

# 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

---

<b>Southern University of Science and Technology</b>	<b>Guangdong, China</b>
<ul style="list-style-type: none"><li>Assistant Professor at Dept. Statistic &amp; Data Science</li></ul>	Sep. 2021 - Present
<b>University of California, Davis</b>	<b>California, USA</b>
<ul style="list-style-type: none"><li>Postdoctoral Researcher at TETRAPODS Institute of Data Science</li></ul>	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>
<ul style="list-style-type: none"><li>Postdoctoral Researcher at Medical Artificial Intelligence and Automation Lab</li></ul>	Oct. 2018 - Jun. 2020
Advisors: Prof. Xun Jia & Prof. Yifei Lou	

## Education

---

<b>The Chinese University of Hong Kong</b>	<b>Hong Kong</b>
<ul style="list-style-type: none"><li>Ph.D. in Mathematics (GPA: 3.92/4.00)</li></ul>	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>
<ul style="list-style-type: none"><li>M.Sc. in Applied Mathematics (GPA: 3.84/4.00)</li></ul>	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>
<ul style="list-style-type: none"><li>B.Sc. in Mathematics (GPA: 3.78/4.00)</li></ul>	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

---

<b>Investigator, NSFC (300,000 RMB)</b>	2023-2025
<ul style="list-style-type: none"><li>The Study of Point Spread Function-based Deep Learning Models and Algorithms for Three-dimensional Point Source Localization</li></ul>	
<b>Investigator, Guangdong Basic and Applied Basic Research Foundation (150,000 RMB)</b>	2024-2026
<ul style="list-style-type: none"><li>The Study of Single-lobe Point Spread Function-based approach for Three-dimensional Point Source Localization and Tracking</li></ul>	
<b>Investigator, Shenzhen Science and Technology Program (500,000 RMB)</b>	2023-2025
<ul style="list-style-type: none"><li>Tensor Reconstruction Models and Algorithms in Brain Imaging</li></ul>	
<b>Co-Investigator, Shenzhen Fundamental Research Program (1,500,000 RMB)</b>	2023-2026
<ul style="list-style-type: none"><li>Algorithms Study on Early Diagnosis Systems for Neurodegenerative Disease</li></ul>	
<b>Co-Investigator, HKRGC Grant (600,000 HKD)</b>	2021 - 2023
<ul style="list-style-type: none"><li>Novel Computational Methods for 3D Point Source Localization based on Point Spread Function Analytics</li></ul>	

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] 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
- [2] **C. Wang**, JF. Aujol, G. Gilboa, Y. Lou.\* "Minimizing quotient regularization model" arXiv preprint arXiv:2308.04095

## Accepted/ Published

- [3] 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.
- [4] 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.
- [5] **C. Wang\***, M. Yan, J. Yu. "Sorted L1/L2 Minimization for Sparse Signal Recovery". *Journal of Scientific Computing*, 99(32),2024.
- [6] 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.
- [7] 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.
- [8] 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.
- [9] 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.
- [10] J. Yang, M. Ma, J. Zhang, **C. Wang\***. "Noise removal using an adaptive Euler's elastica-based model." *the Visual Computing*. 1-12. 2022
- [11] 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.
- [12] 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>
- [13] 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.
- [14] **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.
- [15] **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.



[16] 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.

[17] 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.

[18] **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.

[19] **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.

[20] **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.

[21] **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.

[22] 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.

[23] 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.

[24] **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.

[25] **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.

[26] **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.

[27] **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.

[28] 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>SIAM Early Career Travel Grant Award</b> 2020 SIAM Conference on Imaging Science (IS20)	2020
• <b>SIAM Student Travel Grant Award</b> 2018 SIAM Conference on Imaging Science (IS18)	2018
• <b>SIAM Student Chapter Certificate of Recognition</b>	2018
• <b>Best Poster Presentation Award</b> 4th AoE Symposium on Organelle Biogenesis and Function	2017
• <b>Best Student Paper Award</b> Annual Meeting of China Society for Industrial and Applied Mathematics	2017
• <b>CUHK Postgraduate Studentship</b>	2015 - 2018
• <b>Second Prize of the National Post-Graduate Mathematic Contest in Modeling</b>	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, Fall 2023

### 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

Special Issue: Multiple Sensors Fusion for Image Recognition

Journal: Sensors

### Referee Service 2019 - Present

- SIAM Journal on Imaging Sciences
- 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
- 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 2022 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 - Present)
- Yaghoub Rahimi (UT Dallas, Oct. 2018 - Jun. 2019)
- Mujibur Chowdhury (UT Dallas, Oct. 2020 – Oct. 2021)
- Zhengfeng Lai (UC Davis, July. 2020 - July. 2022)
- Gregory Rehm (UC Davis, Jan. 2021 – Jul. 2021)

MPhil students:

- Zitian Ao (SUSTech, Sept. 2023 - Present)
- Xiaotong Wu (SUSTech, Sept. 2022 - Present)
- Junjie Yu (SUSTech, Sept. 2021 - Jun. 2023)
- Vishal Bhuvaneshwari (UC Davis, Jan. 2021 – Jan. 2022)

RAs:

- Heyu Huang (SUSTech, May 2021 - Jan. 2022)
- Shengjie Niu (SUSTech, Jul. 2023 - Aug. 2023)

Undergraduate Students:

Simin Du, Jinsong Zhou, Yulun Wu,

**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**

---

- 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 Insitute 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

---

### 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)