

# Wen-Feng Wang

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**Key Talents SE:** Chinese Academy of Sciences

**Professor (Visiting):** KWL Team, University of Malaya, Malaysia

**Editor-in-chief:** International Journal of Applied Nonlinear Science (ESCI-indexed)

**Professor:** Shanghai Institute of Technology, China and IMT Institute, India

**Scientist in Chief:** Shanghai Lingang Artificial Intelligence Laboratory, China

**The Director:** ASEM-London CTI of Shanghai Cooperation Organization

**Biography:** Editor-in-chief of IJANS and IJEEE; EBM of Nature - Scientific Reports; General chair of the World Conference on Intelligent and 3D Technologies; Reviewer of many SCI journals, including some top ones – Nature Computational Science, Expert System with Applications, Water Research, Science China-Information Sciences, Science of the Total Environment, Environmental Pollution, IEEE Transactions on Automation Science and Engineering, etc.; Plenary/Keynote speakers of many international conferences - AMICR2019, IACICE2020, NAMSP2021, AMMCS2021, ICCEAI2021, AICS2021, 3DIT-MSP&DL2020, CSAMCS 2021, AMMCS2021, ICPEM2021, ATAMI2021, ICRDET2022 and etc.



## Education Backgrounds

**1998.9~2002.7** College of Mathematics and Information Science, Shanxi Teachers University, UG.

After 2002, I taught advanced mathematics in Shanxi Conservancy Technical Institute, China.

**2004.9~2007.6** College of Mathematics and Information Science, Shanxi Normal University, PG.

Tried to prove the famous Kadison-Singer Conjecture and communicate it with Pete Casazza.

**2010.7~2014.6** Xinjiang Institute of Ecology and Geography, Chinese Academy of Sciences, Ph.D.

**Another two academic backgrounds (not formal, but worth mentioning):**

**2015.1~2015.12** Discuss ecological modeling from Phillippe Ciais (very famous in climate change).

**2019.1~2019.12** Discuss cognitive computation from Steve S. Chen (very famous in supercomputer).

## Work Experiences

**2007.8~2010.7** Assistant professor, Department of Mathematics, Shihezi University.

Teaching undergraduate courses (Mathematical analysis, Differential equation, Complex-variable function, etc.) and graduate courses (Linear programming and its applications, Functional analysis, Fuzzy theory, etc.)

**2014.7~2017.10** Assistant professor, Xinjiang Institute of Ecology and Geography, Chinese Academy of Sciences.

I applied nonlinear science in ecological modeling and presented the first global model for estimating unsung CO<sub>2</sub> absorption by soils in arid region. Benefiting from this work, I obtained my NSFC project. In 2016, Professor Phillippe Ciais (very famous in climate change) joined my NSFC project as the 1st participant.

**2017.11~2018.11** Associative professor, State Key Laboratory of Desert and Oasis Ecology, Xinjiang Institute of Ecology and Geography, Chinese Academy of Sciences.

I applied nonlinear science in computer vision and edited two Chinese books. Benefiting from them, I was selected as a 'key talent plan' by the Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences.

**2018.11~2022.3** Senior engineer with a "key talent plan" in Computer Vision, the Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences (2019.7~2022.3 is part-time).

I applied nonlinear science in electrical engineering and published two English books. I was invited to give speeches in the Communication University of China, IFLYTEK CO.LTD. and etc. Professor Steve S. Chen (a member of National Academy of Engineering, U. S.) was impressed by my books and hence, he invited me to present a speech for his team in China. In February 2019, He invited me to join the Third Brain Research Institute, U. S. as a senior visiting professor.

**2019.7~2022.7** Professor/Senior engineer in Shanghai Institute of Technology, China.

In September 2019, I was invited to give a speech in RealMax and subsequently, I was appointed as a Professor-level senior engineer of RealMax and the chief scientist in the field of big data and intelligent computing. In October 2020, I was invited as the scientist in chief of Shanghai Lingang Artificial Intelligence Laboratory.

**2021.3~2022.7** A tenured professor of Interscience Institute of Management and Technology (IIMT), India, and due to the covid-19, I continue to serve as a senior engineer in Shanghai Institute of Technology, China.

