

Peirong Liu

Postdoctoral Researcher
Athinoula A. Martinos Center for Biomedical Imaging
Harvard Medical School & Massachusetts General Hospital
Boston, MA, US

♀ she/her
🏠 Homepage
🎓 Google Scholar
✉️ pliu17@mgh.harvard.edu

Education	University of North Carolina at Chapel Hill	Chapel Hill, U.S
	<i>Ph.D. in Computer Science</i> <ul style="list-style-type: none">▪ Advisor: Dr. Marc Niethammer▪ Thesis committee: Dr. Yueh Z. Lee, Dr. Stephen Aylward, Dr. Colin Raffel, Dr. Gedas Bertasius	Aug 2018 – Jun 2023
	Shanghai University	Shanghai, China
	<i>B.S. in Mathematics and Applied Mathematics</i> <ul style="list-style-type: none">▪ GPA: 3.95/4.00 (Rank: 1/305)▪ President's List; National Scholarship	Sep 2014 – Jun 2018

Summary	My research interest lies in AI for Healthcare , at an intersection of machine learning, computer vision, and medical imaging. My recent research topics include	
	<ul style="list-style-type: none">▪ Partial differential equations, optimal transport, physics-driven deep learning▪ Generative models, modality-agnostic foundation models for medical imaging▪ Clinical applications: CT/MR perfusion imaging, low-field MR imaging, stroke diagnosis	

Experience	Harvard Medical School & Massachusetts General Hospital	Boston, U.S
	<i>Postdoctoral researcher (Host: Dr. Juan Eugenio Iglesias)</i> <ul style="list-style-type: none">▪ Modality-agnostic foundation models for medical imaging▪ Pathology representation and detection	Aug 2023 – present
	Department of Computer Science, University of North Carolina at Chapel Hill	Chapel Hill, U.S
	<i>Research assistant (Advisor: Dr. Marc Niethammer)</i> <ul style="list-style-type: none">▪ Partial differential equations, Physics-driven deep learning for perfusion imaging▪ Regularized optimal mass transport (rOMT) and non-rigid fluid-based image registration	Jan 2019 – Aug 2023
	Computer Vision (Generative AI), Meta AI	New York, U.S
	<i>Research Intern: open-vocabulary object detection, multi-object tracking</i>	May 2022 – Nov 2022
	Computer Vision (Content Understanding), Facebook AI	New York, U.S
	<i>Research Intern: unsupervised image synthesis, motion transfer</i>	May 2021 – Nov 2021
	Biomedical Research Imaging Center, University of North Carolina at Chapel Hill	Chapel Hill, U.S
	<i>Research assistant (Advisors: Dr. Dinggang Shen and Dr. Pew-Thian Yap)</i> <ul style="list-style-type: none">▪ Geometric deep learning for mesh-structured data	Aug 2018 – Dec 2018

Selected Publications	Journal	
	Peirong Liu , Yueh Z. Lee, Stephen Aylward, and Marc Niethammer, “Perfusion Imaging: An Advection Diffusion Approach,” <i>IEEE Transactions on Medical Imaging (TMI)</i> , 2021. [paper] [code]	
	Refereed Conference	
	Peirong Liu , Oula Puonti, Xiaoling Hu, Daniel C. Alexander, and Juan E. Iglesias, “Brain-ID: Learning Contrast-agnostic Anatomical Representations for Brain Imaging,” <i>ECCV</i> , 2024. [paper] [code]	
	Peirong Liu , Oula Puonti, Annabel Sorby-Adams, William T. Kimberly, and Juan E. Iglesias, “PEPSI: Pathology-Enhanced and Pulse-Sequence-Invariant Representations for Brain MRI,” <i>MICCAI</i> , 2024. [paper] [code]	
	Peirong Liu , Yueh Z. Lee, Stephen Aylward, and Marc Niethammer, “Deep Decomposition for Stochastic Normal-Abnormal Transport,” <i>CVPR</i> , 2022. (Oral - 4.0%) [paper] [code]	
	Peirong Liu , Lin Tian, Yubo Zhang, Stephen Aylward, Yueh Z. Lee, and Marc Niethammer, “Discovering Hidden Physics Behind Transport Dynamics,” <i>CVPR</i> , 2021. (Oral - 3.7%) [paper] [code]	

Zhengyang Shen, Jean Feydy, **Peirong Liu**, Ariel Hernán Curiale, Ruben San José Estépar, and Marc Niethammer, “Accurate Point Cloud Registration with Robust Optimal Transport,” *NeurIPS*, 2021. [paper] [code]

