Zeju Li

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https://zerojumpline.github.io/ https://github.com/ZerojumpLine

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Research Interests

Medical Image Computing, Neuroimaging and Machine Learning

Primary area — Semantic Segmentation, Brain MRI, Class Imbalance.

Secondary area — Meta-Learning, Federated Learning, 3D Vision, Image Restoration.

Research Experience

Feb. 25 – · · · — **Associate Professor.** School of Information Science and Technology, Shanghai, China.
He leads a team of graduate students working on advanced AI techniques mainly for healthcare applications.

Jan. 23 – Jan. 25 — **Post-Doctoral Researcher.** Nuffield Department of Clinical Neurosciences, University of Oxford, Oxford, United Kingdom.
Supervisor: Prof. Saad Jbabdi
He worked on advancing neuroimaging with machine learning algorithms.

Oct. 18 – Dec. 22 — **Research Student.** Department of Computing, Imperial College London, London, United Kingdom.
Supervisors: Prof. Ben Glocker and Prof. Daniel Rueckert
He worked on improving the generalization capability of neural networks for medical imaging, especially under class imbalance.

Jul. 19 – Mar. 20 — **Research Intern.** Noah's Ark Lab, Huawei, London, United Kingdom.
Supervisors: Prof. Greg Slabaugh and Dr. Liang Chen
He worked on exploring AutoML for computational photography.

Jul. 18 – Sep. 18 — **Research Intern.** Institute of Computing Technology, Chinese Academy of Sciences, Beijing, China.
Supervisors: Prof. Shaohua Kevin Zhou and Prof. Hu Han
He worked on embedding CT prior knowledge in chest X-ray diagnosis.

Jun. 14 – Jun. 18 — **Research Student.** Department of Electronic Engineering, Fudan University, Shanghai, China.
Supervisors: Prof. Yuanyuan Wang and Prof. Jinhua Yu
He worked on brain MR image analysis including tumor segmentation, image reconstruction and disease classification.
He also worked on compressing ultrasound signal.

Education

2018 – 2022 — **PhD in Computing, Imperial College London, United Kingdom.**
Thesis title: *Learning strategies for improving neural networks for image segmentation under class imbalance.*

Education (continued)

2015 – 2018 **MSc in Biomedical Engineering, Fudan University, China.**
Thesis title: *Deep learning based MR images analysis of glioma and its clinical applications.*

2011 – 2015 **BSc in Electronic Engineering, Fudan University, China.**
Thesis title: *Fourier domain ultrasound beamforming.*

Research Publications (H-index: 21; Citation: 4067, per Google Scholar on 27 Nov. 2024)

