

Chao Wang

Department of Statistics and Data Science,
Southern University of Science and Technology,
Shenzhen 518055, P.R. China
Tel: +86 (0755) 8801-1671
Email: wangc6@sustech.edu.cn; chaowang.hk@gmail.com
Website: <https://wangcmath.github.io>

Employment & Experience

| | |
|---|-------------------------|
| Southern University of Science and Technology | Guangdong, China |
| • Assistant Professor at Dept. Statistic & Data Science | Sep. 2021 - Present |
| University of California, Davis | California, USA |
| • Postdoctoral Researcher at TETRAPODS Institute of Data Science | Jul. 2020 - Present |
| Advisors: Prof. Chen-Nee Chuah & Prof. Nina Amenta | |
| University of Texas (UT) Southwestern Medical Center & UT Dallas | Texas, USA |
| • Postdoctoral Researcher at Medical Artificial Intelligence and Automation Lab | Oct. 2018 - Jun. 2020 |
| Advisors: Prof. Xun Jia & Prof. Yifei Lou | |

Education

| | |
|---|------------------------|
| The Chinese University of Hong Kong | Hong Kong |
| • Ph.D. in Mathematics (GPA: 3.92/4.00) | 2015 - 2018 |
| Advisor: Prof. Raymond H. Chan | |
| Dissertation: Sparse Recovery Algorithms for 3D Imaging Using Point Spread Function Engineering | |
| Shantou University | Shantou, China |
| • M.Sc. in Applied Mathematics (GPA: 3.84/4.00) | 2012 - 2015 |
| Advisor: Prof. Fu-Rong Lin | |
| Thesis: Research on Regularization Parameter Selection Methods in Inverse Problems | |
| Hanshan Normal University | Chaozhou, China |
| • B.Sc. in Mathematics (GPA: 3.78/4.00) | 2008 - 2012 |

Research Interests

Scientific Computing, Image Processing, Interdisciplinary Mathematical Modeling, Compressed Sensing, Convex and Nonconvex Optimization, Hyperspectral Imaging, Tensor Computation, Deep Learning, Numerical Linear Algebra

Grants

| | |
|--|-------------|
| Investigator, NSFC (300,000 RMB) | 2023-2025 |
| • The Study of Point Spread Function-based Deep Learning Models and Algorithms for Three-dimensional Point Source Localization | |
| Investigator, Guangdong Basic and Applied Basic Research Foundation (150,000 RMB) | 2024-2026 |
| • The Study of Single-lobe Point Spread Function-based approach for Three-dimensional Point Source Localization and Tracking | |
| Investigator, Shenzhen Science and Technology Program (500,000 RMB) | 2023-2025 |
| • Tensor Reconstruction Models and Algorithms in Brain Imaging | |
| Co-Investigator, Shenzhen Fundamental Research Program (1,500,000 RMB) | 2023-2026 |
| • Algorithms Study on Early Diagnosis Systems for Neurodegenerative Disease | |
| Co-Investigator, HKRGC Grant (600,000 HKD) | 2021 - 2023 |
| • Novel Computational Methods for 3D Point Source Localization based on Point Spread Function Analytics | |

Core-member, National Key R&D Program of China (12,000,000 RMB)

2024-2026

- The Mathematical Issues and Their Applications in the Construction and Analysis of Brain Dynamic Imaging

Publications

Preprint (* indicates corresponding author, # indicates co-first author)

- [1] T. Wang#, Z. Yan#, J. Li, X. Zhao, **C. Wang***, M. Ng. "Hyperspectral and multispectral image fusion with arbitrary resolution through self-supervised representations" arXiv preprint arXiv: 2405.17818
- [2] GB. Rehm, **C. Wang**, I. Cortes-Puch, CN. Chuah, J. Adams. "Deep learning-based detection of the acute respiratory distress syndrome: what are the models learning?" arXiv preprint arXiv:2109.12323

