

CONTACT
INFORMATION

Email: chen.liu.cl2482@yale.edu
GitHub: [ChenLiu-1996](#)

Website: ChenLiu-1996.github.io
Google Scholar: [3rDjnykAAAAJ](#)

APPOINTMENTS

GE Healthcare, San Ramon, CA, USA Aug 2021 ~ Jul 2022
Senior Research Scientist

Matic, Palo Alto, CA, USA Jan 2021 ~ Jun 2021
Research Software Engineer

Columbia University Medical Center, New York, NY, USA Dec 2019 ~ Nov 2020
Research Assistant, Fully funded by NIH grants

EDUCATION

Yale University, New Haven, CT, USA Aug 2022 ~ May 2027 (Expected)
Ph.D. in Computer Science
Advisor: [Smita Krishnaswamy](#)

Columbia University, New York, NY, USA Aug 2018 ~ Feb 2020
M.S. in Electrical Engineering
Honors: Nikola Tesla Electrical Engineering Scholar
“to the most exceptional applicants”, top 10% among those admitted

Bucknell University, Lewisburg, PA, USA Aug 2014 ~ May 2018
B.S. in Electrical Engineering

AWARDS

Neural Information Processing Systems 2024 **Top Reviewer** **top 9%**
International Conference on Machine Learning 2022 **Outstanding Reviewer** **top 10%**

SERVICE

Peer Reviewing and Program Committee Member

Neural Information Processing Systems (NeurIPS) 2021 ~ 2025
International Conference on Machine Learning (ICML) 2022, 2024 ~ 2025
International Conference on Learning Representations (ICLR) 2022 ~ 2025
International Conference on Acoustics, Speech, and Signal Processing (ICASSP) 2025
Medical Image Computing and Computer-Aided Intervention (MICCAI) 2024 ~ 2025
IEEE Transactions on Neural Networks and Learning Systems (TNNLS) 2021 ~ 2025

PERSONAL
PROJECTS

1. [\[PDF\]](#) [\[GitHub \(>512 stars\)\]](#)
“**CitationMap**: A Python Tool to Identify and Visualize Your Google Scholar Citations Around the World”.
[Chen Liu](#).

PUBLICATIONS

* denotes equal authorship (co-first, etc).

Sub-topics: ♠ Manifold learning. ♥ Spatial-temporal. ♣ Multimodal. ◇ Weak supervision.

FEATURED

3. ♠ ♥ [arXiv] [PDF] [ICASSP] [GitHub]

I designed a position-parameterized neural ODE that flows the multiscale latent representations, so that we can predict a future image given an earlier image and the change in time. For example: “Predict how this patient’s eye will look like if we leave the disease untreated for 2 years.”

“**ImageFlowNet**: Forecasting Multiscale Image-Level Trajectories of Disease Progression with Irregularly-Sampled Longitudinal Medical Images.”

Chen Liu*, Ke Xu*, Liangbo L Shen, Guillaume Huguet, Zilong Wang, Alexander Tong, Danilo Bzdok, Jay Stewart, Jay C Wang, Lucian V Del Priore, Smita Krishnaswamy.

International Conference on Acoustics, Speech, and Signal Processing (**ICASSP 2025**). **Oral Presentation**

2. ♣ ♠ [bioRxiv] [PDF]

ImmunoStruct predicts immunogenicity of protein MHC complexes by fusing information from multiple biological modalities: sequence, structure and biochemical properties. I designed a novel cancer-wildtype contrastive learning objective to establish a new state of the art in the field, by encouraging immunogenicity-aware pairwise similarity and suppressing feature space collapse.

“**ImmunoStruct**: a multimodal neural network framework for immunogenicity prediction from peptide-MHC sequence, structure, and biochemical properties.”

Kevin Bijan Givechian, João Felipe Rocha*, Edward Yang*, Chen Liu*, Kerrie Greene, Rex Ying, Etienne Caron, Akiko Iwasaki, Smita Krishnaswamy.

bioRxiv Preprint (2024). Under review at Nature Machine Intelligence.

1. ♠ ◇ [arXiv] [PDF] [MICCAI] [Poster] [GitHub]

I introduced CUTS, a multiscale unsupervised segmentation framework. It first uses intra-image contrastive learning and local patch reconstruction to organize a meaningful pixel-level embedding space, and then produces multiscale assignments with diffusion condensation. On datasets with few training samples, CUTS performs on par or better than Segment Anything methods.

