial Models for Image Restoration and Beyond." *IEEE Transaction on Pattern Analysis and Machine Intelligence (TPAMI)*, 2020  
[\[webpage\]](#)
3. W. Wang, S. Liao, X. Li, **J.S. Ren**. "The Process of Information Propagation along a Traffic Stream through Inter-vehicle Communication." *IEEE Transaction on Intelligent Transportation Systems (TITS)*, 2014

## Book Chapters

4. **J.S. Ren**, D. Zou, Y. Zhang. "A Gentle Introduction to Image Understanding." *Introduction to Artificial Intelligence Vol. 3 (In Chinese)*, Editor-in-chief: Yukun Chen, The Commercial Press, ISBN: 9787100173704, 2019.

## Conference Publications

5. L. Xu, J. Zhang, X. Cheng, F. Zhang, X. Wei, **J.S. Ren**. "Efficient Deep Image Denoising via Class Specific Convolution." *Thirty-Fifth AAAI Conference on Artificial Intelligence (AAAI)*, 2021
6. S. Zhang, Z. Jiang, Y. Zhang, D. Zou, **J.S. Ren**, B. Zhou. "Learning to See in the Dark with Events." *European Conference on Computer Vision (ECCV)*, 2020
7. S. Lin, J. Zhang, Z. Jiang, D. Zou, J. Pan, Y. Wang, J. Chen, **J.S. Ren**. "Learning Event-Driven Video Deblurring and Interpolation." *European Conference on Computer Vision (ECCV)*, 2020
8. J. Gu, H. Cai, H. Chen, X. Ye, **J.S. Ren**, C. Dong. "PIPAL: a Large-Scale Image Quality Assessment Dataset for Perceptual Image Restoration." *European Conference on Computer Vision (ECCV)*, 2020
9. J. Liu, J. He, Y. Qiao, **J.S. Ren**, H. Li. "Learning to Predict Context-adaptive Convolution for Semantic Segmentation." *European Conference on Computer Vision (ECCV)*, 2020
10. J. Liu, J. He, J. Zhang, **J.S. Ren**, H. Li. "EfficientFCN: Holistically-guided Decoding for Semantic Segmentation." *European Conference on Computer Vision (ECCV)*, 2020

11. Y. Liu, **J.S. Ren**, J. Zhang, J. Liu, M. Lin. "Visually Imbalanced Stereo Matching." IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2020
12. Z. Jiang, Y. Zhang, D. Zou, **J.S. Ren**, J. Lv, Y. Liu. "Learning Event-Based Motion Deblurring." IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2020
13. Z. Wang, J. Zhang, M. Lin, J. Wang, P. Luo, **J.S. Ren**. "Learning a Reinforced Agent for Flexible Exposure Bracketing Selection." IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2020
14. Y. Chen, **J.S. Ren**, X. Cheng, K. Qian, L. Wang, J. Gu. "Very Power Efficient Neural Time-of-Flight." IEEE Winter Conference on Applications of Computer Vision (**WACV**), 2020
15. Y. Liu, J. Zhang, Y. Ma, **J.S. Ren**. "Self-Guided Novel View Synthesis via Elastic Displacement Network." IEEE Winter Conference on Applications of Computer Vision (**WACV**), 2020
16. J. Pan, D. Sun, Y. Liu, **J.S. Ren**, M. Cheng, J. Yang, J. Tang. "Image Formation Model Guided Deep Image Super-Resolution." The 34th AAAI Conference on Artificial Intelligence (**AAAI**), 2020
17. S. Lin, J. Zhang, J. Pan, Y. Liu, Y. Wang, J. Chen, **J.S. Ren**. "Learning to Deblur Face Images via Sketch Synthesis." The 34th AAAI Conference on Artificial Intelligence (**AAAI**), 2020
18. S. Zhou, J. Zhang, J. Pan, H. Xie, W. Zuo, **J.S. Ren**. "Spatio-Temporal Filter Adaptive Network for Video Deblurring." International Conference on Computer Vision (**ICCV**), 2019
19. Z. Ke, D. Wang, Q. Yan, **J.S. Ren**, R. Lau. "Dual Student: Breaking the Limits of Teacher in Semi-supervised Learning." International Conference on Computer Vision (**ICCV**), 2019
20. Y. Liu, J. Pan, **J.S. Ren**, Z. Su. "Learning Deep Priors for Image Dehazing." International Conference on Computer Vision (**ICCV**), 2019
21. S. Zhou, J. Zhang, W. Zuo, H. Xie, J. Pan, **J.S. Ren**. "DAVANet: Stereo Deblurring with View Aggregation." IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2019, **Oral**
22. Y. Zhang, D. Zou, **J.S. Ren**, Z. Jiang, X. Chen. "Structure-Preserving Stereoscopic View Synthesis with Multi-Scale Adversarial Correlation Matching." IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2019
23. J. Pan, J. Dong, **J.S. Ren**, L. Lin, J. Tang, M.H. Yang. "Spatially Variant Linear Representation Models for Joint Filtering." IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2019
24. R. Xiao, W. Sun, J. Pang, Q. Yan, **J.S. Ren**. "DSR: Direct Self-rectification for Uncalibrated Dual-lens Cameras." International Conference on 3D Vision (**3DV**), 2018
25. X. Guo, H. Li, S. Yi, **J.S. Ren**, X. Wang. "Learning Monocular Depth by Distilling Cross-domain Stereo Networks." European Conference on Computer Vision (**ECCV**), 2018
26. Y. Liu, **J.S. Ren**, J. Liu, J. Zhang, X. Chen. "Learning Selfie-Friendly Abstraction from Artistic Style Images." The 10th Asian Conference on Machine Learning (**ACML**), 2018
27. Z. Wang, T. Chen, **J.S. Ren**, W. Yu, H. Cheng, L. Lin. "Deep Reasoning with Knowledge Graph for Social Relationship Understanding." The 27th International Joint Conference on Artificial Intelligence (**IJCAI**), 2018
28. Y. Luo, **J.S. Ren**, M. Lin, J. Pang, W. Sun, H. Li, L. Lin. "Single View Stereo Matching." IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2018
29. J. Zhang, J. Pan, **J.S. Ren**, Y. Song, L. Bao, R. Lau, M.H. Yang. "Dynamic Scene Deblurring Using Spatially Variant Recurrent Neural Networks." IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2018