Accepted/ Published

- [3] **C. Wang**, JF. Aujol, G. Gilboa, Y. Lou.* "Minimizing quotient regularization model" *Inverse Problems and Imaging*. 2024 (to appear)
- [4] J. Li, X. Zhao*, J. Wang, **C. Wang**, M. Wang. "Superpixel-informed implicit neural representation for multi-dimensional data". *European Conference on Computer Vision* 2024 (to appear)
- [5] G. Li, Z. Tu, J. Lu, **C. Wang**, L. Shen. "Multi-dimensional image recovery via Self-Supervised Nonlinear Transform Based a Three-Directional Tensor Nuclear Norm" *Numerical Mathematics: Theory, Methods and Applications*, 17(3), 727-750, 2024.
- [6] M. Chowdhury*, **C. Wang**, Y. Lou. "Poissonian Image Restoration via the L1/L2-based minimization" *Journal of Scientific Computing*, 101:17, 2024
- [7] L. Luo, Z. Tu, J. Lu, **C. Wang**, C. Xu. "A nonlinear high-order transformations-based method for high-order tensor completion". *Signal Processing*, 109514, 2024.
- [8] H. Zheng, Y. Lou, G. Tian, **C. Wang***. "A scale-invariant relaxation in low-rank tensor recovery with an application to tensor completion". *SIAM Journal on Imaging Sciences*, 17(1), 756-783, 2024.
- [9] J. Lu, J. Zhang, **C. Wang**, C. Deng. "Hyperspectral sparse fusion using adaptive total variation regularization and superpixel-based weighted nuclear norm". *Signal Processing*, 220, 109449, 2024.
- [10] **C. Wang***, M. Yan, J. Yu. "Sorted L1/L2 Minimization for Sparse Signal Recovery". *Journal of Scientific Computing*, 99(32), 2024.
- [11] T. Wang, J. Li, M. Ng, **C. Wang***. "Nonnegative matrix functional factorization for hyperspectral unmixing with non-uniform spectral sampling". *IEEE Transactions on Geoscience and Remote Sensing* 62, 1-13, 2024.
- [12] T. Wang, X. Wu, J. Li*, **C. Wang***. "Robust retrieval of material chemical states in X-ray microspectroscopy". *Optics Express*, 31(25), 42524-42538, 2023.
- [13] L. Dai, M. Lu, **C. Wang***, S. Prasad, R. Chan*. "LocNet: Deep Learning-based Localization on Rotating Point Spread Function with Applications to Telescope Imaging". *Optics Express*, 31(24), 39341-39355, 2023.
- [14] J. Zhang, J. Lu, **C. Wang**, S. Li*. "Hyperspectral and multispectral image fusion via superpixel-based weighted nuclear norm minimization". *IEEE Transactions on Geoscience and Remote Sensing*. 5521612. 2023.
- [15] J. Yang, M. Ma, J. Zhang, **C. Wang***. "Noise removal using an adaptive Euler's elastica-based model." *the Visual Computing*. 1-12. 2022
- [16] Z. Lai, **C. Wang#**, H. Gunawan, SC. Cheung, CN. Chuah. "Smoothed adaptive weighting for imbalanced semi-supervised learning: improve reliability against unknown distribution." *The International Conference on Machine Learning (ICML)*. 2022.

