

# Weisheng Dong

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## Education

- 2004.9~2010.8: Ph. D in Circuit and System, Xidian University, Xi'an, China.  
Thesis: *The Context-based Adaptive Image Modeling for Image Restoration*
- 2000.9~2004.6: B.S in Communication Engineering, Hua Zhong University of Science and Technology, Wuhan, China

## Research Interest

Low-level Vision, Computer Vision, Image Processing

## Profession experiences

- 2018.1~present: Professor, School of Artificial Intelligence, Xidian University, Xi'an, China.
- 2016.8~2017.12: Professor, School of Electronic Engineering, Xidian University, Xi'an, China.
- 2012.7~2016.7: Associate professor, School of Electronic Engineering, Xidian University, Xi'an, China.
- 2010.9~2012.6: Lecturer, School of Electronic Engineering, Xidian University, Xi'an, China.
- 2012.8~2013.2: Visiting researcher, Visual Computing group, Microsoft Research Asia (MSRA), host: Yi Ma
- 2009.1~2010.6: Research Assistant/Associate (2009.1-2010.6), Dept. of Computing, The Hong Kong Polytechnic University, Hong Kong

## Awards

- The Second Prize** National Natural Science Award of China, 2017
- Top 10% Paper Awards:** IEEE International Conf. on Image Processing, 2014
- Excellent Ph. D. Thesis:** Excellent Ph. D. thesis award of Xidian University, 2011
- Best Paper Award:** SPIE Conf. on Visual Comm. and Image Process., 2010

## Grants

- Structured sparse representation for image restoration*, National natural Sciences Foundation of China (NSFC), 250, 000 RMB, 2012.1~2014.12, PI.
- Dictionary learning for depth images recovery with applications to 3D reconstruction*, National natural Sciences Foundation of China (NSFC), 830, 000 RMB, 2015. 1~2018.12.
- Sparse representation and image restoration*, National natural Sciences Foundation of China

(NSFC), 1, 300, 000 RMB, 2017. 1~2019. 12.

## Publications

### Book chapter:

- [1] Weisheng Dong and Xin Li, “Sparsity-regularized image restoration: locality and convexity revisited,” in *Image Restoration: Fundamentals and Advances*, CRC Press, Bahadir Gunturk and Xin Li (Editors), 2012.

### Journal papers:

- [1] C. Wang, W. Dong, X. Li, F. Wu, J. Wu, and G. Shi, “Memory based temporal fusion network for video deblurring,” *International Journal of Computer Vision (IJCV)*, 2023.
- [2] T. Huang, X. Yuan, W. Dong, J. Wu, and G. Shi, “Deep Gaussian Scale Mixture Prior for Image Reconstruction,” *IEEE Trans. on Pattern Analysis and Machine Intelligence (T-PAMI)*, 2023.
- [3] X. Lu, W. Dong, X. Li, J. Wu, L. Li, and G. Shi, “Adaptive search-and-training for robust and efficient network pruning,” *IEEE Trans. on Pattern Analysis and Machine Intelligence (T-PAMI)*, 2023.
- [4] J. Xu, F. Wu, X. Li, W. Dong, T. Huang, and G. Shi, “Spatially varying prior learning for blind hyperspectral image fusion,” *IEEE Trans. on Image Processing*, 2023.
- [5] Q. Ning, W. Dong, X. Li and J. Wu, “Searching efficient model-guided deep network for image denoising,” *IEEE Trans. on Image Processing*, vol. 23, pp. 668-681, 2023.
- [6] X. Li, W. Dong, J. Wu, L. Li, G. Shi, “Super-resolution Image Reconstruction: Selective milestones and open problems”, *IEEE Signal Process. Mag.*, 2023.
- [7] L. Sun, Y. Wang, F. Wu, X. Li, W. Dong, and G. Shi, “Deep unfolding network for efficient mixed video noise removal,” *IEEE Trans. on Circuits and System for Video Technology (T-CSVT)*, 2023.
- [8] H. Huang, L. Shen, C. He, W. Dong, and W. Liu, “Differentiable Neural Architecture Search for Extremely Lightweight Image Super-Resolution”, *IEEE Trans. Circuits Syst. Video Technol.*, vol. 33, no. 6, pp. 2672-2682, 2023.
- [9] T. Huang, W. Dong, F. Wu, X. Li, and G. Shi, “Uncertainty-driven knowledge distillation for language model compression,” *IEEE/ACM Transactions on Audio, Speech, and Language Processing*, 2023.
- [10] Mengluan Huang, Le Dong, Weisheng Dong, Guangming Shi, “Supervised Contrastive Learning Based on Fusion of Global and Local Features for Remote Sensing Image Retrieval”, *IEEE Trans. Geosci. Remote. Sens.*, vol. 61, pp. 1-13, 2023.
- [11] **W. Dong**, J. Wu, L. Li, G. Shi, and X. Li, “Bayesian deep learning for image reconstruction: from structured sparsity to uncertainty estimation,” *IEEE Signal Processing Magazine*, 2022.
- [12] T. Huang, **W. Dong**, J. Wu, L. Li, X. Li, and Guangming Shi, “Deep hyperspectral image fusion network with iterative spatio-spectral regularization,” *IEEE Trans. on Computational Imaging*, 2022.
- [13] Yongxu Liu, Jinjian Wu, Leida Li, **Weisheng Dong**, Guangming Shi, “Quality Assessment of UGC Videos Based on Decomposition and Recomposition”, *IEEE Transactions on Circuits and Systems for Video Technology*, 2022.

