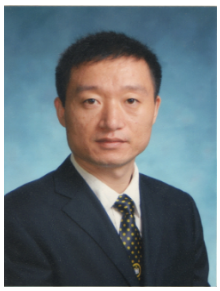
Professor Zhanchuan Cai

Faculty of Information Technology/Space Science Institute

Office： A213

Tel.：+853-8897 2329

E-mail：zccai@must.edu.mo



Academic Qualification:

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

Teaching Area

COMPUTER LANGUAGE AND PROGRAMMING

FUNDAMENTALS OF ADVANCED ENGINEERING MATHEMATICS

NUMERICAL ANALYSIS

Research Area

Lunar Data Processing and Analysis

Remote Sensing Data Processing and Analysis

Intelligent Information Processing

Computer Graphics and Image Processing

Working Experience

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

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

Academic Publication（selected）

T. Lan, **Z. C. Cai**, Lunar Brightness Temperature Map and TB Distribution Model, IEEE Transactions on Geoscience and Remote Sensing, DOI: 10.1109/TGRS.2018.2850034. In Press.

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, T. Lan, Lunar Brightness Temperature Model Based on the Microwave Radiometer Data of Chang'e-2, IEEE Transactions on Geoscience and Remote Sensing, 2017, 55(10): 5944-5955.

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.

W. Cao, **Z. C. Cai**, Improved Multiscale Roughness Algorithm for Lunar Surface,IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, DOI:10.1109/JSTARS.2018. 2822297. In Press.

A.J. Li, **Z.C. Cai**, and W. Cao, Correlation Analysis Between Lunar Surface Roughness and Other Land-Surface Parameters Using BPNN, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, 2017, 10(12): 5647 - 5656.

Z.G. Meng , S. Hu, T.X. Wang , C. Li , **Z.C. Cai** , J.S. Ping ,Passive Microwave Probing Mare Basalts in Mare Imbrium Using CE-2 CELMS Data, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, DOI:10.1109/JSTARS.2018.2845417.In Press.

Z. Li, M. J. Ye, **Z. C. Cai,** and Z. S. Tang, Automatic stitching method for Chang'E-2 CCD images of the Moon, Journal of Earth Science, 2017, 28(1): 168-179.

Z. G. Meng, R. Zhao, **Z. C. Cai,** J. S. Ping, Z. S. Tang, and S. Chen, Microwave Thermal Emission at Tycho Area and Its Geological Significance, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, 2017, 10(6): 2984-2990.

Z. G. Meng, J. D. Zhang, **Z. C. Cai,** J. S. Ping, and Z. S. Tang, Microwave thermal emission features of Mare Orientale revealed by CELMS data, IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, 2017, 10(6): 2991-2998.

W. Chen, **Z.C. Cai,** Orthogonal Polar V Transforms and Application to Shape Retrieval, Journal of Visual Communication and Image Representation, 2016,34(1): 146–152.

Z.G Meng, G.D. Yang, J.S. Ping, **Z.C. Cai**, G. Alexander, M.O. Edward, Influence of (FeO+TiO2) Abundance on the Microwave Thermal Emissions of Lunar Regolith, Sci. China Earth Sci. 2016, 59: 1498.

W. Chen, **Z.C. Cai,** Texture Image Classification Based on Rotation-invariant U Transforms, Journal of Computer-Aided Design & Computer Graphics, 2016, 28(9): 1527-1533.

W. Chen, **Z.C. Cai,** An Explicit Hermite Curve Interpolation, Journal of Computer-Aided Design & Computer Graphics, 2016, 28(8): 1326-1332.

W. Chen, **Z.C. Cai**, The Generalization of High Order Haar Functions, Acta Scientiarum Naturalium Universitatis Sunyatseni, 2016, 55(3): 59-63.

S. Chen, Z.G. Meng, J.D. Zhang, J.S. Ping, **Z.C. Cai,** Research on Microwave Radiation Characteristics at Tycho Crater Area, Sci. China Phys. Mech. Astron, 2016, 46(2): 029608.

W. Cao, **Z.C. Cai,** Z.S. Tang, Fractal Structure of Lunar Topography: An Interpretation of Topographic Characteristics, Geomorphology, 2015, 238: 112–118.