30. W. Yang, W. Ouyang, X. Wang, **J.S. Ren**, H. Li, X. Wang. "3D Human Pose Estimation in the Wild by Adversarial Learning." IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2018
31. Y. Luo, **J.S. Ren**, Z. Wang, W. Sun, J. Pan, J. Liu, J. Pang, L. Lin. "LSTM Pose Machines." IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2018
32. J. Pang, W. Sun, C. Yang, **J.S. Ren**, R. Xiao, J. Zeng, L. Lin. "Zoom and Learn: Generalizing Deep Stereo Matching to Novel Domains." IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2018
33. J. Pan, S. Liu, D. Sun, J. Zhang, Y. Liu, **J.S. Ren**, Z. Li, J. Tang, H. Lu, Y.W. Tai, M.H. Yang. "Learning Dual Convolutional Neural Networks for Low-Level Vision." IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2018
34. **J.S. Ren**, X. Chen, J. Liu, W. Sun, J. Pang, Q. Yan, Y.W. Tai, L. Xu. "Accurate Single Stage Detector Using Recurrent Rolling Convolution." IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**), 2017
35. **J.S. Ren**, Y. Hu, Y.W. Tai, C. Wang, L. Xu, W. Sun, Q. Yan. "Look, Listen and Learn - A Multimodal LSTM for Speaker Identification." The 30th AAAI Conference on Artificial Intelligence (**AAAI**), 2016
36. **J.S. Ren**, L. Xu, Q. Yan, W. Sun. "Shepard Convolutional Neural Networks." Advances in Neural Information Processing Systems (**NeurIPS**), 2015
37. L. Xu, **J.S. Ren**, Q. Yan, R. Liao, J. Jia. "Deep Edge-Aware Filters." The 32nd International Conference on Machine Learning (**ICML**), 2015
38. Y. Hu, **J.S. Ren**, J. Dai, C. Yuan, L. Xu, W. Wang. "Deep Multimodal Speaker Naming." The 23rd ACM International Conference on Multimedia (**ACMMM**), 2015
39. **J.S. Ren**, L. Xu. "On Vectorization of Deep Convolutional Neural Networks for Vision Tasks." The 29th AAAI Conference on Artificial Intelligence (**AAAI**), 2015
40. L. Liu, **J.S. Ren**, L. Song, K. Mirkovski. "A Mixed-Methods Approach to Disclose the Influence of Twofold Information Usefulness on Sales." 48th Annual Hawaii International Conference on System Sciences (**HICSS-48**), 2015
41. L. Xu, **J.S. Ren**, C. Liu, J. Jia. "Deep Convolutional Neural Network for Image Deconvolution." Advances in Neural Information Processing Systems (**NeurIPS**), 2014
42. **J.S. Ren**, W. Wang, J. Wang, S. Liao. "Exploring The Contribution of Unlabeled Data in Financial Sentiment Analysis." The 27th AAAI Conference on Artificial Intelligence (**AAAI**), 2013
43. **J.S. Ren**, H. Ge, X. Wu, G. Wang, W. Wang, S. Liao. "Effective Sentiment Analysis of Corporate Financial Reports." The 34th International Conference on Information Systems (**ICIS**), 2013
44. J. Wang, **J.S. Ren**, W. Wang, X. Li, Q. Li, S. Liao. "When Multivariate Forecasting Meets Unsupervised Feature Learning - Towards a Novel Anomaly Detection Framework for Decision Support." The 33rd International Conference on Information Systems (**ICIS**), 2012
45. **J.S. Ren**, W. Wang, J. Wang, S. Liao. "An Unsupervised Feature Learning Approach to Improve Automatic Incident Detection." The 15th IEEE International Conference on Intelligent Transportation Systems (**ITSC**), 2012
46. J. Wang, **J.S. Ren**, W. Wang, Z. Hua, K. Xu, S. Liao. "Optimal Refactoring Policy for Agile Information Systems Maintenance: A Control Theoretic Approach." The 32nd International Conference on Information Systems (**ICIS**), 2011

