

Zhanchuan Cai

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Academic Qualification

Ph.D. in Computer Software and Theory, Sun Yat-sen University

Research & Teaching Area

Intelligent Information Processing
Applied Mathematics and Scientific Computing
Computer Graphics and Image Processing
Remote Sensing Data Processing and Analysis

Recent Events/Links(Selected)

26 Jan. 2021, the article *High-fidelity Reversible Image Watermarking Based on Effective Prediction Error-Pairs Modification* published on *IEEE Transactions on Multimedia* was reported by the CCF TC-Multimedia Technology through the article guide module. (Website: <https://mp.weixin.qq.com/s/pF3Ey5tuOdRjN0q7uNSEFQ>)

6 Apr. 2021, the article *Uniform Partition and U-Net for Image Segmentation* published on *IEEE Transactions on Multimedia* was reported by the CCF TC-Multimedia Technology through the article guide module. (Website: https://mp.weixin.qq.com/s/IZv12szuakwWR_4aiNZPYg)

The article *An Adaptive Triangular Partition Algorithm for Digital Images* published on *IEEE Transactions on Multimedia* was reported by the CCF TC-Multimedia Technology through the article guide module. (Website: <https://signalprocessingsociety.org/publications-resources/ieee-transactions-multimedia/adaptive-triangular-partition-algorithm-digital>)

3-5 Sept. 2020, as the organizing chair, we held the 8th International Conference on Computational Visual Media. (Website: <https://www.must.edu.mo/news/34371-article09041637>)

Awards & Honors/Appointments (Selected)

Awards & Honors

Second Prize of the Teaching Achievement Award (Co-awarded), Macau University of Science and Technology, 2020.

Third Prize of Technological Invention Award of the Macau Science and Technology Awards (Co-awarded), 2018.

Excellent Supervisor for Contemporary Undergraduate Mathematical Contest in Modeling, CSIAM, 2017.

BOC Excellent Research Award, Macau University of Science and Technology, 2016

Third Prize of Natural Science Award of the Macau Science and Technology Awards (Co-awarded), 2012.

Excellent Organization Worker for Contemporary Undergraduate Mathematical Contest in Modeling, CSIAM, 2011.

Appointments

Senior Member, Institute of Electrical and Electronics Engineers (IEEE).

Distinguished Member, China Computer Federation (CCF).

Member, Association for Computing Machinery (ACM).

Member, Asia Graphics Association (AG).

Committee Member, Computer-Aided Design & Computer Graphics (CCF TCCADCG).

Committee Member, Geometric Design and Computing of China.

Working Experience

2008-Present, Assistant Professor/ Associate Professor/ Professor, Faculty of Information Technology, Macau University of Science and Technology, Macau, China

2007-2008, Visiting Scholar, University of Nevada, Las Vegas, USA

Academic Publications (selected)

Books

Z.C. Cai, *Fundamentals of Engineering Mathematics*, Science Press, 2018, ISBN-13: 978-7030568632. (in Chinese)

J. Huang, Z.C. Cai, K.Y. U, Y.Y. Liang, *Local Interpolation Explicit Algorithm and Its Application*, Science Press, 2016, ISBN-13: 978-7030462947. (in Chinese)

Journal Papers

W.G. He and **Z.C. Cai***, Reversible Data Hiding Based on Dual Pairwise Prediction-Error Expansion, *IEEE Transactions on Image Processing*, 2021,30:5045-5055.

B. Ye, X.X. Yuan, **Z.C. Cai***, and T. Lan, Severity Assessment of COVID-19 Based on Feature Extraction and V-Descriptors, *IEEE Transactions on Industrial Informatics*, DOI: 10.1109/TII.2021.3056386.

Q.Y. Huang, **Z.C. Cai***, and T. Lan, A New Approach for Character Recognition of Multi-Style Vehicle License Plates, *IEEE Transactions on Multimedia*, DOI: 10.1109/TMM.2020.3031074.

Y.Q. Xiao, **Z.C. Cai***, and X.X. Yuan, YuvConv: Multi-Scale Non-Uniform Convolution Structure Based on YUV Color Model, *IEEE Transactions on Multimedia*, DOI: 10.1109/TMM.2020.3013352.

J.Y. Yuan, W. Cao, **Z.C. Cai***, and B.H. Su, An Underwater Image Vision Enhancement Algorithm Based on Contour Bougie Morphology, *IEEE Transactions on Geoscience and Remote Sensing*, DOI: 10.1109/TGRS.2020.3033407.

