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, Deep Learning, Compressed Sensing, Convex and Nonconvex Optimization, Hyperspectral Imaging, Tensor Computation

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

Investigator, SUSTech Teaching Reform Project (40,000 RMB) 2024-2025

- Teaching Reform on Constructivism-based “Operational Research and Optimization”

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 (11,100,000 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] **C. Wang**, H. Zheng, R. Chan, Y. Wen*. "Variational Bayesian inference for tensor robust principal component analysis" arXiv preprint arXiv: 2412.18717

[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] T. Wang#, Z. Yan#, J. Li, X. Zhao, **C. Wang***, M. Ng. "Hyperspectral and multispectral image fusion with arbitrary resolution through self-supervised representations" *International Journal of Computer Vision*, 2025. (to appear)

[4] M. Lu, Z. Ao, **C. Wang***, S. Prasad, R. Chan*, "PiLocNet: Physics-informed neural network on 3D localization with rotating point spread function" *Applied Optics*, 2025. (to appear)

[5] H. Zheng, Y. Lou, G. Tian, **C. Wang***. "Tensor robust principal component analysis via the tensor nuclear over Frobenius norm" *Journal of Scientific Computing,* 2025. (to appear)

[6] S. Niu#, L. Lin#, J. Huang, **C. Wang***. "OwMatch: conditional self-labeling with consistency for open-world semi-supervised learning" *Neural Information Processing Systems (NeurIPS)*, 2024.

[7] **C. Wang,** JF. Aujol, G. Gilboa, Y. Lou.* "Minimizing quotient regularization model" *Inverse Problems and Imaging*. Doi: 10.3934/ipi.2024041, 2024.

[8] J. Li, X. Zhao*, J. Wang, **C. Wang**, M. Wang. "Superpixel-informed implicit neural representation for multi-dimensional data". *European Conference on Computer Vision (ECCV),* 2024

[9] 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.

[10] M. Chowdhury*, **C. Wang**, Y. Lou. "Poissonian Image Restoration via the L1/L2-based minimization" *Journal of Scientific Computing*, 101:17, 2024

[11] 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.

[12] 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.

[13] 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.

[14] **C. Wang***, M. Yan, J. Yu. "Sorted L1/L2 Minimization for Sparse Signal Recovery". *Journal of Scientific Computing,* 99(32),2024.

[15] 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.

[16] 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.

[17] 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.

[18] 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.

[19] J. Yang, M. Ma, J. Zhang, **C. Wang***. “Noise removal using an adaptive Euler’s elastica-based model.” *the Visual Computing*. 1-12. 2022

[20] 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.

[21] 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

[22] 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.

[23] **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.

[24] **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.

[25] 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.

[26] 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.

[27] **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.

[28] **C. Wang**, Y. Gonzalez, C. Shen, B. Hrycushko, 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.

[29] **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.

[30] **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.

[31] 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.

[32] 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.

[33] **C. Wang***, G. Ballad, 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.

[34] **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.

[35] **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.

[36] **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 (CEL0) based algorithm." *International Workshop on Image Processing and Inverse Problems*. 1-12, 2018.

[37] 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
- Computational Optimization and Applications
- Signal Processing
- Journal of Computational and Applied Mathematics
- Royal Society Open Science
- IET Image Processing
- Journal of Nonlinear and Variational Analysis
- International Journal of Digital Earth
- Geocarto International

Conference Organization

- International Workshop on Image Processing and Machine Learning, Shenzhen Oct. 2025
- Advanced Methods and Theories in High-dimensional Image Processing, Kunming (Tianyuan), Mar. 2025
- Statistics & Data Science Symposium between SUSTech and UIC, Shenzhen Nov. 2024
- Min-symposium in International Congress on Industrial and Applied Mathematics, Tokyo Aug. 2023
- Min-symposium in SIAM Conference on Imaging Science (IS22), online 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:

- Ting Wang (SUSTech, Sept. 2022 - Present)
- Huiwen Zheng (SUSTech, May 2022 - Jun. 2024)
- Rongmei Liang (SUSTech, start from Sept. 2025)

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 or 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

- International Symposium on Image Computing and Digital Medicine (ISICDM 2024), Shenzhen — Dec. 2024
- Invited Talk, Sun Yat-Sen University, Shenzhen, — Nov 2024
- School-Conference on Tensor Methods in Mathematics and Data Science, Shenzhen — Nov. 2024
- CSIAM Annual Meeting, Nanjing — Oct. 2024
- SIAM Annual Meeting (AN24), Spokane, US — Jul. 2024
- SIAM Conference on Image Science (IS24), Atlanta, US — May 2024
- Invited Talk, City University of Hong Kong, HK, — Apr. 2024
- Invited Talk, The Hong Kong Polytechnic University, HK — Apr. 2024
- Workshop on Data Science and Scientific Computing, HKBU — Dec. 2023
- CSIAM Annual Meeting, Kunming — 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
- 4th 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
- 15th 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 2025-5-27