Zhipeng Ding, Xu Han, **Peirong Liu**, and Marc Niethammer, “Local Temperature Scaling for Probability Calibration,” *ICCV*, 2021. [paper] [code]

Peirong Liu, Yueh Z. Lee, Stephen Aylward, and Marc Niethammer, “PIANO: Perfusion Imaging via Advection-diffusion,” *MICCAI*, 2020. (Early accept; Oral - 5.0%) [paper] [code]

Lin Tian, Connor Puett, **Peirong Liu**, Zhengyang Shen, Stephen Aylward, Yueh Z. Lee, and Marc Niethammer, “Fluid registration between lung CT and stationary chest tomosynthesis images,” *MICCAI*, 2020. [paper] [code]

Peirong Liu, Zhengwang Wu, Gang Li, Pew-Thian Yap, and Dinggang Shen, “Deep Modeling of Growth Trajectories for Longitudinal Prediction of Missing Infant Cortical Surfaces,” *IPMI*, 2019. (Oral - 10.0%) [paper] [code]

Under Review

Peirong Liu, Oula Puonti, Xiaoling Hu, Karthik Gopinath, Annabel Sorby-Adams, William T. Kimberly, and Juan E. Iglesias, “A Modality-agnostic Multi-task Vision Foundation Model for Brain Imaging,” *In Submission to IEEE Transactions on Medical Imaging (TMI)*, 2024.

Peirong Liu, Yueh Z. Lee, Stephen Aylward, and Marc Niethammer, “HARP: Hemisphere-normalized Atlas Representing Perfusion,” *In Submission to Radiology*, 2024.

Peirong Liu, Yueh Z. Lee, Stephen Aylward, and Marc Niethammer, “D²-SONATA+: Deep Decompositions for Stochastic Normal-Abnormal Transport,” *In Submission to IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, 2023.

Invited Talks

Perfusion Imaging via Mass Transport

Athinoula A. Martinos Center for Biomedical Imaging, Harvard Medical School, Charlestown, US Mar 2023

Brigham and Women’s Hospital, Harvard Medical School, Boston, US Jan 2023

Weill Cornell Medicine, Cornell University, New York, US Dec 2022

Deep Decomposition for Stochastic Normal-Abnormal Transport

CVPR’22, New Orleans, US Jun 2022

Discovering Hidden Physics Behind Transport Dynamics

CVPR’21, Virtual Jun 2021

Perfusion Imaging via Advection-diffusion

MICCAI’20, Virtual Oct 2020

Deep Modeling of Growth Trajectories for Longitudinal Prediction of Missing Infant Cortical Surfaces

IPMI’19, Hong Kong, China Jun 2019

Awards

Rising Stars in Data Science, UCSD & UChicago & Stanford 2024

Rising Stars in EECS, MIT 2024

MICCAI NIH Award, Marrakesh 2024

MICCAI Travel Award, Lima 2020

IPMI Scholarship, Hong Kong 2019

President’s List, Shanghai University (the Highest honor, Top 10) 2018

Shanghai Outstanding Graduate, Shanghai 2018

Baogang Outstanding Student Award, Shanghai (Top 4) 2017

National Scholarship, Shanghai University (Top 1%) 2017

Finalist Winner, U.S. Mathematical Contest In Modeling (MCM) (Team leader, 36/8843) 2017

Third Prize, Shanghai Mathematics Competitions (Math Major) 2016

Top Grade Scholarship, Shanghai University (Top 3 department-wise) 2015-2017

Outstanding Student Award, Shanghai University 2015-2017

Academic Innovation Award, Shanghai University 2015-2016

Public Service Award, Shanghai University 2015-2016

DEI

Volunteer research mentor at Talaria Summer Institute, for students of underrepresented genders
Member and guest speaker at UNC GWiCS (Graduate Women in Computer Science)
Reviewer and invited presenter at WiCV WiCV (Women in Computer Vision)

Services

Journals: Computer Graphics Forum, Frontiers in Radiology, PLOS ONE
Conferences: NeurIPS, ICLR, CVPR, ICCV, ECCV, AAAI, WiCV, MICCAI, IPMI, ISBI

Skills

Computer: Python, MATLAB, C/C++, \LaTeX , HTML, JAVA, R
Libraries & OS: PyTorch, TensorFlow, ITK, FreeSurfer; Linux (Ubuntu), Mac OSX
Languages:

- Mandarin (Native Proficiency)
- English (Full Professional Proficiency)
 - TOEFL: 116 (R-30, L-30, S-27, W-29)
 - Shanghai Advanced-level English Interpretation Certificate

Misc: Guzheng (Professional Level-10 with Distinction); Piano; Drums; Rock Climbing