- [14] Zhiwen Chen, Jinjian Wu, Junhui Hou, Leida Li, **Weisheng Dong**, Guangming Shi, “ECSNet: Spatio-Temporal Feature Learning for Event Camera”, **IEEE Transactions on Circuits and Systems for Video Technology**, 2022.
- [15] Wen Yang, Jinjian Wu, Shiwei Tian, Leida Li, **Weisheng Dong**, Guangming Shi, “Fine-Grained Image Quality Caption With Hierarchical Semantics Degradation”, **IEEE Transactions on Image Processing**, 2022.
- [16] Yuan Cao, Guangming Shi, **Weisheng Dong**, Tianzhu Zhang, Jinjian Wu, Xuemei Xie, Xin Li, “Correlation filters based on spatial-temporal Gaussian scale mixture modelling for visual tracking”, **Neurocomputing**, 2022.
- [17] **W. Dong**, C. Zhou, F. Wu, J. Wu, G. Shi, and X. Li, “Model-guided deep hyperspectral image super-resolution,” **IEEE Trans. on Image Processing**, 2021.
- [18] J. Ma, J. Wu, L. Li, **W. Dong**, X. Xie, G. Shi, and W. Lin, “Blind Image Quality Assessment With Active Inference”, **IEEE Trans. on Image Processing**, vol. 30, no. 3, pp. 3650-3663, March 2021.
- [19] Q. Ning, **W. Dong**, G. Shi, L. Li and X. Li, “Accurate and lightweight image super-resolution with model-guided deep unfolding network,” **IEEE Journal of Selected Topics on Signal Processing**, vol. 15, no. 2, 240-252, 2021.
- [20] H. Zhu, L. Li, J. Wu, **W. Dong**, G. Shi, Generalizable No-Reference Image Quality Assessment via Deep Meta-learning, **IEEE Trans. on Circuits and Systems for Video Technology**, 2021.
- [21] T. Huang, **W. Dong**, J. Liu, F. Wu, G. Shi, and X. Li, “Accelerating convolutional neural network via structured Gaussian scale mixture models: a joint grouping and pruning approach,” **IEEE Journal of Selected Topics on Signal Processing**, vol. 14, no. 4, pp. 817-827, May, 2020, 2020.
- [22] **W. Dong**, H. Wang, F. Wu, G. Shi, and X. Li, “Deep spatial-spectral representation learning for hyperspectral image denoising”, **IEEE Trans. on Computational Imaging**, vol. 5, no. 4, pp. 635-648, 2019.
- [23] **Weisheng Dong**, P. Wang, W. Yin, G. Shi, F. Wu, and X. Lu, “Denoising Prior Driven Deep Neural Network for Image Restoration” **IEEE Trans. on Pattern Analysis and Machine Intelligence (TPAMI)**, Vol. 41, no. 10, pp. 2308-2318, Oct., 2019.
- [24] X Lu, H Wang, W Dong, F Wu, Z Zheng, and G Shi, Learning a Deep Vector Quantization Network for Image Compression, **IEEE Access**, vol. 7, pp. 118815-118825, 2019.
- [25] **Weisheng Dong**, Tao Huang, Guangming Shi, Yi Ma, and Xin Li, “Robust Tensor Approximation With Laplacian Scale Mixture Modeling for Multiframe Image and Video Denoising”, **IEEE Journal of Selected Topics in Signal Processing (JSTSP)**, vol. 12, no. 6, 1435-1448, 2018.
- [26] Guangming Shi, Tao Huang, **Weisheng Dong**, Jinjian Wu, and Xuemei Xie, “Robust Foreground Estimation via Structured Gaussian Scale Mixture Modeling”, **IEEE Transactions on Image Processing (TIP)**, vol. 27, no. 10, pp. 4810-4824, 2018.
- [27] Yongbo Li, **Weisheng Dong**, Xuemei Xie, Guangming Shi, Jinjian Wu, and Xin Li, “Image super-resolution with parametric sparse model learning”, **IEEE Transactions on Image Processing (TIP)**, vol. 27, no. 9, pp. 4638-4650, 2018.
- [28] Xuemei Xie, Yongbo Li, **Weisheng Dong**, Guangming Shi, Xin Li, Zhonglong Zheng, Learning Parametric