“**CUTS**: A Deep Learning and Topological Framework for Multigranular Unsupervised Medical Image Segmentation”.

Chen Liu*, Matthew Amodio*, Liangbo L Shen, Feng Gao, Arman Avesta, Sanjay Aneja, Jay C Wang, Lucian V Del Priore, Smita Krishnaswamy.

International Conference on Medical Image Computing and Computer Assisted Intervention (**MICCAI 2024**).

CONFERENCES

9. ♠ ♥ [arXiv] [PDF] [ICASSP] [GitHub]

“**ImageFlowNet**: Forecasting Multiscale Image-Level Trajectories of Disease Progression with Irregularly-Sampled Longitudinal Medical Images.”

Chen Liu*, Ke Xu*, Liangbo L Shen, Guillaume Huguet, Zilong Wang, Alexander Tong, Danilo Bzdok, Jay Stewart, Jay C Wang, Lucian V Del Priore, Smita Krishnaswamy.

International Conference on Acoustics, Speech, and Signal Processing (**ICASSP 2025**). **Oral Presentation**

8. ♠ ◇ [arXiv] [PDF] [ICASSP] [GitHub]

“**DiffKillR**: Killing and Recreating Diffeomorphisms for Cell Annotation in Dense Microscopy Images.”

Chen Liu*, Danqi Liao*, Alejandro Parada-Mayorga*, Alejandro Ribeiro, Marcello DiStasio, Smita Krishnaswamy.

International Conference on Acoustics, Speech, and Signal Processing (**ICASSP 2025**). **Oral Presentation**

7. [◇ \[arXiv\]](#) [\[PDF\]](#) [\[ICASSP\]](#) [\[GitHub\]](#)
 “Hyperedge Representations with Hypergraph Wavelets: Applications to Spatial Transcriptomics”.
 Xingzhi Sun, Charles Xu, João F. Rocha, [Chen Liu](#), Benjamin Hollander-Bodie, Laney Goldman, Marcello DiStasio, Michael Perlmutter, Smita Krishnaswamy.
International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2025).
6. [♠ \[arXiv\]](#) [\[PDF\]](#)
 “Geometry-Aware Generative Autoencoders (**GAGA**) for Warped Riemannian Metric Learning and Generative Modeling on Data Manifolds.”
 Xingzhi Sun*, Danqi Liao*, Kincaid MacDonald*, Yanlei Zhang, [Chen Liu](#), Guillaume Huguet, Guy Wolf, Ian Adelstein, Tim GJ Rudner, Smita Krishnaswamy.
Artificial Intelligence and Statistics (AISTATS 2025).
5. [♠ ◇ \[arXiv\]](#) [\[PDF\]](#) [\[MICCAI\]](#) [\[Poster\]](#) [\[GitHub\]](#)
 “**CUTS**: A Deep Learning and Topological Framework for Multigranular Unsupervised Medical Image Segmentation”.
[Chen Liu*](#), Matthew Amodio*, Liangbo L Shen, Feng Gao, Arman Avesta, Sanjay Aneja, Jay C Wang, Lucian V Del Priore, Smita Krishnaswamy.
International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI 2024).
4. [♠ ◇ \[arXiv\]](#) [\[PDF\]](#) [\[IEEE\]](#) [\[GitHub\]](#)
 “Assessing Neural Network Representations During Training Using Noise-resilient **Diffusion Spectral Entropy**”.
 Danqi Liao*, [Chen Liu*](#), Benjamin W Christensen, Alexander Tong, Guillaume Huguet, Guy Wolf, Maximilian Nickel, Ian Adelstein, Smita Krishnaswamy.
IEEE 58th Annual Conference on Information Sciences and Systems (CISS 2024).
3. [\[arXiv\]](#) [\[PDF\]](#) [\[IEEE\]](#) [\[GitHub\]](#)
 “Segmentation with Residual Attention U-Net and an Edge-Enhancement Approach Preserves Cell Shape Features”.
 Nanyan Zhu*, [Chen Liu*](#), Britney Forsyth, Zakary S. Singer, Tal Danino, Andrew F. Laine, Jia Guo.
Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC 2022).
2. [♣ \[arXiv\]](#) [\[PDF\]](#) [\[IEEE\]](#)
 “Deep Learning Identifies Neuroimaging Signatures Of Alzheimer’s Disease Using Structural And Synthesized Functional MRI Data”.
 Nanyan Zhu*, [Chen Liu*](#), Xinyang Feng, Dipika Sikka, Sabrina Gjerswold-Selleck, Scott A. Small, Jia Guo.
IEEE International Symposium on Biomedical Imaging (ISBI 2021).
1. [\[arXiv\]](#) [\[PDF\]](#) [\[IEEE\]](#)
 “Substituting Gadolinium in Brain MRI Using DeepContrast”.
 Haoran Sun, Xueqing Liu, Xinyang Feng, [Chen Liu](#), Nanyan Zhu, Sabrina J Gjerswold-Selleck, Hong-Jian Wei, Pavan S Upadhyayula, Angeliki Mela, Cheng-Chia Wu, Peter D Canoll, Andrew F Laine, J Thomas Vaughan, Scott A Small, Jia Guo.
IEEE International Symposium on Biomedical Imaging (ISBI 2020).

