

Chao Wang

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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 Advisors: Prof. Chen-Nee Chuah & Prof. Nina Amenta	Jul. 2020 - Present
University of Texas (UT) Southwestern Medical Center & UT Dallas	Texas, USA
• Postdoctoral Researcher at Medical Artificial Intelligence and Automation Lab Advisors: Prof. Xun Jia & Prof. Yifei Lou	Oct. 2018 - Jun. 2020

Education

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

Research Grants

Investigator, NSFC	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	2024-2026
• The Study of Single-lobe Point Spread Function-based approach for Three-dimensional Point Source Localization and Tracking	
Investigator, the Stable Support Plan Program of Shenzhen Natural Science Fund	2023-2025
• Tensor Reconstruction Models and Algorithms in Brain Imaging	
Co-Investigator, Shenzhen Fundamental Research Program	2023-2026
• Algorithms Study on Early Diagnosis Systems for Neurodegenerative Disease	
Co-Investigator, HKRGC Grant	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

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***, M. Yan, J. Yu. "Sorted L1/L2 Minimization for Sparse Signal Recovery" arXiv preprint arXiv:2308.04125
- [3] **C. Wang**, JF. Aujol, G. Gilboa, Y. Lou.* "Minimizing quotient regularization model" arXiv preprint arXiv:2308.04095
- [4] J. Zhang, L. Zhu, **C. Wang**, S. Li*. "Hyperspectral image fusion via logarithmic low-rank tensor ring decomposition". arXiv preprint arXiv:2310.10044

Accepted/ Published

- [5] 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* (to appear)
- [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* (to appear).
- [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", accepted by International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC).
- [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

• 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
<ul style="list-style-type: none"> • Instructor, Department of Statistics and Data Science 2022 – Present <ul style="list-style-type: none"> • STA201 Operational Research and Optimization, 2022- Present • STA5013 Statistical & Mathematical Image Processing, Fall 2023 	
The Chinese University of Hong Kong	Hong Kong
<ul style="list-style-type: none"> • Teaching Assistant, Department of Mathematics 2015 - 2018 <ul style="list-style-type: none"> • 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
<ul style="list-style-type: none"> • Teaching Assistant, Department of Mathematics 2013 <ul style="list-style-type: none"> • 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
<ul style="list-style-type: none"> • 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 	<ul style="list-style-type: none"> • 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
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
<u>PhD students:</u>	
• 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 Bhuvaneswari (UC Davis, Jan. 2021 – Jan. 2022)

RAs:

- Heyu Huang (SUSTech, May 2021 - Jan. 2022)
- Shengjie Niu (SUSTech, Apr. 2021 - Present)

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

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- Invited Talk, CSIAM Annual Meeting, Kuiming Oct. 2023
 - International Congress on Industrial and Applied Mathematics (ICIAM2023), Tokyo 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 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)