Sparse Models for Heavy Noisy Removal From Images. *IEEE Access* 6: 15823-15834 (2018)

- [29] Tao Huang, **Weisheng Dong**, X. Xie, et al. "Mixed Noise Removal via Laplacian Scale Mixture Modeling and Nonlocal Low-rank Approximation," *IEEE Transactions on Image Processing (TIP)*, vol. 26, no. 7, pp.3171-3186, 2017.
- [30] **Weisheng Dong**, Guangming Shi, Xin Li, Jinjian Wu, and Zhenhua Guo, "Color-guided depth recovery via local structural and nonlocal low-rank regularization," *IEEE Transactions on Multimedia*, vol. 19, no. 2, pp. 293-301, 2017.
- [31] Jinjian Wu, Leida Li, **Weisheng Dong**, Guangming Shi, Weisi Lin, C.-C. Jay Kuo, Enhanced Just Noticeable Difference Model for Images With Pattern Complexity. *IEEE Trans. Image Processing (TIP)* 26(6): 2682-2693 (2017)
- [32] **Weisheng Dong**, Fazuo Fu, Guangming Shi, and Xun Cao, Jinjian Wu, Guangyu Li, and Xin Li, "Hyperspectral Image Super-Resolution via Non-Negative Structured Sparse Representation", *IEEE Transactions on Image Processing (TIP)*, vol. 25, no. 5, pp. 2337-2352, May 2016.
- [33] Ying Fu, **Weisheng Dong**, 3D magnetic resonance image denoising using low-rank tensor approximation. *Neurocomputing* 195: 30-39 (2016)
- [34] **Weisheng Dong**, G. Shi, Y. Ma, and X. Li, "Image Restoration via Simultaneous Sparse Coding: Where Structured Sparsity Meets Gaussian Scale Mixture," *International Journal of Computer Vision (IJCV)*, vol. 114, no. 2, pp. 217-232, Sep. 2015.
- [35] **Weisheng Dong**, Xiaolin Wu, and Guangming Shi, "Sparsity fine tuning in Wavelet domain with application to compressive image reconstruction", *IEEE Trans. on Image Processing (TIP)*, vol. 23, no. 12, pp. 5249-5262, Dec. 2014.
- [36] **Weisheng Dong**, Guangming Shi, Xiaocheng Hu, and Yi Ma, "Nonlocal sparse and low-rank regularization for optical flow estimation," *IEEE Trans. on Image Processing (TIP)*, vol. 23, no. 10, pp. 4527-4538, 2014.
- [37] **Weisheng Dong**, Guangming Shi, Xin Li, Yi Ma, and Feng Huang, "Compressive sensing via nonlocal low-rank regularization", *IEEE Trans. on Image Processing (TIP)*, vol. 23, no. 8, pp. 3618-3612, Aug. 2014.
- [38] **Weisheng Dong**, Lei Zhang, Guangming Shi, and Xin Li, "Nonlocally centralized sparse representation for image restoration," *IEEE Trans. on Image Processing (TIP)*, vol. 22, no. 4, pp. 1620-1630, Apr. 2013.
- [39] **Weisheng Dong**, Lei Zhang, Rastislav Lukac, and Guangming Shi, "Sparse representation based image interpolation with nonlocal autoregressive modeling," *IEEE Trans. on Image Processing (TIP)*, vol. 22, no. 4, pp. 1382-1394, Apr. 2013.
- [40] **Weisheng Dong**, Guangming Shi, and Xin Li, "Nonlocal image restoration with bilateral variance estimation: a low-rank approach," *IEEE Trans. on Image Processing (TIP)*, vol. 22, no. 2, pp. 700-711, Feb. 2013.
- [41] **Weisheng Dong**, Lei Zhang, Guangming Shi, and Xiaolin Wu, "Image deblurring and super-resolution by adaptive sparse domain selection and adaptive regularization," *IEEE Trans. On Image Processing*, vol. 20, no. 7, pp. 1838-1857, July 2011.
- [42] Xiaolin Wu, **Weisheng Dong**, Xiangjun Zhang, and Guangming Shi, "Model-assisted adaptive recovery of compressed sensing with imaging applications," *IEEE Trans. on Image Processing (TIP)*, vol. 21, no. 2, Feb. 2012.
- [43] **Weisheng Dong**, Guangming Shi, Xiaolin Wu, Lei Zhang, "A learning-based method for compressive image recovery," *Journal of Visual Communication and Image Representation*, vol. 24, no. 7, pp. 1055-1063, 2013.