- Y.M. Wang, **Z.C. Cai***, and W.G. He, High Capacity Reversible Data Hiding in Encrypted Image Based on Intra-block Lossless Compression, *IEEE Transactions on Multimedia*, DOI: 10.1109/TMM.2020.2999187.
- T. Lan and **Z.C. Cai***, Efficient Reconstruction of Industrial Images Using Optimized HMK Splines, *IEEE Transactions on Industrial Informatics*, 2021, 17(7): 4657-4668.
- T. Lan and **Z.C. Cai***, A Novel Image Representation Method Under a Non-Standard Positional Numeral System, *IEEE Transactions on Multimedia*, 2021, 23: 1301-1315.
- T. Lan and **Z.C. Cai***, Modeling of Lunar Digital Terrain Entropy and Terrain Entropy Distribution Model, *IEEE Transactions on Geoscience and Remote Sensing*, 2021, 59(2): 1052-1066.
- W.G. He, **Z.C. Cai***, and Y.M. Wang, High-fidelity Reversible Image Watermarking Based on Effective Prediction Error-Pairs Modification, *IEEE Transactions on Multimedia*, 2021, 23: 52-63.
- Y.M. Zhang, **Z.C. Cai***, and G.Q.Xiong, A New Image Compression Algorithm Based on Non-uniform Partition and U-System, *IEEE Transactions on Multimedia*, 2021, 23: 1069-1082.
- J.J. Chen and **Z.C. Cai***, A New Class of Explicit Interpolatory Splines and Related Measurement Estimation, *IEEE Transactions on Signal Processing*, 2020, 68:2799-2813.
- W.G. He and **Z.C. Cai***, An Insight Into Pixel Value Ordering Prediction-Based Prediction-Error Expansion, *IEEE Transactions on Information Forensics and Security*, 2020, 15:3859-3871.
- X.X. Yuan and **Z.C. Cai***, An Adaptive Triangular Partition Algorithm for Digital Images, *IEEE Transactions on Multimedia*, 2019, 21(6): 1372-1383.
- T. Lan and **Z.C. Cai***, Lunar Brightness Temperature Map and TB Distribution Model, *IEEE Transactions on Geoscience and Remote Sensing*, 2018, 56(12): 7310-7323.
- W. Cao, **Z.C. Cai***, and B. Ye, Measuring Multiresolution Surface Roughness Using V-System, *IEEE Transactions on Geoscience and Remote Sensing*, 2018, 56(3): 1497-1506.
- Z.C. Cai***, T. Lan, and C.M. Zheng, Hierarchical MK Splines: Algorithm and Applications to Data Fitting, *IEEE Transactions on Multimedia*, 2017, 19(5): 921-934.
- Z.C. Cai*** and T. Lan, Lunar Brightness Temperature Model Based on the Microwave -2, *IEEE Transactions on Geoscience and Remote Sensing*, 2017, 55(10): 5944-5955.
- W.G. He, **Z.C. Cai***, and Y.M. Wang, Flexible spatial location-based PVO predictor for high-fidelity reversible data hiding. *Information Sciences*, 2020, 520: 431-444.
- J.J. Chen and **Z.C. Cai***, Cardinal MK-spline Signal Processing: Spatial Interpolation and Frequency Domain Filtering, *Information Sciences*, 2019, 495: 116-135.

* Corresponding author

Patents

- Z.C. Cai** and T. Lan, Method and System for Secure Encryption, United States Patent, Patent No. 10,985,906 B2, April, 2021.
- Z.C. Cai** and T. Lan, Methods and Apparatus for Encrypting Multimedia Information, United States Patent, Patent No. 10635786 B2, April 2020.
- Z.C. Cai** and W. Cao, Method for Improving Calculations of Surface Roughness, United States Patent, Patent No. 10580150 B2, March 2020.
- Z.C. Cai** and T. Lan, Methods and Apparatus for Image Construction, United States Patent, Patent No. 10332279 B2, June 2019.
- Z.C. Cai**, Methods and Apparatus for Color Image Watermarking, United States Patent, Patent No. 10296999 B2, May 2019.

Z.C. Cai and W. Cao, Omnidirectional Roughness Algorithm for Topographic Signature Analysis of Lunar Craters, United States Patent, Patent No. 10354398 B2, July 2019.

Z.C. Cai, Lunar Brightness Temperature Modeling Based on the Microwave Radiometer Data, United States Patent, Patent No. 10346565 B2, July 2019.

Z.C. Cai, B. Ye, T. Lan, and Y.Q. Xiao, Systems and Methods for Reducing Computer Resources Consumption to Reconstruct Shape of Multi-Object Image, United States Patent, Patent No. 10062187 B1, August 2018.

Z.C. Cai and Z. Li, Image Stitching, United States Patent, Patent No. 9990753 B1, June 2018.

Z.C. Cai, Color Image Watermarking, United States Patent, Patent No. 10037587 B2, July 2018.