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 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

Research Grants

Investigator, NSFC 2023-2025

- The Study of Point Spread Function-based Deep Learning Models and Algorithms for Three-dimensional Point Source Localization

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

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] T. Wang, X. Wu, J. Li, **C. Wang***. "Robust retrieval of material chemical states in X-ray microspectroscopy" arXiv preprint arXiv:2308.04207

Accepted/ Published

[5] 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 (to appear)

[6] 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.

[7] J. Zhang, J. Yang, M. Ma, **C. Wang***. "Noise removal using an adaptive Euler's elastica-based model." *the Visual Computing*. 1-2. 2022

[8] 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.

[9] 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

[10] 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.

[11] **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.

[12] **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.

[13] 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.

[14] 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).

[15] **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.

[16] **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.

[17] **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.

[18] **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.

[19] 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.

[20] 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.

[21] **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.

[22] **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.

[23] **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.

[24] **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.

[25] 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**

- **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

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 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

- 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
- 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 2023-9-10