Chen Liu

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Education

Yale University, PhD in Computer Science — *New Haven, CT. Aug 2022 - May 2028*

- Deep learning in healthcare. Computer Vision, Neural Network Manifold, Medical Imaging.
- Teaching Fellow for (1) Deep Learning on Graphs (Rex Ying), (2) AI Foundation Models (Arman Cohan).

Columbia University, MS in Electrical Engineering — *New York, NY. Aug 2018 - Feb 2020*

- Nikola Tesla Electrical Engineering Scholar ("to the most exceptional applicants", ≈ top 10% among those admitted)

Bucknell University, BS in Electrical Engineering, Minor in Biomedical Engineering — *Lewisburg, PA. Aug 2014 - May 2018*

- Tau Beta Pi Honor, Alpha Lambda Delta Honor, ILTM student consultant

Skills

Research Deep Learning, Neural Network Manifold, Computer Vision, Medical Imaging

Programming Python (TensorFlow, PyTorch, Numpy, etc.), LaTeX, Rust, C++, Linux Bash, Git, Docker

Work Experience

Senior Research Scientist @ GE Healthcare — *San Ramon, CA. Aug 2021 - Jul 2022*

Research and development of deep learning solutions in medical imaging.

- Anatomic landmark detection in X-ray images for quantification. — Publication 5, Patent 1
- External object classification in X-ray images. — Patent 2

Research Software Engineer @ Matician Inc — *Palo Alto, CA. Jan 2021 – Jun 2021*

Developing SLAM from scratch in Rust, aiming at 30 times faster than the SOTA ORB-SLAM using only visual input.
Supervisor: Dr. Navneet Dalal (first author of Histogram of Oriented Gradients, a.k.a. HoG).

- Re-localization and Loop Closure. Location detection, loop detection, geometric and temporal check, etc.
- Development of various modules for SLAM. Visual correspondences, pose-graph optimization, etc.

Research Assistant (Funded by Grant) @ Columbia University Medical Center — *New York, NY. Dec 2019 – Nov 2020*

Return offer after working in the lab during my masters. Led or participated in projects while mentoring master student research.
Authored 10+ publications in conferences or journals.

- Synthesize Contrast Enhancement from Common but Harmful Contrast Agents in MRI. — Publication 6, 8, 12
- Open-Access Software (in MATLAB) for SOTA Magnetic Resonance Spectroscopy Processing. — Publication 9, 10, 11
- Dense Cell Segmentation. — Publication 7

Achievements and Services

2022 **Outstanding Reviewer Award,** International Conference on Machine Learning (ICML) — *top 10%*

- **Reviewing Committe Member,** NeurIPS 2021-2023, ICLR 2022-2023, ICML 2022
- **Journal Reviewer,** IEEE Trans. NNLS 2021-2023

Selected Publications and Patents

1. Co-inventor. "System and Method for Obtaining Accurate Measurements and Quantification of X-Ray Image from Estimation of Key Anatomical Locations". **US Patent App.** [Patent]
2. Co-inventor. "X-Ray Lead Marker Detection System for X-Ray Imaging System". **US Patent App.** [Patent]
3. Danqi Liao*, Chen Liu*, Alexander Tong, Guillaume Huguet, Guy Wolf, Maximilian Nickel, Ian Adelstein, Smita Krishnaswamy. "Assessing Neural Network Representations During Training Using Data Diffusion Spectra". **ICML 2023 Workshop**. [PDF] [Git]
4. Chen Liu*, Matthew Amodio*, Liangbo L. Shen, Feng Gao, Arman Avesta, Sanjay Aneja, Jay Wang, Lucian V Del Priore, Smita Krishnaswamy. "CUTS: A Fully Unsupervised Framework for Medical Image Segmentation". Preprint. [PDF] [Git]
5. Chen Liu, et al. "Adversarial focal loss: Asking your discriminator for hard examples". Preprint. [PDF]
6. Chen Liu*, et al. "Deep learning of MRI contrast enhancement for mapping cerebral blood volume from single-modal non-contrast scans of aging and Alzheimer's disease brains". Frontiers on Aging Neuroscience (Impact Factor: 5.7). [PDF] [Git]
7. Nanyan Zhu*, Chen Liu*, Britney T Forsyth, Zakary S Singer, Tal Danino, Andrew F Laine, Jia Guo. "Segmentation with Residual Attention U-Net and an Edge-Enhancement Approach Preserves Cell Shape Features". IEEE EMBC 2022. [PDF] [Git]
8. Nanyan Zhu*, Chen Liu*, Xinyang Feng, Dipika Sikka, Sabrina Gjerswold-Selleck, Scott A Small, Jia Guo. "Deep Learning Identifies Neuroimaging Signatures of Alzheimer's Disease Using Structural and Synthesized Functional MRI Data". IEEE ISBI 2021. [PDF]
9. Chen Liu, et al. "JET – A MATLAB Toolkit for Automated J-Difference-Edited MR Spectra Processing of in vivo Mouse MEGA-PRESS Study at 9.4 T". ISMRM 2021. [PDF] [Git]
10. Co-author. "In vivo γ-aminobutyric acid increase as a biomarker of the epileptogenic zone: An unbiased metabolomics approach". Epilepsia (Impact Factor: 6.7). [PDF] [Journal Commentary]
11. Co-author. "Reduced hippocampal GABA+ is associated with poorer episodic memory in healthy older women: a pilot study". Frontiers in Behavioral Neuroscience (Impact Factor: 3.6). [PDF]
12. Co-author. "Substituting gadolinium in brain MRI using DeepContrast". IEEE ISBI 2020. Best paper finalist. [PDF]