Since 2021, I begin to serve as the editor in chief of International Journal of Electrical and Electronics Engineering (IJEEE) and International Journal of Applied Nonlinear Science (IJANS). Since April 20, 2021, I begin to serve as a Ph. D. Supervisor in Northwest A&F University. In 2021, I was also selected as "100 people in the intelligent era" of China. In 2022, I was appointed to be the director for ASEM-London CTI of Shanghai Cooperation Organization.

After then, I have participated in THE's Global Academic Reputation Survey at the invitation of THE to determine the World University Reputation Ranking in 2022 and the World University Ranking in 2023. I have also participated in the Global Survey on Soil Biodiversity at the invitation of Food and Agriculture Organization of the United Nations.

In July 21, 2022, I was invited as a visiting member by Professor Lai Khin Wee for his team in Department of Biomedical Engineering, University of Malaya, Malaysia.

## Research Projects

Operator theory and operator algebras based on quantum information theory (NSFC, attendant, 2005-2008)

Carbon process of saline-alkali soils and the global change (NSFC, attendant, 2008-2013)

Research of intrusion detection and precaution on the county scale (CAS, leader, 2014-2017)

Groundwater recharge/discharge as a regulator of soil CO<sub>2</sub> flux in arid regions (NSFC, leader, 2016-2019)

“TianShan Scholar” Project for Excellent Young Scientists (Xinjiang Province , leader, 2016-2018)

Key Talents Project in the Ningbo Institute of Materials Technology and Engineering (CAS, leader, 2019-2021)

The High-level Base-building Project for Industrial Technology Innovation (SHMFB, leader, 2020-2021)

## Publications

**2021~, Frontiers in applied nonlinear science with applications in biomedicine and Engineering:**

[1] **Wang W F**, Zhang J J, An P. EW-CACTUs-MAML: A Robust Metalearning System for Rapid Classification on a Large Number of Tasks [J]. Complexity, 2022, Article ID 7330823.

[2] **Wang W F**, et al. Interdisciplinary Evolution of the Machine Brain [M], Springer, 2021.

[3] **Wang W F**, et al. Five-layer Intelligence of the Machine Brain: System Modelling and Simulation, Springer, 2022.

[4] **Wang W F**, et al. Face recognition with medical applications, ICCEAI, 2021.

[5] **Wang W F**, et al. Identifying People Wearing Masks, NAMSP, 2021.

[6] **Wang W F**, et al. Meta-learning Improves Emotion Recognition, WCI3DT, 2022.

[7] **Wang W F**, et al. Extenics in Face Recognition, WCI3DT, 2022.

[8] **Wang W F**, et al. Meta-learning with Logistic Regression for Multi-classification, NAMSP, 2021.

[9] Zhang K, Zhu Y.W., **Wang W F**, et al. Measurement for Blade Edge Based on Machine Vision, NAMSP, 2021.

[10] Zhang W.J., **Wang W F**, et al. Broad Learning System for Tackling Emerging Challenges in Face Recognition, Computer Modeling in Engineering & Sciences, 2022. DOI: 10.32604/cmcs.2022.020517

