

Curriculum Vitae

Name Shangqi Gao (Ph.D.)

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- Education & Work

Research Associate	University of Cambridge	03/2024-date
Postdoctoral Research Assistant	University of Oxford	04/2023-02/2024
Ph.D. in Statistics	Fudan University	09/2018-07/2022
MSc in Applied Mathematics	Wuhan University	09/2015-07/2018
BSc in Applied Mathematics	Northwestern Polytechnical University	09/2011-07/2015

- Dissertation

➤ Ph.D. Dissertation

Thesis: Deep Image Decomposition and Reconstruction Defensed in 05/2022

Advisor: Prof. Xiahai Zhuang

✧ This dissertation chronicles deep learning-based mathematical and statistical frameworks for solving inverse problems in photography and medical imaging as well as their applications in natural image super-resolution and medical image segmentation.

➤ MSc Dissertation

Thesis: Regularization-Based Approaches for Tensor Completion Defensed in 05/2018

Advisor: Prof. Qibin Fan

✧ This dissertation chronicles regularization approaches for solving inverse problems in tensor completion as well as their applications in color images, color videos, and magnetic resonance images.

- Research Experience

Postdoc	Crispin group	03/2024-date	University of Cambridge
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➤ Doing projects on “AI for Cancer Imaging” by integrating machine learning and multi-omics data analysis.

- Focusing on bridging various data modalities, including radiological imaging, genomics, liquid biopsies, and digital pathology, to identify novel biomarkers, uncover disease mechanisms, and develop personalized therapeutic approaches.
- Postdoc Verrill group and Rittscher group 04/2023-02/2024 University of Oxford, UK
- Doing a project on “Urological Cancer Pathology AI-Beyond Prostate” by translating new AI solutions for pathology into the clinical environment.
 - Focusing on graph neural networks, Bayesian deep learning, and uncertainty quantification in urological cancer grading.
- Ph.D. Lab of Prof. Xiahai Zhuang 09/2018-07/2022 Fudan University, China
- Built deep learning-based mathematical and statistical frameworks for solving inverse problems in photography and medical imaging.
 - Focused on model interpretability, model generalizability, and unsupervised learning in natural image super-resolution and medical image segmentation.
- Master Lab of Prof. Qibin Fan 09/2015-07/2018 Wuhan University, China
- Built regularization-based approaches for solving inverse problems in tensor completion
 - Explored applications of low-rank tensor completion in color images, color videos, and magnetic resonance images.

- Teaching Experience

- Guest lecturer School of Data Science, Fudan University, China 2020
- Designed and presented 3 lectures in graduate level course on Medical Image Analysis
- Teaching Assistant School of Data Science, Fudan University, China 2019
- Examined assignments and graded exam in graduate level course on Data Visualization
- Teaching Assistant School of Data Science, Fudan University, China 2018
- Examined assignments and graded exam in graduate level course on Sparse Statistics

➤ Grants

- Participant Methodologies and applications of combined NSFC 2020-2023
segmentation of multimodality cardiac images
based on multivariate mixture model
- Participant Self-supervised deep learning for multimodal NSFC-STINT 2021-2023
whole heart segmentation of four-dimensional cine
images
- Participant Cardiac Image Segmentation via Deep Learning NSFC-NRF 2020-2022
with Regularization using Prior Sub Networks

- Awards & Honors

- MedIA Best Paper Award Elsevier & MICCAI 2023
- Excellent Graduate Award Shanghai Higher Education Department 2022
- Student Travel Award MICCAI 2022
- National Graduate Scholarship (Ph.D.) Fudan University, China 2021

National Graduate Scholarship (MSc)	Wuhan University, China	2017
Meritorious Winner of MCM	SIAM	2014
Honorable Mention of MCM	CSIAM	2013
National Endeavor Scholarship (BSc)	Northwestern Polytechnical University	2012

- Supervisory Experience

- I am working with a Ph.D. candidate on studying interpretable and generalizable AI in image denoising and anomaly detection.
- I am working with a Ph.D. candidate and a master student on studying image-to-image translation in liver MRI.
- I worked with a master student on conducting research in unsupervised MR image reconstruction from 2019 to 2022.
- I worked with a Ph.D. candidate on joining Fetal Tissue Annotation (FeTA) Challenge of MICCAI 2022.
- I worked with a Ph.D. candidate on joining Medical Out-Of-Distribution (MOOD) Challenge of MICCAI 2022
- I worked with a master student and a Ph.D. candidate on joining Image Super-resolution Challenge of CVPR 2021.

