PENGCHENG WANG

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EDUCATION

University of Southern California (USC) *Aug 2023 - Present*
PhD student in Biomedical Engineering
University of Science and Technology of China (USTC) *Sep 2018 - Jul 2022*
Bachelor in Electrical Engineering (Special Talent Program in Artificial Intelligence)

PUBLICATIONS

Advancing Presurgical Non-Invasive Molecular Subgroup Prediction in Medulloblastoma Using Artificial Intelligence and MRI Signatures
Yan-Ran Wang, Pengcheng Wang*, Zihan Yan*, ... ,Lu Tian, Feng Wu, Jian Gong*
Cancer Cell 2024, Impact Factor: 50.3, Co-first Author, Selected as Preview Article [Preview] [Paper] [Code]

Screening and Diagnosis of Cardiovascular Disease Using Artificial Intelligence-Enabled Cardiac Magnetic Resonance Imaging
Yan-Ran Wang, Kai Yang*, Yi Wen†, Pengcheng Wang†, Yuepeng Hu†, ... , Joseph C. Wu, Shihua Zhao*
Nature Medicine 2024, Impact Factor: 82.9, Co-Second Author [Paper] [Code]

Low-count whole-body PET/MRI restoration: an evaluation of dose reduction spectrum and five state-of-the-art artificial intelligence models
Yan-Ran Wang, Pengcheng Wang, Lisa Christine Adams, ... , Daniel Rubin, Heike E. Daldrup-Link
European Journal of Nuclear Medicine and Molecular Imaging (EJNMMI 2023) [Paper] [Code]
*† equal contribution

CONFERENCES

Multi-contrast MR-driven deep learning for abdominal multi-organ segmentation (McDAMOS)
Pengcheng Wang, Dan Ruan, Junzhou Chen, Jiayu Xiao, Diane Ling, Lijun Ma, Wensha Yang, Zhaoyang Fan
American Association of Physicists in Medicine - **AAPM 2024 Snap Oral Presentation**

ASSISTANTSHIP EXPERIENCES

University of Southern California (USC) *Aug 2023 - Present*
Served as a research assistant, focused on Medical Image Segmentation
University of Science and Technology of China (USTC) *Sep 2021 - Jun 2023*
Served as a research assistant, focused on Biomedical AI

RESEARCH EXPERIENCES

Automated Abdominal Organs Segmentation Based on MRI *Sep 2023 - Present*
University of Southern California Advisor: Dr. Zhaoyang Fan & Dr. Dan Ruan
- Developed a multi-contrast 3D abdominal MRI dataset based on multi-task-MR (MT-MR) technique.
- Perfromed data pre-processing, data quality control, and constructed and evaluated segmentation neural networks.
- Investigated synthetic T2w contrast methods for clinical T1w datasets and shape representation models.
- Demonstrated that multi-contrast MRI, pre-training on T1-weighted datasets with synthesized T2-weighted images, and shape representation loss contribute to improved abdominal organ segmentation.
- Presented findings as a Snap Oral Presentation at AAPM 2024.

Pre-surgical Molecular Subgroup Prediction in Medulloblastoma *Mar 2022 - Jun 2023*
University of Science and Technology of China Advisor: Dr. Yan-Ran Wang
- Established an international database of 934 medulloblastoma patients, employing image-based machine learning strategies for non-invasive molecular subgroup prediction.

• Executed data processing, developed machine learning experiments, and performed model and data analysis to enhance the accuracy of molecular subgroup predictions.
• Validated the model using robust strategies, including cross-validation and external validation, demonstrating its efficacy as a generalizable molecular diagnostic classifier.
• Conducted statistical analyses and drafted tables and figures.
• Contributed equally as a co-first author in *Cancer Cell* 2024.
• Our work was selected as the Preview Article in the July issue of *Cancer Cell*. Dr. Vijay Ramaswamy from Canadas SickKids Hospital (ranked first in pediatric care) highlighted the significance of our study:"*This study raises the prospect of globally applicable pre-operative prediction of medulloblastoma subgroups using basic MRI sequences, which are widely available even in low- and middle-income countries. This could democratize access to molecular diagnostics, significantly impacting the clinical care of children with medulloblastoma worldwide. As such, routine incorporation of medulloblastoma subgrouping into clinical paradigms would extend beyond the 5% of children in the developed world. Although imaging-based subgrouping accuracy has room for improvement, this study marks a significant advance toward universal molecular diagnostics for medulloblastoma patients globally.*"

AI-enabled Screening and Diagnosis of Cardiovascular Disease *Jan 2022 - Jun 2023*
University of Science and Technology of China Advisor: Dr. Yan-Ran Wang
• Developed and validated a computerized cardiac magnetic resonance imaging (CMR) interpretation system for screening and diagnosing 11 types of cardiovascular diseases (CVD) in 9,719 patients.
• Conducted data processing, developed and trained deep learning algorithms, and performed model analysis to enhance the accuracy and effectiveness of CVD screening and diagnosis.
• Highlighted the potential of AI-enabled CMR to detect previously unidentified CMR features.
• Contributed equally as a co-second author in *Nature Medicine* 2024.

Low-Count Whole-Body PET/MRI Restoration *Oct 2021 - Mar 2022*
University of Science and Technology of China Advisor: Dr. Yan-Ran Wang & Dr. Liang-Qiong Qu
• Investigated five state-of-the-art AI algorithms for low-count whole-body PET restoration, providing a comprehensive comparison of current AI techniques.
• Implemented the convolutional neural networks for PET/MRI restoration: U-Net, enhanced deep super-resolution network (EDSR), and generative adversarial network (GAN).
• Explored swin transformer firstly - swin transformer image restoration network (SwinIR) and EDSR-ViT (vision transformer) - for whole-body PET/MRI restoration.
• Served as the lead contributor for methodology development, coding, and data analysis.

SKILLS

Programming skills: Python (Pytorch, Tensorflow), C, Matlab, R
Software: OsiriX/Horos, ITK-SNAP, 3D Slicer, ANTs

AWARDS

• 2nd place of Best Posters in the 26th Grodins Symposium, USC 2024
• Scholarship of Talent Program in Artificial Intelligence, USTC 2022
• Outstanding Student Scholarship, USTC 2021, 2020, 2019
• Outstanding Freshman Scholarship, USTC 2018

TEACHING

• Served as a Teaching Assistant for Computer Programming 2021