Liwen Zou, Ph.D.

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Biography: Liwen Zou is a Ph.D. candidate supervised by ***Prof. Xiaoping Yang*** at School of Mathematics, Nanjing University. His work focuses on developing AI-based and mathematical model-driven methods for medical image analysis and biomedical engineering. Previously, he has proposed several deep learning models for **medical image segmentation** to support precision diagnosis and treatment of **pancreatic cancer**. He has published over 10 papers in internationally renowned academic journals such as ***Medical Image Analysis*** and ***Artificial Intelligence in Medicine***.

Education

2020-09 – 2025-12 **Ph.D. in Applied Mathematics, Nanjing University**.
Supervisor: ***Prof. Xiaoping Yang***
Thesis: ***Mechanism Modeling, Clinical Thinking and Deep Learning Fused Medical Image Segmentation Methods for Precision Diagnosis and Treatment of Pancreatic Cancer.***

2016-09 – 2020-06 **B.S. in Information and Computing Science, South China University of Technology**.
Supervisor: ***Prof. Delu Zeng***
Thesis: *Measuring the Rogue Wave Pattern Triggered from Gaussian Perturbations by Deep Learning.*
GPA: 3.80/4.00 **Ranking**: 2/35

Research Publications

Journal Articles

1. **L. Zou**, Y. Cao, Z. Nie, L. Mao, Y. Qiu, Z. Wang, Z. Cai, and X. Yang, "Segment like a doctor: Learning reliable clinical thinking and experience for pancreas and pancreatic cancer segmentation," **Medical Image Analysis**, vol. 102, p. 103 539, 2025, DOI GitHub.
2. **L. Zou**, Z. Cai, L. Mao, Z. Nie, Y. Qiu, and X. Yang, "Automated peripancreatic vessel segmentation and labeling based on iterative trunk growth and weakly supervised mechanism," **Artificial Intelligence in Medicine**, vol. 150, p. 102 825, 2024, DOI GitHub.
3. **L. Zou**, Z. Cai, Y. Qiu, L. Gui, L. Mao, and X. Yang, "Ctg-net: An efficient cascaded framework driven by terminal guidance mechanism for dilated pancreatic duct segmentation," **Physics in Medicine & Biology**, vol. 68, no. 21, p. 215 006, 2023, DOI.
4. **L. Zou**, X. Luo, D. Zeng, L. Ling, and L. C. Zhao, "Measuring the rogue wave pattern triggered from gaussian perturbations by deep learning," **Physical Review E**, vol. 105, no. 5, p. 054 202, 2022, DOI GitHub.
5. H. Liu, **L. Zou**, N. Xu, H. Shen, Y. Zhang, P. Wan, B. Wen, X. Zhang, Y. He, L. Gui, et al., "Deep learning radiomics based prediction of axillary lymph node metastasis in breast cancer," **NPJ Breast Cancer**, vol. 10, no. 1, p. 22, 2024, **(Co-first authors)** DOI GitHub.
6. B. Wang, **L. Zou**, J. Chen, Y. Cao, Z. Cai, Y. Qiu, L. Mao, Z. Wang, J. Chen, L. Gui, et al., "A weakly supervised segmentation network embedding cross-scale attention guidance and noise-sensitive constraint for detecting tertiary lymphoid structures of pancreatic tumors," **IEEE Journal of Biomedical and Health Informatics**, vol. 28, no. 2, pp. 988–999, 2023, DOI.

7. J. Song, **L. Zou**, Y. Li, X. Wang, J. Qiu, and K. Gong, "Combining artificial intelligence assisted image segmentation and ultrasound based radiomics for the prediction of carotid plaque stability," **BMC Medical Imaging**, vol. 25, no. 1, p. 89, 2025, **(Co-first authors)** DOI.
8. L. Tian, **L. Zou**, and X. Yang, "A two-stage data-model driven pancreas segmentation strategy embedding directional information of the boundary intensity gradient and deep adaptive pointwise parameters," **Physics in Medicine & Biology**, vol. 68, no. 14, p. 145 005, 2023, DOI.
9. L. Tian, **L. Zou**, and X. Yang, "Medical image segmentation started from a single point annotation: A novel variational model," **Physica Scripta**, 2025, DOI.
10. C. Ren, **L. Zou**, and L. Gui, "2am: Weakly supervised tumor segmentation in pathology via cam and sam synergy," **Electronics**, vol. 14, no. 15, p. 3109, 2025, **(Co-corresponding authors)** DOI.

Conference Papers

1. Y. Zhu, **L. Zou**, L. Li, and P. Wen, "Selected partially labeled learning for abdominal organ and pan-cancer segmentation," pp. 209–221, **MICCAI Challenge on Fast and Low-Resource Semi-supervised Abdominal Organ Segmentation**, 2023, Springer, 2023. DOI GitHub.
2. Y. Zhu, **L. Zou**, P. Wen, Z. Nie, L. Gui, and X. Yang, "A novel pseudo label-based unsupervised multiple target domain adaptation framework for abdominal organ segmentation," pp. 164–177, **MICCAI Challenge on Fast and Low-Resource Semi-supervised Abdominal Organ Segmentation**, 2024, Springer, 2024. DOI.

Research Projects

2020-12 – 2025-12 **Mathematical Theories and Algorithms for Precision Diagnosis and Treatment of Pancreatobiliary Malignant Tumors.** (Role: **Subproject Manager**; Funding: Ministry of Science and Technology of the People's Republic of China, No. 2020YFA0713802)

2022-04 – 2023-04 **Accurate and Efficient AI Models for Pancreatic Cancer and Peripancreatic Vessel Segmentation on CT Images.** (Role: **Project Leader**; Funding: Postgraduate Research and Practice Innovation Program of Jiangsu Province, China, No. KYCX22_0082)

Additional Experience

Awards and Achievements

2022 **Honorable Mention Award, MICCAI PARSE 2022: Pulmonary Artery Segmentation Challenge.**

2019 **Grand Prize, Mathematics Competition of South China University of Technology.**

2018 **Second Prize, National College Student Mathematics Competition of China (Guangdong Division).**

2024 **National Scholarship for Doctoral Students of China.**

Outstanding Graduate Student Model of Nanjing University.

Patents

2023 Yang, X., **Zou, L.,** Cai, Z., Qiu, Y., Gui, L., Mao, L. "A Dilated Pancreatic Duct Segmentation Method Based on Cascaded Terminal Guidance Mechanism." China Patent, No. 202310639583.1.

Yang, X., **Zou, L.,** Cai, Z., Qiu, Y., Nie, Z., Mao, L. A Peripancreatic Vessel Segmentation and Labeling Method Based on Iterative Trunk Growth and Weakly Supervised Learning. China Patent, No. 202310639579.5.