- Academic service

I am servicing peer review for international journals on:

- Cancer Discovery
- Nature Communications
- Medical Image Analysis
- IEEE Transactions on Medical Imaging
- IEEE Transactions on Neural Network and Learning System
- Neural Networks
- Neurocomputing

- Patents

- [1] X Zhuang, **S Gao**, H Zhou, J Jin. Semi-supervised MR image reconstruction from 3T to 7T. Authorized. China. Patent No. ZL202110687898.4. Authorized date: Feb 18, 2022.
- [2] X Zhuang, **S Gao**, H Zhou, J Jin. k-space accelerated MR image reconstruction based on variational low-rank decomposition. Authorized. China. Patent No. ZL202110687906.5. Authorized date: Apr 6, 2022.

- Computer Languages

- Matlab
- Python (Tensorflow, Pytorch)

- Presentations

- Invited Talk The 1st Youth Academic Forum on Intelligent Imaging, Chinese Society of Stereology 2023
- Poster Pre The 25th International Conference on Medical Image Computing and Computer Assisted Intervention, Resorts World Convention Centre Singapore. 2022
- Invited Talk The 1075th Academic Seminar on Biomedical and Health Engineering, Shenzhen Institution of Advanced Technology Chinese Academy of Sciences. 2022
- Invited Talk Applied Math Ph.D. Seminar, School of Mathematics, Fudan University, China. 2021

- Publications

➤ Journal Papers

- [1] **S Gao**, H Zhou, Y Gao & X Zhuang. BayeSeg: Bayesian Modeling for Medical Image Segmentation with Interpretable Generalizability. *Med Image Anal*, 2023, 89(7):102889. **(Medical Image Analysis MICCAI Best Paper Award 2023)**
- [2] **S Gao** & X Zhuang. Bayesian Image Super-Resolution with Deep Modelling of Image Statistics. *IEEE TPAMI*, 2023. 45(2): 1405-1423.
- [3] **S Gao** & X Zhuang. Rank-One Network: An Effective Framework for Image Restoration. *IEEE TPAMI*, 2022, 44(6): 3224-3238.
- [4] **S Gao** & X Zhuang. Robust Approximations of Low-Rank Minimization for Tensor Completion. *Neurocomputing*, 2020, 379: 319-333.
- [5] **S Gao** & Q Fan, Robust Schatten-p Norm Based Approach for Tensor Completion, *J Sci Comput*, 82:11, 2020.
- [6] **S Gao** & Q Fan, Robust Balancing Scheme-Based Approach for Tensor Completion, *Neurocomputing*, 330:328-336, 2019.
- [7] **S Gao** & Q Fan, A mixture of Nuclear Norm and Matrix Factorization for Tensor Completion, *J Sci Comput*, 75:43-64, 2018.

➤ Conference Papers

- [1] **S Gao**, N.K. Alham, A Protheroe, K Edwards, J Hamblin, J Rittscher, and C Verrill, Characterising borderline areas in bladder tumour grading with Bayesian graph neural networks, ISBI. 2024. **(Oral)**
- [2] **S Gao**, H Zhou, Y Gao, X Zhuang. Joint Modelling of Image and Label Statistics for Enhancing Model Generalizability of Medical Image Segmentation. MICCAI. 2022: 360-369. **(Best paper finalist)**
- [3] H Zhou, C Huang, **S Gao**, X Zhuang. VSpsr: Explorable Super-Resolution via Variational Sparse Representation. CVPRW. 2021: 373-381.
- [4] **S Gao**, X Zhuang. Multi-Scale Deep Neural Networks for Real Image Super-Resolution. CVPRW. 2019: 2006-2013.

- **References**

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My Ph.D. supervisor

Dr. Mireia Crispin-Ortuzar
University of Cambridge, UK

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My line manager