Refereed Journal Articles

1. **Li, Z.**, Kamnitsas, K., Dou, Q., Qin, C., & Glocker, B.. (2023). Joint optimization of class-specific training- and test-time data augmentation in segmentation. *IEEE Transactions on Medical Imaging*. doi:10.1109/TMI.2023.3282728
2. **Li, Z.**, Kamnitsas, K., Ouyang, C., Chen, C., & Glocker, B.. (2023). Context label learning: improving background class representations in semantic segmentation. *IEEE Transactions on Medical Imaging*. doi:10.1109/TMI.2023.3242838
3. **Li, Z.**, Kamnitsas, K., & Glocker, B.. (2020). Analyzing overfitting under class imbalance in neural networks for image segmentation. *IEEE Transactions on Medical Imaging*. doi:10.1109/TMI.2020.3046692
4. **Li, Z.**, Yu, J., Wang, Y., Zhou, H., Yang, H., & Qiao, Z.. (2019). Deepvolume: brain structure and spatial connection-aware network for brain mri super-resolution. *IEEE Transactions on Cybernetics*. doi:10.1109/TCYB.2019.2933633
5. **Li, Z.**, Wang, Y., Yu, J., Guo, Y., & Cao, W.. (2017). Deep learning based radiomics (dlr) and its usage in noninvasive idh1 prediction for low grade glioma. *Scientific Reports*. doi:10.1038/s41598-017-05848-2
6. **Li, Z.**, Wang, Y., Yu, J., Shi, Z., Guo, Y., Chen, L., & Mao, Y.. (2017). Low-grade glioma segmentation based on cnn with fully connected crf. *Journal of Healthcare Engineering*. doi:10.1155/2017/9283480
7. **Li, Z.**, Wang, Y., Yu, J., Guo, Y., & Zhang, Q.. (2017). Age groups related glioblastoma study based on radiomics approach. *Computer Assisted Surgery*. doi:10.1080/24699322.2017.1378722
8. Chen, C., Ouyang, C., **Li, Z.**, Wang, S., Qiu, H., Chen, L., … Rueckert, D.. (2022). Enhancing mr image segmentation with realistic adversarial data augmentation. *Medical Image Analysis*. doi:10.1016/j.media.2022.102597
9. Ouyang, C., Chen, C., Li, S., **Li, Z.**, Qin, C., Bai, W., & Rueckert, D.. (2022). Causality-inspired single-source domain generalization for medical image segmentation. *IEEE Transactions on Medical Imaging*. doi:10.1109/TMI.2022.3224067
10. Qiao, M., Liu, C., **Li, Z.**, Zhou, J., Xiao, Q., Zhou, S., … Wang, Y.. (2022). Breast tumor classification based on mri-us images by disentangling modality features. *IEEE Journal of Biomedical and Health Informatics*. doi:10.1109/JBHI.2022.3140236
11. Hering, A., Hansen, L., Mok, T. C., Chung, A. C., Siebert, H., Häger, S., … Shao, W.. et al. (2022). Learn2reg: comprehensive multi-task medical image registration challenge, dataset and evaluation in the era of deep learning. *IEEE Transactions on Medical Imaging*, *42*(3), 697–712. doi:10.1109/TMI.2022.3213983
12. Luo, H., Zhuang, Q., Wang, Y., Abudumijiti, A., Shi, K., Rominger, A., … Wu, G.. et al. (2021). A novel image signature-based radiomics method to achieve precise diagnosis and prognostic stratification of gliomas. *Laboratory investigation*, *101*(4), 450–462. doi:10.1038/s41374-020-0472-x

13 Dou, Q., So, T. Y., Jiang, M., Liu, Q., Vardhanabhuti, V., Kaissis, G., … Yu, K.. et al. (2021). Federated deep learning for detecting covid-19 lung abnormalities in ct: a privacy-preserving multinational validation study. *NPJ digital medicine*, *4*(1), 1–11. doi:10.1038/s41746-021-00431-6

14 Li, H., Han, H., **Li**, **Z.**, Wang, L., Wu, Z., Lu, J., & Zhou, S. K.. (2020). High-resolution chest x-ray bone suppression using unpaired ct structural priors. *IEEE Transactions on Medical Imaging*. doi:10.1109/TMI.2020.2986242

15 Wu, G., Lin, J., Chen, X., **Li**, **Z.**, Wang, Y., Zhao, J., & Yu, J.. (2019). Early identification of ischemic stroke in noncontrast computed tomography. *Biomedical Signal Processing and Control*. doi:10.1016/j.bspc.2019.03.008

16 Zhou, Z., Wang, Y., Yu, J., Guo, W., & **Li**, **Z.**. (2019). Super-resolution reconstruction of plane-wave ultrasound image based on a multi-angle parallel u-net with maxout unit and novel loss function. *Journal of Medical Imaging and Health Informatics*. doi:10.1166/jmihi.2019.2548

17 Gu, J., **Li**, **Z.**, Wang, Y., Yang, H., Qiao, Z., & Yu, J.. (2019). Deep generative adversarial networks for thinsection infant mr image reconstruction. *IEEE Access*. doi:10.1109/ACCESS.2019.2918926

18 Chen, Y., **Li**, **Z.**, Wu, G., Yu, J., Wang, Y., Lv, X., … Chen, Z.. (2018). Primary central nervous system lymphoma and glioblastoma differentiation based on conventional magnetic resonance imaging by high-throughput sift features. *International Journal of Neuroscience*. doi:10.1080/00207454.2017.1408613

19 Wu, G., **Li**, **Z.**, Wang, Y., Yu, J., Chen, Y., & Chen, Z.. (2018). Primary central nervous system lymphoma and glioblastoma image differentiation based on sparse representation system. *Journal of Biomedical Engineering*. doi:10.7507/1001-5515.201705061

20 Yu, J., Shi, Z., Lian, Y., **Li**, **Z.**, Liu, T., Gao, Y., … Mao, Y.. (2017). Noninvasive idh1 mutation estimation based on a quantitative radiomics approach for grade ii glioma. *European Radiology*. doi:10.1007/s00330-016-4653-3