W. Cao, **Z.C. Cai,** Z.S. Tang, Lunar Surface Roughness Based on Multiscale Morphological Method, Planetary and Space Science, 2015, 108: 13–23.

W. Chen, **Z.C. Cai,** D.X. Qi, Orthogonal Franklin Moments and Its Application for Image Representation, Chinese Journal of Computers, 2015, 38(6): 1140-1147.

J.H. Lai, B. Ye, **Z.C. Cai,** C.G. Li, Y. Jia, A New Approach for Orthogonal Representation of Lunar Contour Maps, Lecture Notes in Computer Science series, Volume 9217, 2015: 198-205.

C.G. Li, B. Ye, J.H. Lai, Y. Jia, **Z.C. Cai,** A Digital Watermarking Algorithm for Trademarks Based on U System, Lecture Notes in Computer Science series, Volume 9217, 2015: 43-52.

Z. Li, M.J Ye, **Z.C. Cai,** Z.S. Tang, Calibration of Location Coordinates in Chang'E-2 CCD Data, Journal of Macau University of Science and Technology, 2015, 9(1):117-124.

T. Lan, **Z.C. Cai,** J. Huang, Visualizing Brightness Temperature Data of King Crater Area with CELMS, In Proceedings of the 15th ACM SIGGRAPH Conference on Virtual-Reality Continuum and Its Applications in Industry-Volume 1, 2016, 417-421.

J. Huang, Y.Y. Liang, **Z.C. Cai,** H. Fang, Z.S. Tang, Stereo Display System of Virtual Moon Using Lunar Exploration Data Derived from Chang'E-1, Computer Engineering and Design, 2015, 36(1): 236-240.

Z.G. Meng, Y. Xu, **Z.C. Cai,** S.B. Chen, Y. Lian, H. Huang, Influence of Lunar Topography on Simulated Surface Temperature, Advances in Space Research, 2014, 54(10): 2131-2139.

Z.C. Cai, C.M. Zheng, Curves Approximation with Hierarchical Many-knot Splines, Acta Scientiarum Naturalium Universitatis Sunyatseni, 2014, 53(1): 18-21.

Z.C. Cai, D.X. Qi, A New Class of Orthogonal Spline Moments and Its Application, Journal of Information and Computation Science, 2013, 10(14): 4563-4571.

Z.C. Cai, W. Chen, Least Square Approximation and Analysis for Scattered Data Based on Orthogonal GF System, Acta Scientiarum Naturalium Universitatis Sunyatseni, 2013, 52(5): 73-77.

Z.C. Cai, F.F. Yao, Z. S. Tang, Digital Image Inpainting with Kriging Method, Journal of Computer-Aided Design & Computer Graphics, 2013, 25(9): 1281-1287.

Z.C. Cai, W. Chen, Z.S. Tang, Lunar Trend Surface Analysis Based on GF system, Journal of Information and Computation Science, 2011, 8(8): 1423-1430.

Z.C. Cai, C.M. Zheng, J. Huang, A Method of Image Zooming-in Based on Mixed Many-knot Spline Surface Interpolation, Acta Scientiarum Naturalium Universitatis Sunyatseni, 2011, 50(2): 16-19.

M.J. Ye, J. Li, Y.Y. Liang, **Z.C. Cai,** Z.S. Tang, Automatic Seamless Stitching Method for CCD Images of Chang'E-1 Lunar Mission, Journal of Earth Science, 2011, 22(5): 610-618.

Z.C. Cai, C.M. Zheng, Z.S. Tang, D.X. Qi, Lunar Digital Elevation Model and Elevation Distribution Model Based on Chang'E-1 LAM Data, Science China: Technological Science, 2010, 53(9): 2558-2568.

Z.C. Cai, Y.Y. Liang, J. Li, Z.S. Tang, D.X. Qi, Digital Elevation Model of the Moon from the Chang'E-1 Laser Altimeter, Progress in Geophysics, 2010, 25(4): 1153-1160.

Z.C. Cai, W. Chen, D.X. Qi, Z.S. Tang, A Class of General Franklin Functions and Its Application, Chinese Journal of Computers, 2009, 32(10): 2004-2013.