- [17] D. Sprouts, Y. Gao, **C. Wang**, X. Jia, C. Shen, Y. Chi "The development of a deep reinforcement learning network for dose-volume-constrained treatment planning in prostate cancer intensity modulated radiotherapy" *Biomedical Physics & Engineering Express*. 8 (4), 045008, 2022.
<https://doi.org/10.1088/2057-1976/ac6d82>
- [18] Z. Lai, **C. Wang**, SC. Cheung, CN. Chuah. "SaR: Self-adaptive refinement on pseudo labels for multiclass-imbalanced semi-supervised learning" *The IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) workshop*, pp. 4091-4100, 2022.
- [19] **C. Wang**, M. Tao, CN. Chuah, J. Nagy, and Y. Lou*. "Minimizing L_1 over L_2 norms on the gradient." *Inverse Problems*. 39 065011, 2022.
- [20] **C. Wang**, H. Jung, M. Yang, C. Shen, X. Jia*, "Simultaneous image reconstruction and element decomposition for iodine contrast agent visualization in multi-energy element-resolved cone beam CT", *Frontiers in Oncology*, 113, 2022.
- [21] Z. Lai*, **C. Wang**, L. Oliveira, B. Dugger, SC. Cheung, CN. Chuah, "Joint semi-supervised and active learning for segmentation of gigapixel pathology images with cost-effective labeling," *Proceedings of the IEEE/CVF International Conference on Computer Vision*, 591-600, 2021.
- [22] Z. Lai, **C. Wang**, Z. Hu, B. Dugger, SC. Cheung, CN. Chuah*, "A semi-supervised learning for segmentation of gigapixel histopathology images from brain tissues", *International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC)* , 2021.
- [23] **C. Wang***, M. Tao, J. Nagy, and Y. Lou. "Limited-angle CT reconstruction via the L_1/L_2 minimization." *SIAM Journal on Imaging Sciences*. 14(2), 749–777, 2021.
- [24] **C. Wang**, Y. Gonzalez, C. Shen, B. Hryushko, and X. Jia*. "Simultaneous needle catheter selection and dwell time optimization for Preplanning of HDR Brachytherapy of Prostate Cancer", *Physics in Medicine & Biology*, (66), 055028, 2021.
- [25] **C. Wang**, M. Yan, and Y. Lou*. "Accelerated schemes for the L_1/L_2 minimization." *IEEE Transaction on Signal Processing*, 68, 2660 - 2669, 2020.
- [26] **C. Wang**, Y. Gonzalez, C. Shen, and X. Jia* "Simultaneous needle selection and dwell time optimization in prostate cancer high-dose-rate brachytherapy." *Medical Physics* 47 (6), E367-E367, 2020.
- [27] Y. Huang, Y. Zhong, **C. Wang**, Y. Gonzalez, C. Shen, and X. Jia*. "Comprehensive calibration and evaluation of a cone-beam CT on a pre-clinical small animal radiation research platform", *Medical Physics* 47 (6), E731-E731, 2020.
- [28] Y. Rahimi, **C. Wang***, H. Dong, and Y. Lou. "A scale invariant approach for sparse signal recovery." *SIAM Journal on Scientific Computing*, 41(6), A3649–A3672, 2019.
- [29] **C. Wang***, G. Ballard, R.J. Plemmons, and S. Prasad "Joint 3D localization and classification of space debris using a multispectral rotating point spread function." *Applied Optics*, 58, 8598-8611, 2019.
- [30] **C. Wang***, R.H. Chan, M. Nikolova, R.J. Plemmons, and S. Prasad. "Non-convex optimization for 3-dimensional point source localization using a rotating point spread function." *SIAM Journal on Imaging Sciences*, 12(1):259–286, 2019.
- [31] **C. Wang***, R.J. Plemmons, S. Prasad, R.H. Chan, and M. Nikolova. "Novel sparse recovery algorithms for 3D debris localization using rotating point spread function imagery." In *Proc. 2018 AMOS Technical Conference*, Maui, HI. 2018.
- [32] **C. Wang***, R.H. Chan, R.J. Plemmons, and S. Prasad, "Point spread function engineering for 3D imaging using a continuous exact L_0 penalty (CELO) based algorithm." *International Workshop On Image Processing and Inverse Problems*. 1-12, 2018.
- [33] X. Fang, F. Lin, and **C. Wang***. "Estimation of a regularization parameter for a robin inverse problem." *East Asian Journal on Applied Mathematics*, 7(2) 325-342, 2017.

Honors & Awards

-
- **Best Paper Awards** 2022
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) workshop
 - **SIAM Early Career Travel Grant Award** 2020
2020 SIAM Conference on Imaging Science (IS20)
 - **SIAM Student Travel Grant Award** 2018
2018 SIAM Conference on Imaging Science (IS18)
 - **SIAM Student Chapter Certificate of Recognition** 2018
 - **Best Poster Presentation Award** 2017
4th AoE Symposium on Organelle Biogenesis and Function
 - **Best Student Paper Award** 2017
Annual Meeting of China Society for Industrial and Applied Mathematics
 - **CUHK Postgraduate Studentship** 2015 - 2018
 - **Second Prize of the National Post-Graduate Mathematic Contest in Modeling** 2013
 - **Outstanding Graduate Student Award** at Shantou University 2013
 - **Second Prize of the National Mathematics Contest**, Guangdong Division (Rank 16th) 2011
 - **National Endeavor Scholarship** 2009 - 2010