Refereed Conference Proceedings

1 **Li**, **Z.**, Kamnitsas, K., Islam, M., Chen, C., & Glocker, B.. (2022). Estimating model performance under domain shifts with class-specific confidence scores. In *International conference on medical image computing and computer-assisted intervention (miccai 2022)*. doi:10.1007/978-3-031-16449-1_66

2 **Li**, **Z.**, Kamnitsas, K., & Glocker, B.. (2019). Overfitting of neural nets under class imbalance: analysis and improvements for segmentation. In *International conference on medical image computing and computer-assisted intervention (miccai 2019)*. doi:10.1007/978-3-030-32248-9_45

3 **Li**, **Z.**, Li, H., Han, H., Shi, G., Wang, J., & Zhou, S. K.. (2019). Encoding ct anatomy knowledge for unpaired chest x-ray image decomposition. In *International conference on medical image computing and computer-assisted intervention (miccai 2019)*. doi:10.1007/978-3-030-32226-7_31

4 **Li**, **Z.**, Wang, Y., & Yu, J.. (2017a). Brain tumor segmentation using an adversarial network. In *International miccai brainlesion workshop (miccai-brainlesion 2017)*. doi:10.1007/978-3-319-75238-9_11

5 **Li**, **Z.**, Wang, Y., & Yu, J.. (2017b). Reconstruction of thin-slice medical images using generative adversarial network. In *International workshop on machine learning in medical imaging (miccai-mlmi 2017)*. doi:10.1007/978-3-319-67389-9_38

6. Chen, X., **Li**, **Z.**, Xu, Z., Xu, K., Ouyang, C., & Qin, C.. (2024). FedFDD: federated learning with frequency domain decomposition for low-dose CT denoising. In *Medical imaging with deep learning (midl 2024)*. https://openreview.net/forum?id=Zg0mfl10o2

7. Wagner, F., **Li**, **Z.**, Saha, P., & Kamnitsas, K.. (2023). Post-deployment adaptation with access to source data via federated learning and source-target remote gradient alignment. In *International workshop on machine learning in medical imaging (miccai-mlmi 2023)*. doi:10.1007/978-3-031-45676-3_26

8. Islam, M., **Li**, **Z.**, & Glocker, B.. (2023). Robustness stress testing in medical image classification. In *Uncertainty for safe utilization of machine learning in medical imaging (miccai-unsure 2023)*. doi:10.1007/978-3-031-44336-7_17

9. Li, L., Ma, Q., Ouyang, C., **Li**, **Z.**, Meng, Q., Zhang, W., … Kainz, B.. (2023). Robust segmentation via topology violation detection and feature synthesis. In *International conference on medical image computing and computer-assisted intervention (miccai 2023)*. doi:10.1007/978-3-031-43901-8_7

10. Chen, C., **Li**, **Z.**, Ouyang, C., Sinclair, M., Bai, W., & Rueckert, D.. (2022). Maxstyle: adversarial style composition for robust medical image segmentation. In *International conference on medical image computing and computer-assisted intervention (miccai 2022)*. doi:10.1007/978-3-031-16443-9_15

11. Gu, X., Guo, Y., **Li**, **Z.**, Jianning, Q., Dou, Q., Liu, Y., … Yang, G.-Z.. (2022). Tackling long-tailed category distribution under domain shifts. In *European conference on computer vision (eccv 2022)*. doi:10.1007/978-3-031-20050-2_42

12. Li, L., Ma, Q., **Li**, **Z.**, Ouyang, C., Zhang, W., Price, A., … Alansary, A.. (2022). Fetal cortex segmentation with topology and thickness loss constraints. In *Topological data analysis and its applications for medical data (miccai-tda 2022)*. doi:10.1007/978-3-031-23223-7_11

13. Ouyang, C., Wang, S., Chen, C., **Li**, **Z.**, Bai, W., Kainz, B., & Rueckert, D.. (2022). Improved post-hoc probability calibration for artifact-corrupted mri segmentation. In *Uncertainty for safe utilization of machine learning in medical imaging (miccai-unsure 2022)*. doi:10.1007/978-3-031-16749-2_6

14. Yan, W., Wang, Y., **Li**, **Z.**, van der Geest, R. J., & Tao, Q.. (2018). Left ventricle segmentation via optical-flow-net from short-axis cine mri: preserving the temporal coherence of cardiac motion. In *International conference on medical image computing and computer-assisted intervention (miccai 2018)*. doi:10.1007/978-3-030-00937-3_70

15. Li, X., Wang, Y., Yan, W., Van der Geest, R. J., **Li**, **Z.**, & Tao, Q.. (2018). A multi-scope convolutional neural network for automatic left ventricle segmentation from magnetic resonance images: deep-learning at multiple scopes. In *International congress on image and signal processing, biomedical engineering and informatics (cisp-bmei 2018)*. doi:10.1109/CISP-BMEI.2018.8633185

Under Review Articles

1. **Li**, **Z.**, Zheng, Y.-Q., Chen, C., & Jbabdi, S.. (2024). Learning label refinement and threshold adjustment for imbalanced semi-supervised learning.

