

# Chao Wang

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## Employment & Experience

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

## Education

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

<b>Investigator, NSFC</b> (430,000 RMB)	2026-2029
• The Study of Spectral-temporal Imaging based on Low-rank self-supervised Learning	
<b>Investigator, NSFC</b> (300,000 RMB)	2023-2025
• The Study of Point Spread Function-based Deep Learning Models and Algorithms for Three-dimensional Point Source Localization	
<b>Investigator, Guangdong Basic and Applied Basic Research Foundation</b> (150,000 RMB)	2024-2026
• The Study of Single-lobe Point Spread Function-based approach for Three-dimensional Point Source Localization and Tracking	
<b>Investigator, Shenzhen Science and Technology Program</b> (500,000 RMB)	2023-2025
• Tensor Reconstruction Models and Algorithms in Brain Imaging	
<b>Investigator, SUSTech Teaching Reform Project</b> (40,000 RMB)	2024-2025
• Teaching Reform on Constructivism-based "Operational Research and Optimization"	
<b>Co-Investigator, Shenzhen Fundamental Research Program</b> (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. Li, T. Wang, X. Zhao, **C. Wang\***, "LoR-SGS: Hyperspectral Image Compression via Low-rank Spectral Gaussian Splatting" *IEEE Transactions on Geoscience and Remote Sensing*, 2025  
<https://doi.org/10.1109/TGRS.2025.3623253>
- [4] 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. <https://doi.org/10.1007/s11263-025-02540-1>
- [5] 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*, 64(18), 5139-5148, 2025.
- [6] 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)
- [7] 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.
- [8] **C. Wang**, JF. Aujol, G. Gilboa, Y. Lou.\* "Minimizing quotient regularization model" *Inverse Problems and Imaging*. Doi: 10.3934/ipi.2024041, 2024.
- [9] 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
- [10] 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.
- [11] M. Chowdhury\*, **C. Wang**, Y. Lou. "Poissonian Image Restoration via the L1/L2-based minimization" *Journal of Scientific Computing*, 101:17, 2024
- [12] 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.
- [13] 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.
- [14] 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.
- [15] **C. Wang\***, M. Yan, J. Yu. "Sorted L1/L2 Minimization for Sparse Signal Recovery". *Journal of Scientific Computing*, 99(32),2024.

- [16] 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.
- [17] 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.
- [18] 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.
- [19] 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.
- [20] J. Yang, M. Ma, J. Zhang, **C. Wang\***. "Noise removal using an adaptive Euler's elastica-based model." *the Visual Computing*. 1-12. 2022
- [21] 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.
- [22] 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>
- [23] 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.
- [24] **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.
- [25] **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.
- [26] 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.
- [27] 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.
- [28] **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.
- [29] **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.
- [30] **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.
- [31] **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.
- [32] 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.

- [33] 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.
- [34] **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.
- [35] **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.
- [36] **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.
- [37] **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.
- [38] 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

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

## Teaching

<b>Southern University of Science and Technology</b>	<b>Shenzhen, China</b>
• <b>Instructor</b> , Department of Statistics and Data Science	2022 – Present
<ul style="list-style-type: none"> <li>• STA201 Operational Research and Optimization, 2022- Present</li> <li>• STA5013 Statistical &amp; Mathematical Image Processing, 2023- Present</li> </ul>	
<b>The Chinese University of Hong Kong</b>	<b>Hong Kong</b>
• <b>Teaching Assistant</b> , Department of Mathematics	2015 - 2018
<ul style="list-style-type: none"> <li>• MATH4230 Optimization Theory, Spring 2018</li> <li>• MATH3215A Operations Research, Fall 2017</li> <li>• MATH2221 Mathematical Laboratory, Spring 2017</li> <li>• MATH3215 Operations Research, Spring 2017</li> <li>• MATH2010 Advanced Calculus I, Spring 2016</li> <li>• MATH3210 Linear Programming, Fall 2015</li> </ul>	

- **Teaching Assistant**, Department of Mathematics
- MAT1002B Linear Algebra and Analytic Geometry, Fall 2013

## Professional Activities

### 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
- Mini-symposium in CSIAM Big Data and AI, Guilin, Jul. 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
- Mini-symposium in International Congress on Industrial and Applied Mathematics, Tokyo Aug. 2023
- Mini-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)
- Siqi Yan (SUSTech, start from Sept. 2025)

#### MPhil students:

- Dunbang Yu (SUSTech, start from Sept. 2025)
- 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 – Aug. 2025)
- 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

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- Plenary Talk, Annual Meeting, Union of Mathematical Imaging, Enshi Sept. 2025
- 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
- 4<sup>th</sup> 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<sup>th</sup> 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

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### 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 2025-8-27