- [11] Xu B.Z., Li X.L., **Wang W F**, et al. Expanding the theory for reducing the CO<sub>2</sub> disaster-Hypotheses from partial least-squares regression and machine learning, *Frontier in Earth Sciences*, 2022. DOI 10.3389/feart.2022.1004920
- [12] Yuan J., Liu X., **Wang W F**, et al. A Broad Learning System to Predict the 28-Day Mortality of Patients Hospitalized with Community-Acquired Pneumonia: A Case-Control Study, *Computational and Mathematical Methods in Medicine*. 2022, Article ID 7003272.
- [13] Zhang L., Li Z.K., ..., **Wang W F**, et al. Association between Congenital Cytomegalovirus Infection and Brain Injury in Neonates: A Meta-analysis of Cohort Studies, *Behavioural Neurology*, 2021, Article ID 9603660.
- [14] Wang L., Li S., ..., **Wang W F**, et al. Association between Serum 25-Hydroxyvitamin D Level and Stroke Risk: An Analysis Based on the National Health and Nutrition Examination Survey, *Behavioural Neurology*, 2021, Article ID 5457881.
- [15] Liu L., Qiao S., ..., **Wang W F**, et al. Choline Intake Correlates with Cognitive Performance among Elder Adults in the United States, *Behavioural Neurology*, 2021, Article ID 2962245.
- [16] Feng Y.Y., Ding X., ..., **Wang W F**, et al. Combining CT Images and Clinical Features of Four Periods to Predict Whether Patients Have Rectal Cancer, *Computational Intelligence and Neuroscience*, 2021, Article ID 4662061.
- [17] Ji H.N., Wu H.T., ..., **Wang W F**, et al. Development and External Validation of a Nomogram for Predicting Overall Survival in Stomach Cancer: A Population-Based Study, *Journal of Healthcare Engineering*, 2021, Article ID 8605869.
- [18] Tan X.S., Xi H.L., ..., **Wang W F**, et al. Development and Validation of Prediction Model for High Ovarian Response in In Vitro Fertilization-Embryo Transfer: A Longitudinal Study, *Computational and Mathematical Methods in Medicine*, 2021, Article ID 7822119.
- [19] Gao Q.Y., Wang D.D., ..., **Wang W F**, et al. Sentiment Analysis Based on the Nursing Notes on In-Hospital 28-Day Mortality of Sepsis Patients Utilizing the MIMICIII Database, *Computational and Mathematical Methods in Medicine*, 2021, Article ID 3440778.
- [20] Li J., Li L J., ..., **Wang W F**, et al. Effect of the Interaction between Depression and Sleep Disorders on the Stroke Occurrence: An Analysis Based on National Health and Nutritional Examination Survey, *Behavioural Neurology*, 2021, Article ID 6333618.
- [21] Huang Q.K., Zhao J., ..., **Wang W F**, et al. The Association between Physical Activity and Cognitive Function: Data from the China Health and Nutrition Survey, *Behavioural Neurology*, 2022, Article ID 3438078.
- [22] Zhang C., Cheng L.H., ..., **Wang W F**, et al. Construction of a Diagnostic Model for Lymph Node Metastasis of the Papillary Thyroid Carcinoma Using Preoperative Ultrasound Features and Imaging Omics, *Journal of Healthcare Engineering*, 2022, Article ID 1872412.
- [23] **Wang W F**, et al. Introduction of Practical Artificial Intelligence (in Chinese)[M], Tsinghua University, 2022.
- [24] Roumen K., Kazumi N., **Wang W F**, et al. Proceedings of the World Conference on Intelligent and 3-D Technologies [M], Springer, 2023.
- [25] **Wang W F**. Functional analysis with applications in algorithms [M], International Academy of Visual Arts and Engineering, 2021.

### 2017~2020, Interdisciplinary applications of nonlinear science in 9 different subjects:

- [1] **Wang W F**, Chen X., Zhang G. W., Qian J., Peng W., Wu B. Q., Zheng H. W. Precision Security: Integrating Video Surveillance with Surrounding Environment Changes. *Complexity*, Article ID 2959030, 2018.