Teaching

-
- Southern University of Science and Technology** **Shenzhen, China**
- **Instructor**, Department of Statistics and Data Science 2022 – Present
 - STA201 Operational Research and Optimization, 2022- Present
 - STA5013 Statistical & Mathematical Image Processing, 2023- Present
- The Chinese University of Hong Kong** **Hong Kong**
- **Teaching Assistant**, Department of Mathematics 2015 - 2018
 - MATH4230 Optimization Theory, Spring 2018
 - MATH3215A Operations Research, Fall 2017
 - MATH2221 Mathematical Laboratory, Spring 2017
 - MATH3215 Operations Research, Spring 2017
 - MATH2010 Advanced Calculus I, Spring 2016
 - MATH3210 Linear Programming, Fall 2015
- Shantou University** **Shantou, China**
- **Teaching Assistant**, Department of Mathematics 2013
 - MAT1002B Linear Algebra and Analytic Geometry, Fall 2013

Professional Activities

-
- Co-Editor** 2023 - 2024
Special Issue: Multiple Sensors Fusion for Image Recognition
Journal: Sensors
- Referee Service** 2019 - Present
- SIAM Journal on Imaging Sciences
 - Mathematical Programming
 - IEEE Transactions on Signal Processing
 - IEEE Transactions on Geoscience and Remote Sensing (TGRS)
 - Optics Express
 - IEEE Internet of Things Journal
 - Inverse Problems and Imaging (IPI)
 - TEST, Springer
 - Journal of Mathematical Imaging and Vision
 - Journal of Scientific Computing (JSC)
 - Journal of Microscopy

- Machine Learning
- Research in the Mathematical Sciences (RMSB)
- Calcolo
- CVPR
- Infrared Physics and Technology
- Advances in Computational Mathematics
- Frontiers
- Computational and Applied Mathematics
- Signal Processing
- Journal of Computational and Applied Mathematics
- IET Image Processing
- Journal of Nonlinear and Variational Analysis
- International Journal of Digital Earth

Conference Organization

- Min-symposium in International Congress on Industrial and Applied Mathematics (ICIAM) Aug. 2023
- Min-symposium in SIAM Conference on Imaging Science (IS22) Mar. 2022
- AI & Biomedical Imaging Workshop at UC Davis, online Jan. - Mar. 2021

Mentorship (Ph.D. /MPhil /RA student project advisor)

2018 - Present

PhD students:

- Yunshan Li (SUSTech, Sept. 2023 - Present)
- Ting Wang (SUSTech, Sept. 2022 - Present)
- Huiwen Zheng (SUSTech, May 2022 - Jun. 2024)

MPhil students:

- Yicheng Wu (SUSTech, Sept. 2024 - Present)
- Zitian Ao (SUSTech, Sept. 2023 - Present)
- Xiaotong Wu (SUSTech, Sept. 2022 - Jun. 2024)
- Junjie Yu (SUSTech, Sept. 2021 - Jun. 2023)

Ras and visiting students:

- Zhenlin Luo (NUS, Aug. 2024 - Present)
- Rongkun Zhu (Xidian U, Jun. 2024 - Jul. 2024)
- Ruiwan Wen (Hainan U, Jun. 2024 - Jul. 2024)
- Wang Ma (RPI, Jun. 2024 - Jul. 2024)
- Shengjie Niu (HK PolyU, Jun. 2023 - Jul. 2023)

Member of Shenzhen Health Economy Academy Health Statistic Committee

2021 - 2026

Student Chapter Representative

Jul. 2017

- SIAM Chapter Meeting with SIAM Leadership at SIAM Annual Meeting in Pittsburgh, PA, USA

Research Exchange & Visiting

- Research Associate Aug. - Sep. 2018 & Jun. - Jul. 2017
 - Department of Computer Science Wake Forest University, USA
 - Advisor: Prof. Robert Plemmons
- Research Assistant Jun. 2015
 - Department of Mathematics at CUHK, Hong Kong
 - Advisor: Professor Raymond H. Chan
- Visiting Scholar 2013 - 2018
 - University of Bologna, Bologna, Italy (May - Jun. 2018)
 - Berlin Mathematical Society, Berlin, Germany (Jul. - Aug. 2016)
 - The Chinese Academy of Sciences, Beijing, China (Jul. - Aug. 2013)