- [44] **Weisheng Dong**, Xiafang Yang, and Guangming Shi, “Compressive sensing via reweighted TV and nonlocal sparsity regularisation”, *Electronic Letters*, vol. 49, no. 3, pp. 184-186, 2013.
- [45] **Weisheng Dong**, Guangming Shi, Xin Li, Lei Zhang, and Xiaolin Wu, “Image reconstruction with locally adaptive sparsity and nonlocal robust regularization,” *Signal Processing: Image Communication*, vol. 27, pp. 1109-1122, 2012.
- [46] **Weisheng Dong**, Guangming Shi, and Jizheng Xu, “Adaptive nonseparable interpolation for image compression with directional wavelet transform,” *IEEE Signal Processing Letters*, vol. 15, pp. 233-236, 2008.
- [47] Ying Fu and **Weisheng Dong**, “3D Magnetic Resonance Image Denoising using Low-rank Tensor Approximation”, *Neurocomputing*, Feb. 2016.
- [48] Lei Zhang, **Weisheng Dong**, Xiaolin Wu, and Guangming Shi “Spatial-temporal color video reproduction from noisy CFA sequence,” *IEEE Trans. On Circuits and Systems for Video Technology*, vol. 20, no. 6, pp. 838-847, June 2010.
- [49] Lei Zhang, **Weisheng Dong**, David Zhang, Guangming Shi, “Two-stage Image Denoising by Principle Component Analysis with Local Pixel Grouping”, *Pattern Recognition*, vol. 43, pp. 1531-1549, Apr. 2010. (325 citations)
- [50] Guangming Shi, **Weisheng Dong**, Xiaolin Wu, and Lei Zhang, “Context-based adaptive image resolution upconversion,” *Journal of Electronic Imaging*, vol. 19, 013008, 2010.
- [51] **Weisheng Dong**, Guangming Shi, and Li Zhang, “Immune Memory clonal selection algorithms for designing stack filters,” *Neurocomputing*, pp. 777-784, Jan. 2007.