- [2] **Wang W F**, Chen X, Zheng H, et al. Intelligence in Ecology: How Internet of Things Expands Insights into the Missing CO<sub>2</sub> Sink. *Scientific Programming*, Article ID 4589723, 2017.
- [3] Yuan X L, **Wang W F**, Cui J J, et al. Vegetation changes and land surface feedbacks drive shifts in local temperatures over central Asia. *Scientific Reports*, 2017, 7(1): 1-8.
- [4] **Wang W F**, Chen X, Wang H Y, et al. Locally compressive sensing for video behaviors recognition (in Chinese with a English abstract). *Journal of Tsinghua University*, 2018, 58(6): 581-586.
- [5] **Wang W F**, Zhou H Y, Zheng H W. Ambulanceeye – the future of medical rescues. *ICCSIP 2016, CCIS 710: 606–615*, 2017.
- [6] Wu B Q, Kausar T, Xiao Q, Wang M J, **Wang W F** (corresponding), et al., 2017. FF-CNN: An Efficient Deep Neural Network for Mitosis Detection in Breast Cancer Histological Images. *MIUA 2017, CCIS 723: 249–260*.
- [7] Mi J L, Yan S J, **Wang W F** (corresponding), et al. A Proxy Signature Scheme with Public Verifiability for NAC. *IEEE 2017, 2nd ICARM: 667–673*.
- [8] **Wang W F**, Bao C B, Chen X. Face tracking and recognition system based on locally compressive sensing, July 2018, *Chinese Software* (No. 2018SR464250).
- [9] **Wang W F**, Bao C B, Chen X. Face recognition system based on brain-inspired intelligence. August 2018, *Chinese Software* (No. 2018SR595597).
- [10] **Wang W F**, Ding X C, Chen X. Remote sensing precipitation products evaluation and runoff simulation on regional scales. May 2018, *Chinese Software* (No. 2018SR300875).
- [11] **Wang W F**, Chen X, Li X L, et al. Temperature Dependence of Soil Respiration in Arid Region Is Reconciled. *ICCSIP 2018, CCIS 1006*, pp. 335–349, 2019.
- [12] **Wang W F**, Chen X, Zhang X L, et al. Rapid Precipitation Shifts in Black Soil Region. *ICCSIP 2018, CCIS 1006*, pp. 350–358, 2019.
- [13] Luan B, Li X Q, **Wang W F**. Broad Recognition of Fake Faces. 2020, *The 5th International Conference on Advanced Robotics and Mechatronics (ICARM)*.
- [14] Pan X C, Li X Q, **Wang W F**. Improving Occluded Face Recognition with Image Fusion. 2020, *The 13th International Congress on Image and Signal Processing, BioMedical Engineering and Informatics (CISP-BMEI)*
- [15] Chen W J, Li X Q, **Wang W F**. Improving robustness and time efficiency with weight function in occlusion face recognition. 2020, *ICAICE 2020*.
- [16] Wang C, Li X Q, **Wang W F**. Image Fusion for Improving Thermal Human Face Image Recognition. 2020, *CISP-BMEI 2020*.
- [17] Wang J X, Li X Q, **Wang W F**. Application of Convolution BLS in AI Face-changing Problem. 2020, *ICCSIP 2020*.
- [18] Wang L C, Li X Q, **Wang W F**. Finger Vein Recognition based on deep Convolutional Neural Networks. 2020, *ICCSIP 2020*.
- [19] **Wang W F**, et al. Principle and Practice of Face Recognition. A book in Chinese, PHEI, 2018.
- [20] **Wang W F**, et al. Computer Vision and Machine Cognition. A book in Chinese, BHP, 2017.
- [21] An P, Gu Y H, **Wang W F**, et al., A Design of Medical Percutaneous Robot. *AMICR2019*.
- [22] Xiong Q, Gu Y H, Wang Q X, **Wang W F**, et al., A Parallel Algorithm to Extract Features of Electromyogram

Signals. Basic & Clinical Pharmacology & Toxicology, AMICR2019.

[23] An P, **Wang W F**, Chen X, et al., Introducing a Chaotic Component in the Control System of Soil Respiration. Complexity, 2020, Volume 2020, Article ID 5310247.

[24] Yao T Z, **Wang W F**, Gu Y H, A Deep Multiview Active Learning for Large-Scale Image Classification. Mathematical Problems in Engineering, 2020, Volume 2020, Article ID 6639503.

[25] Yao T Z, **Wang W F**, Gu Y H, et al., Multiview Active Learning for Scene Classification with High-Level Semantic-Based Hypothesis Generation. Scientific Programming, 2020, Volume 2020, Article ID 3878153.

[26] Zhou L F, Liu Z W, **Wang W F**, Terrain Classification Algorithm for Lunar Rover Using a Deep Ensemble Network with High-Resolution Features and Interdependencies between Channels. Wireless Communications and Mobile Computing, 2020, Volume 2020, Article ID 8842227.

[27] Xiong Q, Zhang X M, **Wang W F**, et al. A Parallel Algorithm Framework for Feature Extraction of EEG Signals on MPI. Computational and Mathematical Methods in Medicine, 2020, Volume 2020, Article ID 9812019.

[28] Zhao W, Zhao W B, **Wang W F**, et al. A Novel Deep Neural Network for Robust Detection of Seizures Using EEG Signals. Computational and Mathematical Methods in Medicine. 2020, Volume 2020, Article ID 9689821.

[29] Zhao W, **Wang W F**. SeizureNet: a model for robust detection of epileptic seizures using EEG signals based on convolutional neural network. Cognitive Computation and Systems, 2020, 2(3).

[30] **Wang W F**, et al. Brain-inspired intelligence and visual perception [M], Springer, 2020.