2. Zheng, Y.-Q., Akram, H., **Li**, **Z.**, Smith, S. M., & Jbabdi, S.. (2024). An image quality transfer technique to localising deep brain stimulation targets.

Awards and Patents

Awards and Achievements

2022 MICCAI UNSURE Workshop Best Paper Award – Runner-Up.
1st place of Fetal Tissue Annotation Challenge.
2019 MICCAI 2019 Graduate Student Travel Award.
2018 Winner of Huawei UK AI Challenge.
Outstanding Graduate of Shanghai.
National Scholarship.
2016 Intel Fellowship.

Patents

- **Li, Z.**, Chen, L., Slabaugh, G., Liu, L., & Fu, Z.. Device and Method for Image Processing, US20230033458A1, 2023.
- Wang, Y., Yu, J. & **Li, Z.**. Thin layer magnetic resonance image reconstruction method based on deep learning, CN108629816A, 2018.
- Wang, Y., Yu, J. & **Li, Z.**. Method and system for lossless prediction of low-grade intracranial gliomas isocitrate dehydrogenase based on deep learning, CN108109140A, 2018.
- Wang, Y., Yu, J., Wu, G. & **Li, Z.**. Identification method of primary central nervous system lymphoma and glioblastoma based on sparse representation system, CN107016395A, 2017.
- Yu, J., Shi, Z., **Li, Z.**, Wang, Y., Chen, L. & Mao, Y.. Brain glioma molecular marker nondestructive prediction method and prediction system based on radiomics, CN106683081A, 2017.

Professional Service

Organizer

- Area Chair, International Conference on Medical Imaging with Deep Learning (MIDL) 2025.
- Area Chair, International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI) 2024.

Journal Reviewer

- IEEE Transactions on Medical Imaging;
- Medical Image Analysis;
- Journal of Biomedical and Health Informatics;
- Neurocomputing;
- Computer Vision and Image Understanding;
- IEEE Access;
- Pattern Recognition;
- Neural Networks;
- Knowledge-Based Systems;
- Computer Methods and Programs in Biomedicine;
- Biomedical Signal Processing and Control;
- Academic Radiology;

Professional Service (continued)

- Biocybernetics and Biomedical Engineering;
- Frontiers in Medicine;
- Scientific Reports;
- Computers in Biology and Medicine;
- Artificial Intelligence In Medicine;
- Frontiers in Oncology;
- IEEE Transactions on Neural Networks and Learning Systems.

Conference Reviewer

- MICCAI;
- The IEEE / CVF Computer Vision and Pattern Recognition Conference (CVPR);
- The IEEE / CVF International Conference on Computer Vision (ICCV);
- The AAAI Conference on Artificial Intelligence (AAAI);
- European Conference on Computer Vision (ECCV);
- Domain Adaptation and Representation Transfer (MICCAI-DART).
- Data Augmentation, Labeling, and Imperfections (MICCAI-DALI).
- Advances in Simplifying Medical UltraSound (MICCAI-ASMUS).
- Computational Mathematics Modeling in Cancer Analysis (MICCAI-CMMCA).
- Distributed, Collaborative and Federated Learning (MICCAI-DeCaF).
- Advancing Data Solutions in Medical Imaging AI (MICCAI-ADSMI).

Volunteer

- MIDL 2019.

Teaching

Imperial
- 70014 Machine Learning for Imaging [Spring 2021];
- 70028 Reinforcement Learning [Autumn 2020];
- CS 496 Mathematics for Machine Learning [Autumn 2019];
- CS 316 Computer Vision [Autumn 2018, Spring 2020];
- CS 317 Graphics [Spring 2019].

Fudan
- Circuit Laboratory [Spring 2016];
- Signal Processing [Spring 2017].

References

Available on Request

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