## Conference papers

- [1] Z. Fang, F. Wu, **W. Dong**, X. Li, J. Wu and G. Shi, “Self-supervised non-uniform kernel estimation with flow-based motion prior for blind image deblurring,” **IEEE CVPR**, 2023.
- [2] Z. Yang, **W. Dong**, X. Li, Y. Sun, M. Huang and G. Shi, “Vector Quantization with Self-attention for Quality-independent Representation Learning”, **IEEE CVPR** 2023.
- [3] Q. Ning, F. Wu, **W. Dong**, X. Li, and G. Shi, “Exploring Correlations in Degraded Spatial Identity Features for Blind Face Restoration,” **ACM Multimedia**, 2023.
- [4] Y. Liu, T. Huang, **W. Dong**, X. Li, and G. Shi, “Low-Light image enhancement with multi-stage residue quantization and brightness-aware attention,” **IEEE ICCV**, 2023.
- [5] C. Xie, Q. Ning, **W. Dong**, G. Shi, “TFRGAN: Leveraging Text Information for Blind Face Restoration with Extreme Degradation”, **CVPR Workshops**, 2023.
- [6] Q. Ning, J. Tang, F. Wu, **W. Dong**, et al., “Learning degradation Uncertainty for unsupervised real-world image super-resolution,” **IJCAI** 2022.
- [7] X. Lu, T. Xi, B. Li, G. Zhang, and W. Dong, “Bayesian based re-parameterization for DNN model pruning,” **ACM Multimedia**, 2022.
- [8] Y. Zhu, W. Dong, X Li, J. Wu, L. Li, and G. Shi, “Robust depth completion with uncertainty-driven loss functions,” **AAAI** 2022.
- [9] Wen Yang, Jinjian Wu, Jupou Ma, Leida Li, Weisheng Dong, Guangming Shi, “Learning for Motion Deblurring with Hybrid Frames and Events”, **ACM Multimedia**, 2022.
- [10] Huachen Fang, Jinjian Wu, Leida Li, Junhui Hou, Weisheng Dong, Guangming Shi, “AEDNet:

Asynchronous Event Denoising with Spatial-Temporal Correlation among Irregular Data”, **ACM Multimedia**, 2022.

- [11] Z. Fang, W. Dong\*, X. Li, J. Wu, L. Li, and G. Shi, “Uncertainty learning in kernel estimation for multi-stage blind image super-resolution,” **ECCV** 2022.
- [12] Z. Yang, W. Dong\*, X. Li, J. Wu, L. Li, and G. Shi, “Self-feature distillation with uncertainty modeling for degraded image recognition,” **ECCV** 2022.
- [13] T. Huang, W. Dong, X. Yuan, J. Wu, and G. Shi, “Deep Gaussian Scale Mixture Prior for Spectral Compressive Imaging,” **IEEE CVPR** 2021.
- [14] H. Zhu, L. Li, J. Wu, W. Dong, G. Shi, “MetaIQA: deep meta-learning for no-reference image quality assessment”, **CVPR**, 2020.
- [15] X. Lu, H. Huang, W. Dong, G. Shi, and X. Li, “Beyond network pruning: a joint search-and-training approach,” **IJCAI**, 2020.
- [16] Q. Ning, W. Dong, F. Wu, J. Wu, J. Lin, and G. Shi, “Spatial-temporal Gaussian scale mixture modeling for foreground estimation,” **AAAI** 2020.
- [17] T. Huang, F. Wu, **Weisheng Dong**, Guangming Shi, and Xin Li, “Lightweight deep residue learning for joint color image demosaicking and denoising,” in Proc. of ICPR, 2018. (Oral)
- [18] Yongbo Li, **Weisheng Dong**, Xuemei Xie, Guangming Shi, Xin Li, and Donglai Xu, “Learned sparse models for image super-resolution,” *Annual Conf. on Neural Information Processing Systems (NIPS)*, 2016.
- [19] Yongbo Li, **Weisheng Dong**, Guangming Shi, and Xuemei Xie, "Learning parametric distributions for image super-resolution: where patch matching meets sparse coding," in *Proc. IEEE Int. Conf. on Computer Vision (ICCV)*, 2015.
- [20] **Weisheng Dong**, Guangyu Li, Guangming Shi, Xin Li, and Yi Ma, "Low-rank tensor approximation with Laplacian scale mixture modeling for multiframe image denoising", in *Proc. IEEE Int. Conf. on Computer Vision (ICCV)*, 2015.
- [21] **Weisheng Dong**, Xin Li, Yi Ma, and Xin Li, "Image reconstruction via Bayesian Structured Sparse Coding", *IEEE Int. Conf. on Image Processing*, 2014. (Oral)
- [22] **Weisheng Dong**, Xiaolin Wu, and Guangming Shi, "Sparsity fine tuning in Wavelet domain with application to compressive image reconstruction", *IEEE Int. Conf. on Acoustics, Speech, and Signal Processing (ICASSP)*, 2014.
- [23] **Weisheng Dong**, Guangming Shi, and Xin Li, “Image deblurring with low-rank approximation structured sparse representation,” **APSIPA**, 2012.
- [24] **Weisheng Dong**, Lei Zhang, and Guangming Shi, "Centralized sparse representation for image restoration", *IEEE International Conference on Computer Vision (ICCV)*, pp. 1259-1266, 2011.
- [25] **Weisheng Dong**, Xin Li, Lei Zhang, and Guangming Shi, “Sparsity-based image denoising via dictionary learning and structure clustering,” *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, pp. 457-464, 2011. (Oral)
- [26] **Weisheng Dong**, Guangming Shi, Lei Zhang, and Xiaolin Wu, “Super-resolution with nonlocal regularized sparse representation,” in Proc. *SPIE Visual Communications and Image Processing (VCIP)*, 2010. (**Best Paper Award**)
- [27] **Weisheng Dong**, Xin Li, Lei Zhang, and Guangming Shi, “Sparsity-based image deblurring with locally adaptive and nonlocally robust regularization,” accept to Proc. *IEEE International Conference on Image Processing (ICIP)*, pp. 1841-1844, 2011.
- [28] **Weisheng Dong**, Xiaolin Wu, Guangming Shi, and Lei Zhang, “Context-based bias removal of statistical