### **2010~2016, Applications of nonlinear science in Artificial Intelligence and Ecology:**

[1] **Wang W F**, Chen X, Luo G P, et al. Modeling the contribution of abiotic exchange to CO<sub>2</sub> flux in alkaline soils of arid areas. Journal of Arid Land, 2014, 6(1): 27-36.

[2] **Wang W F**, Chen X, Wang W F, Chen X, Pu Z, et al. Negative soil respiration fluxes in unneglectable arid regions. Polish Journal of Environmental Studies, 2015, 24(2): 905-908.

[3] **Wang W F**, Chen X, Pu Z, Luo G P. Remote sensing of CO<sub>2</sub> absorption by saline-alkali soils: potentials and constraints. Journal of Spectroscopy, 2014, Article ID: 425753.

[4] **Wang W F**, Chen X, Zhang H, et al. Highlighting Photocatalytic H<sub>2</sub>-Production from Natural Seawater and the Utilization of Quasi-Photosynthetic Absorption as Two Ultimate Solutions for CO<sub>2</sub> Mitigation. International Journal of Photoenergy, 2015, Article ID: 481624.

[5] **Wang W F**, Chen X, Wang L C, et al. Approach to the truth of the missing CO<sub>2</sub> sink. Polish Journal of Environmental Studies, 2016, 25(4): 1799-1802.

[6] **Wang W F**, Chen X, Zhang Y, et al. Nanodeserts: A Conjecture in Nanotechnology to Enhance Quasi-Photosynthetic CO<sub>2</sub> Absorption. International Journal of Polymer Science, 2016, 2016(9):1-10.

[7] **Wang W F**, Chen X, Zheng H, et al. Soil CO<sub>2</sub> Uptake in Deserts and Its Implications to the Groundwater Environment. Water, 2016, 8(9), 379; doi:10.3390/w8090379.

[8] **Wang W F**, Chen X. Extension of GSMW formula in weaker assumptions. Abstract and applied analysis, 2014, Article ID: 324836.

- [9] Chen X, **Wang W F**, Luo G P, et al. Can soil respiration estimate neglect the contribution of abiotic exchange? *Journal of Arid Land*, 2014, 6(2): 129-135.
- [10] Chen X, **Wang W F**, Luo G P, et al. Time lag between carbon dioxide influx to and efflux from bare saline-alkali soil detected by the explicit partitioning and reconciling of soil CO<sub>2</sub> flux. *Stochastic Environmental Research and Risk Assessment*, 2013, 27(3): 737-745.
- [11] Wang L C, Gong W, Luo M, **Wang W F**, et al. Comparison of different UV models for cloud effect study. *Energy*, 2015, 80:695-705.
- [12] Chen X, **Wang W F**. On the apparent CO<sub>2</sub> absorption by alkaline soils. *Biogeosciences Discussions*, 2014, 11(2): 2665-2683 (ICDC6-oral presentation).

### 2005~2010, Functional analysis and mathematical experiments in nonlinear science:

- [1] Du H K, **Wang W F**, Duan Y T. Path connectivity of k-generalized projectors. *Linear algebra and its applications*, 2007, 422(2): 712-720.
- [2] Yang X, **Wang W F**. Connections between Generalized Idempotents. *Journal of Shihezi University*, 2010, 28(5): 651-654.
- [3] **Wang W F**, Du H K. Path connectivity of generalized projections. *International conference of operator theory and its applications*. Huangshan, China, July, 2005.
- [4] Yang X, **Wang W F**. Approximation of Generalized Projections. *Journal of Shihezi University (Natural Science)*, 2010, 28(3): 383-388.
- [5] Wang X F, **Wang W F**. SVM parameter selection based on ainet algorithm (in Chinese with English abstract). *Computer applications and software*, 2009, 26(9): 266-268.
- [6] Mi J L, Zhang J Z, **Wang W F**. A (t, n)-threshold group signature scheme with freedom of decision. *Application research of computers (in Chinese with English abstract)*, 2007, 24(4): 125-126
- [7] Duan Y T, Wang W F. Characterizations of conditional expectations on wave-algebra (in Chinese with English abstract). *Journal of Zhanjiang Normal University*, 2013, 34(3): 41-43
- [8] Liu B, Cao H X, Wang W F. On some trace inequalities. *Basic Sciences Journal of Textile Universities*, 2007.