Treasurer

2017-2018

- Student Chapter of SIAM, The Chinese University of Hong Kong

Presentations

| | |
|---|------------|
| • CSIAM Annual Meeting, Nanjing | Oct. 2024 |
| • SIAM Annual Meeting (AN24), Spokane, US | Jul. 2024 |
| • SIAM Conference on Image Science (IS24), Atlanta, US | May 2024 |
| • Workshop on Data Science and Scientific Computing, HKBU | Dec. 2023 |
| • CSIAM Annual Meeting, Kuiming | Oct. 2023 |
| • International Congress on Industrial and Applied Mathematics (ICIAM2023), Tokyo, Japan | Aug. 2023 |
| • Invited Talk, Jiangxi Normal University, Nanchang, | May 2023 |
| • Invited Talk, Nanchang Institute of Technology, Nanchang | May 2023 |
| • Invited Talk, International Conference on Image Processing and Artificial Intelligence, Online, | Dec. 2022 |
| • Invited Talk, International Conference on Frontier of Statistics & Data Science, SUSTech | Dec. 2022 |
| • Invited Talk, CSIAM Annual Meeting, online | Nov. 2022 |
| • Invited Talk, Nanjing University, online | Jun. 2022 |
| • AI for Medical Imaging Workshop, Zhejiang Normal University, online | May 2022 |
| • SIAM Conference on Image Science (IS22), online | Mar. 2022 |
| • Invited Talk, Shenzhen Institute of Advanced Technology, Chinese Academy of Science | Sept. 2021 |
| • Invited Talk, Frontiers in Biomedical Imaging Seminar Series, UCD BME, online | Nov. 2020 |
| • Invited Talk, Machine Learning Working Group, UCD Health, online | Oct. 2020 |
| • Invited Talk, Mathematics of Data and Decisions at Davis, UCD Math, online | Oct. 2020 |
| • Joint AAPM & COMP Virtual Meeting, online | Jul. 2020 |
| • SIAM Conference on Image Science (IS20), online | Jul. 2020 |
| • SIAM Conference on Computational Science and Engineering (CSE19) , WA, USA | Feb. 2019 |
| • 2019 Georgia Scientific Computing Symposium, Georgia Institute of Technology, GA, USA | Feb. 2019 |
| • Scientific Computing Seminar, Emory University, GA, USA | Feb. 2019 |
| • Advanced Maui Optical and Space (AMOS) Surveillance Technologies Conference, HI, USA | Sep. 2018 |
| • Invited Talk, Wake Forest University, NC, USA | Aug. 2018 |
| • Invited Talk, Shantou University, Shantou, China | Jul. 2018 |
| • SIAM Conference on Image Science (IS18), Bologna, Italy | Jun. 2018 |
| • SIAM Conference on Applied Linear Algebra (ALA18), HKBU, HK | May 2018 |
| • International Workshop on Image Processing and Inverse Problems, CSRC, Beijing, China | Apr. 2018 |
| • 4 th AoE Symposium on Organelle Biogenesis and Function, CUHK, Hong Kong | Dec. 2017 |
| • International Conf. & AoE Symposium on Organelle Biogenesis and Function, CUHK, HK | Sep. 2017 |
| • 15 th Annual Meeting of China SIAM, Qingdao, China | Oct. 2017 |
| • 2017 Imaging Science Camp at SUST, Shenzhen, China | Mar. 2017 |
| • East Asian Section of SIAM Conference (EASIAM), Macau | Jun. 2016 |
| • 2014 Imaging Science Camp at SYSU, Guangzhou, China | May 2014 |

Skills**Programming:**

- MATLAB (Proficient), Python (Competent), Mathematica (Competent), C/C++ (Competent)



Software/API:

- TensorFlow, Keras, MS Office, LaTeX

Language:

- English (Fluent), Cantonese Chinese (Native), Mandarin Chinese (Fluent), Teochew Chinese (Native)

Last updated on 2024-09-20