Linkai Peng

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PERSONAL PROFILE

Ph.D. student in Electrical Engineering at Northwestern University, specializing in **deep learning**, **computer vision**, and **medical image analysis**. Published in top-tier conferences and journals, including **ISBI**, **MICCAI**, and **MedIA**, with three additional papers under review. Passionate about applying AI/ML to healthcare.

Research Interests: Deep Learning & AI for Medical Imaging & Multi-modal Learning

EDUCATION

09/2023 – Present   ***Northwestern Univeristy***
Ph.D. in Electrical Engineering, advisor: Prof. Ulas Bagci

09/2019 – 06/2023   ***Southern University of Science and Technology***
B.Eng in Computer Science and Engineering, advisor: Prof. Xiaoying Tang

MAJOR PUBLICATIONS

2025   Li, S., **Peng, L**., Zhang, Z., Durak, G., & Bagci, U. TAGS: 3D Tumor-Adaptive Guidance for SAM. (co-first author, under review)

2025   Zhang, Z., **Peng, L.**, Dou, W., & Bagci, U. Large Scale Semi-Supervised Pretraining Guided Generalized MRI Segmentation. (co-first author, under review)

2024   Zhang, Z., Keles, E., Durak, G., Taktak, Y., Susladkar, O., Gorade, V., ..., **Peng, L.**, ..., & Bagci, U. (2024). Large- Scale Multi-Center CT and MRI Segmentation of Pancreas with Deep Learning. arXiv preprint arXiv:2405.12367. (accepted in **MedIA**)

2024   **Peng, L.**, Zhang, Z., Durak, G., Miller, F. H., Medetalibeyoglu, A., Wallace, M. B., & Bagci, U. (2024). Optimizing Synthetic Data for Enhanced Pancreatic Tumor Segmentation. arXiv preprint arXiv:2407.19284. (accepted in **MICCAI-AIPAD** 2024)

2023   Lin, L., **Peng, L.**, He, H., Cheng, P., Wu, J., Wong, K. K., & Tang, X. (2023). YoloCurvSeg: You only label one noisy skeleton for vessel-style curvilinear structure segmentation. Medical Image Analysis, 90, 102937. (accepted in **MedIA**)

2022   **Peng, L.**, Lin, L., Cheng, P., He, H., & Tang, X. (2022, September). Student becomes decathlon master in retinal vessel segmentation via dual-teacher multi-target domain adaptation. In International Workshop on Machine Learning in Medical Imaging (pp. 32-42). Cham: Springer Nature Switzerland. (accepted in **MICCAI-MLMI** 2022)

2022   **Peng, L.**, Lin, L., Cheng, P., Huang, Z., & Tang, X. (2022, March). Unsupervised domain adaptation for cross-modality retinal vessel segmentation via disentangling representation style transfer and collaborative consistency learning. In 2022 IEEE 19th International Symposium on Biomedical Imaging (ISBI) (pp. 1-5). IEEE. (accepted in **ISBI** 2022)

2021   **Peng, L.**, Lin, L., Cheng, P., Wang, Z., & Tang, X. (2021). Fargo: A joint framework for faz and rv segmentation from octa images. In Ophthalmic Medical Image Analysis: 8th International Workshop, OMIA 2021, Held in Conjunction with MICCAI 2021, Strasbourg, France, September 27, 2021, Proceedings 8 (pp. 42-51). Springer International Publishing. (accepted in **MICCAI-OMIA** 2021)

RESEARCH EXPERIENCES

Multi-modal Segmentation & Large-scale Pretraining   2024 - Present
- Integrated **SAM** and **CLIP** for tumor segmentation, optimizing model robustness with adapter layers.
- Designed an **EMA**-based semi-supervised learning framework to enhance generalization.
- Developed **multi-prompt** strategies for nnUNet to improve segmentation performance across diverse datasets.

Pancreas Segmentation & Synthetic Data Optimization   2023 - 2024
- Contributed to a large-scale multi-center study on **CT** and **MRI** pancreas segmentation.
- Improved segmentation accuracy by incorporating **linear self-attention** mechanisms.
- Developed a **diffusion model** to optimize synthetic data generation for robust tumor segmentation.

Ophthalmic Image Segmentation & Domain Adaptation   2021 - 2023
- Designed a joint framework for **FAZ** and **retinal vessel** segmentation from OCTA images.
- Proposed a **multi-target domain adaptation** method for robust vessel segmentation across multiple imaging modalities.

RESEARCH GRANTS

- Climbing Plan Fund for Science & Technology Innovation   (Project Member, 2021 - 2023)
  - Developed transfer learning-based image quality evaluation models for OCTA images.
- Student Innovation & Entrepreneurship Training Program   (Project Leader, 2021 - 2023)
  - Built an AI-driven diagnosis system for eye diseases using OCTA imaging.

TECHNICAL SKILLS

Programming: Python (PyTorch, TensorFlow), MATLAB, C++, Java
AI & ML Frameworks: PyTorch, TensorFlow, JAX, Hugging Face Transformers
Medical Imaging Tools: MONAI, nnUNet, SimpleITK

AWARDS & HONORS

First Class Merit Student Scholarship (2019 - 2022)

TEACHING & SERVICES

- Reviewer for **MICCAI**, IEEE Transactions on Medical Imaging (**TMI**), and Medical Image Analysis (**MedIA**)
- Teaching Assistant: Object-Oriented Analysis and Design, Digital Logic, Introduction to Computer Programming