models of wavelet coefficients for image denoising,” in Proc. *IEEE International Conference on Image Processing (ICIP)*, pp. 3841-3844, Oct. 2009.

- [29] **Weisheng Dong**, Lei Zhang, Guangming Shi, and Xiaolin Wu, “Nonlocal back-projection for adaptive image enlargement,” in Proc. *IEEE International Conference on Image Processing (ICIP)*, pp. 349-352, Oct. 2009. (113 citations)
- [30] Fangfang Wu, Guangming Shi, **Weisheng Dong**, and Xiaolin Wu, “Learning-based recovery of compressive sensing with application in multiple description coding,” in Proc. *IEEE International Workshop on Multimedia Signal Processing (MMSp)*, Oct. 2009.
- [31] **Weisheng Dong**, Guangming Shi, and Jizheng Xu, “Signal-adapted directional lifting scheme for image compression,” in Proc. *IEEE International Symposium on Circuits and Systems (ISCAS)*, pp. 1392-1395, 2008.

## **Professional Services**

### **Associate Editor:**

IEEE Transactions on Image Processing, 2015. 7 ~2019.1

SIAM Journal on Imaging Sciences, 2017. 1~至今

Circuit, System and Signal Processing, 2014. 9~present

### **Technical Program Committee member of:**

IEEE International Conference on Computer Vision and Pattern Recognition (CVPR) 2019, 2018, 2017, 2016, 2014, AAAI Conf. on Artificial Intelligence 2017, IEEE International Conference on Computer Vision (ICCV) 2017, 2015, European Conference on Computer (ECCV) 2016, 2014, SIGGRAPH Asia 2014, IEEE International Conference on Image Processing' 2014, 2013, 2011, 2010, IEEE International Conference on Multimedia and Expo' 2013, 2012, IEEE Conference on Visual Communication and Image Representation' 2013, 2011.

### **Reviewer for:**

IEEE TIP, IEEE TMI, IEEE TCSVT, IEEE TSMC-B, IEEE TMM, IJCV, IEEE SPL, SIAM J. on Imag. Sci., Optics Express, Optics Letters, J. Bio. Opt., Signal Processing, J. Electronic Imaging