

Fan Xiao

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Education

Ludwig-Maximilians-Universität München, Munich, Germany PhD candidate in Medical Physics <i>Research focus:</i> AI-based Efficient Sequence Modeling, Monte Carlo Simulation, Medical Image Segmentation	2023.09 – Now
Southern Medical University, Guangzhou, China MS in Biomedical Engineering, GPA 3.6/4.0	2020.09 – 2023.06
Wuhan University of Technology, Wuhan, China BS in Communication Engineering	2016.09 – 2020.06

Research Experience

Benchmarking Mamba/Transformer/ConvLSTM for Dose Calculation First Author	2025.07 – Now
<ul style="list-style-type: none">- Designed a GPU-accelerated processing pipeline using CuPy to perform Ray-Casting for segment projection and Cubic B-spline resampling for Beam's Eye View transformations- Developed a unified benchmarking framework comparing CNN-Mamba, Transformer, CNN-ConvLSTM, and Unet for volumetric sequence modeling (high-resolution dense regression task)- Developed an optimized inference pipeline integrating CUDA Graphs and Automatic Mixed Precision (AMP), achieving high-throughput inference (<40 ms/segment) with low memory footprint (2.9 GB), validated across multiple GPU generations- Under revision: <i>Physics in Medicine & Biology</i> (2026)	
Real-Time MRI-Only Photon Dose Calculation Engine First Author	2024.10 – 2025.06
<ul style="list-style-type: none">- Proposed a CNN-RNN framework (UNet-LSTM) to approximate computationally expensive Monte Carlo particle transport simulations directly from MRI data- Solved the domain shift challenge (lack of electron density information in MRI) by integrating CT-MRI deformable registration with a segmentation-guided feature mechanism- Achieved 12 ms per photon beam inference latency with a gamma passing rate (2%/2mm) exceeding 99.50% compared to Monte Carlo ground truth- Published in <i>Medical Physics</i> (2025), DOI: 10.1002/mp.70106	
Proton Range Verification via Prompt Gamma Emission Prediction First Author	2024.01 – 2024.09
<ul style="list-style-type: none">- Architected an LSTM model by integrating heterogeneous data streams (anatomical relative stopping power maps and physical dose fields) to predict prompt gamma emissions across wide proton energies (125–210 MeV).- Achieved sub-millimeter accuracy with a mean absolute range shift deviation of 0.15 mm against Monte Carlo ground truth.- Reduced prediction time to <130 ms per pencil beam, facilitating sub-second feedback for adaptive proton therapy.- Published in <i>Physics in Medicine & Biology</i> (2024), DOI: 10.1088/1361-6560/ad8e2a	

Technical Skills

- Languages: Python, C++ (Geant4 focus), Bash.
- Deep Learning: Pytorch, RNN/LSTM, Transformer, Mamba, Unet/nnUnet.
- Tools: Git, Docker, Slurm, Cupy, Plastimatch, Pydicom, RayStation scripting.

Additional Info and Awards

- Selected Talks:
AAPM 2025 (Washington, DC), ICCR 2024 (Lyon), ECMP 2024 (Munich).
 - Awards:
Chinese National Scholarship (2022) – Top 2%;
First-class Academic Scholarship (2022, 2023) – Top 20%.
 - Languages:
Chinese (Native), English (Professional Working Proficiency).
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