## Workshop Papers

47. L. Wang, Y. Chen, Z. Guo, K. Qian, M. Lin, H. Li, **J.S. Ren**. "Generalizing Monocular 3D Human Pose Estimation in the Wild." International Conference on Computer Vision - Workshop on Geometry Meets Deep Learning (ICCVW), 2019
48. J. Pang, W. Sun, **J.S. Ren**, C. Yang, Q. Yan. "Cascade Residual Learning: A Two-stage Convolutional Neural Network for Stereo Matching." International Conference on Computer Vision - Workshop on Geometry Meets Deep Learning (ICCVW), 2017

## Talks

### **Very Power Efficient Neural Time-of-Flight**

Invited Talk at EE Department, City University of Hong Kong, Hong Kong, Mar., 2020

### **Computer Vision, Visualization and Deep Learning**

Guest Lecture at Engineering School, Chinese University of Hong Kong, Hong Kong, Mar., 2019

Guest Lecture at Business School, Swinburne University of Technology, Melbourne, Apr., 2019

### **The A.I. You Can See: A SenseTime Journey**

Guest Lecture at EE Department, City University of Hong Kong, Hong Kong, Nov., 2018

Guest Lecture at Business School, Hong Kong Baptist University, Hong Kong, Sep., 2018

## Professional Services

**Conference reviewer:** CVPR'21, CVPR'20, CVPR'19, CVPR'18, ICCV'19, ECCV'20, ECCV'18, NeurIPS'20, NeurIPS'19, ICML'20, PRCV'19, ACCV'18

**Journal reviewer:** IEEE Trans. on PAMI, IEEE Trans. on Computational Imaging, Information Sciences

## Teaching Experiences

### **The City University of Hong Kong**

Sep 2012 - Dec 2012

Lecturer for IS3230 Information Systems Construction (undergrad-level course)

– Course page: <http://www.cityu.edu.hk/catalogue/ug/201617/course/IS3230.htm>

### **The City University of Hong Kong**

Jan 2011 – May 2011

Teaching Assistant for IS6421 Human-Computer Interaction and Multimedia (grad-level course)

– Course page: <https://www.cityu.edu.hk/catalogue/pg/201617/course/IS6421.htm>

## Interns Advised

<b>Daoye Wang</b> (Next position: Master student at ETH Zurich)	2018-2019
<b>Guocheng Qian</b> (Next position: Master student at King Abdullah Univ. of Science and Technology)	2018-2019
<b>Cheng-Tsung Liu</b> (Next position: Master student at University of Southern California)	2018
<b>Zhengyang Xia</b> (Next position: Master student at Carnegie Mellon University)	2018
<b>Danlei Zhu</b> (Next position: Ph.D. student at Carnegie Mellon University)	2018
<b>Ziqi Chen</b> (Next position: Master student at Carnegie Mellon University)	2018
<b>Fangjun Zhang</b> (Next position: Master student at New York University)	2017-2018
<b>Yicun Liu</b> (Next position: Master student at Columbia University)	2017-2018
<b>Yue Luo</b> (Next position: Master student at Columbia University)	2017-2018