Z.C. Cai, X.L. Yang, Z.S. Tang, The Plotting of Lunar Contour Map Based on Chang'E-1 LAM Data, Journal of Macau University of Science and Technology, 2009, 3(2): 1-7.

Z.C. Cai, H. Ma, W. Sun, D.X. Qi, Analysis of Frequency Spectrum for Geometric Modeling in Digital Geometry, In the volume "Wavelet Analysis and Applications" in the Springer book series "Applied and Numerical Harmonic Analysis", 525-542, 2007.

Z.C. Cai, H. Ma, W. Sun, D.X. Qi, Matching 2D Shapes Using U Descriptors, Lecture Notes in Computer Science, 2006, 4035: 209-220.

Z.C. Cai, W. Sun, D.X. Qi, A Classification and Recognition Method for Planar Figures Based on Complete Orthogonal U-system. Journal of Software, 2006, 17 (S.): 21-27.

Z.C. Cai, W. Sun, C.Z. Xiong, D.X. Qi, A New Scheme for Watermarking Engineering graph. International Journal of CAD/CAM, 2006, 6(1): 99-104.

D.X. Qi, C.J. Tao, R.X. Song, H. Ma, W. Sun, **Z.C. Cai,** Representation for a Group of Parametric Curves Based on the Orthogonal Complete U-System, Chinese Journal of Computers, 2006, 29(5): 778-785.

Books

Z.C. Cai, Fundamentals of Engineering Mathematics, Science Press, 2018, ISBN: 978-7030568632.

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.

Patents（selected）

Z.C. Cai, T. Lan, Method for Coding Data, US patent, Grant No. 9755661, September 2017 and Australia Innovation patent, Grant No. 2016101456, August 2017.

Z.C. Cai, Computer System that Executes Hierarchical MK Splines Scheme for Scattered Data Interpolation, US patent, Grant No. 9990334, June 2018 and Australia Innovation patent, Grant No. 2016101559, September 2016.

Z.C. Cai, Z. Li, Image Stitching, US patent, Grant No. 9990753, June 2018 and Australia Innovation patent, Grant No. 2017100064, January 2017.

Z.C. Cai, T. Lan, Methods and Apparatus for Encrypting Multimedia Information, Australia Innovation patent, Grant No. 2017100438, April 2017.

Z.C. Cai, T. Lan, Methods and Apparatus for Image Construction, Australia Innovation patent, Grant No. 2017100337, 22 March 2017.

Z.C. Cai, W. Cao, Omnidirectional Roughness Algorithm for Topographic Signature Analysis of Lunar Craters, Australia Innovation patent, Grant No. 2017100063, January 2017.

Z.C. Cai, Lunar Brightness Temperature Modeling Based on the Microwave Radiometer Data, Australia Innovation patent, Grant No. 2017100037, January 2017.

Professional Certification and Awards

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 Macao Science and Technology Awards (Co-awarded), 2012.

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

Student Awards

Postgraduate Award of the Macao Science and Technology Award, 2016, Advisor.

First Prize, NPMCM-2017, Advisor.

Second Prize, NPMCM-2016, Advisor.

Third Prize, NPMCM-2015, Advisor.

Second Prize, NPMCM-2014, Advisor.

Second Prize, NPMCM-2013, Advisor.

Second Prize, NPMCM-2011, Advisor.

Second Prize, CUMCM-2017, Advisor.

Second Prize, CUMCM-2016 ,Advisor.

Second Prize, CUMCM-2014 , Advisor.

First Prize, CUMCM-2003, Advisor.

Silver Prize, China Pan-Pearl River Delta Region University IT Project Competition 2010, Advisor.

Gold Prize, China Pan-Pearl River Delta Region University IT Project Competition 2009, Co-advisor.

Professional Society Membership

Member of Asia Graphics Association (AG)

Member of Association for Computing Machinery (ACM)

Member of Institute of Electrical and Electronics Engineers (IEEE)

Member of China Computer Federation (CCF)

Member of China Society for Industrial and Applied Mathematics (CSIAM)

Committee of Computer-Aided Design & Computer Graphics (TCCADCG)

Committee of Geometric Design and Computing of China(GDC)

Committee of Chinese Society of Computer Mathematics (CSCM)