JOURNALS

5. ♣ [\[medRxiv\]](#) [\[PDF\]](#) [\[Nature\]](#)
 “Deep Learning Unlocks the True Potential of Organ Donation after Circulatory Death with Accurate Prediction of Time-to-Death”.
 Xingzhi Sun*, Edward De Brouwer*, [Chen Liu](#) , Smita Krishnaswamy, Ramesh Batra.
Scientific Reports (2025), Impact Factor = 3.8.
4. ♣ [\[PDF\]](#) [\[NIH PubMed\]](#) [\[GitHub\]](#)
 “Deep Learning of MRI Contrast Enhancement for Mapping Cerebral Blood Volume from Single-Modal Non-Contrast Scans of Aging and Alzheimer’s Disease Brains”.
[Chen Liu*](#) , Nanyan Zhu*, Haoran Sun, Junhao Zhang, Xinyang Feng, Sabrina Gjerswold-Selleck, Dipika Sikka, Xuemin Zhu, Xueqing Liu, Tal Nuriel, Hong-Jian Wei, Cheng-Chia Wu, J Thomas Vaughan, Andrew F Laine, Frank A Provenzano, Scott A Small, Jia Guo.
Frontiers in Aging Neuroscience (2022), Impact Factor = 4.8.
3. [\[PDF\]](#) [\[NIH PubMed\]](#)
 “Reduced Hippocampal GABA+ is Associated with Poorer Episodic Memory in Healthy Older Women: A Pilot Study”.
 Joan Jiménez-Balado, Alexandra Ycaza Herrera, Kay Igwe, Lynda Klem, Korhan Buyukturkoglu, Andrei Irimia, [Chen Liu](#) , Jia Guo, Adam M Brickman, Teal S Eich.
Frontiers in Behavioral Neuroscience (2021), Impact Factor = 3.6.
2. [\[PDF\]](#) [\[Commentary\]](#) [\[Wiley\]](#)
 “In Vivo γ -Aminobutyric Acid Increase as a Biomarker of the Epileptogenic Zone: An Unbiased Metabolomics Approach”.
 Sophie Hamelin, Vasile Stupar, Lucile Mazière, Jia Guo, Wafae Labriji, [Chen Liu](#) , Ludiwine Bretagnolle, Sandrine Parrot, Emmanuel L Barbier, Antoine Depaulis, Florence Fauvelle.
Epilepsia (2021), Impact Factor = 6.7.
1. [\[Energies\]](#)
 “Understanding and Modeling Climate Impacts on Photosynthetic Dynamics with FLUXNET Data and Neural Networks”.
 Nanyan Zhu, [Chen Liu](#) , Andrew F Laine, Jia Guo.
Energies (2020), Impact Factor = 3.0.

PREPRINTS

5. “**CourtReasoner**: Can LLM Agents Reason Like Judges?”
 Simeng Han, Yoshiki Takashima, Shannon Zejiang Shen, [Chen Liu](#) , Yixin Liu, Roque K. Thuo, Sonia Knowlton, Ruzica Piskac, Scott J Shapiro, Arman Cohan.
ArXiv Preprint (2025).
4. [\[ArXiv\]](#) [\[PDF\]](#)
 “Creativity or Brute Force? Using **Brainteasers** as a Window into the Problem-Solving Abilities of Large Language Models.”
 Simeng Han, Stephen Xia, Grant Zhang, Howard Dai, [Chen Liu](#) , Lichang Chen, Hoang Huy Nguyen, Hongyuan Mei, Jiayuan Mao, R. Thomas McCoy.
ArXiv Preprint (2025).

3. ♣ ♠ [bioRxiv] [PDF]

“**ImmunoStruct**: a multimodal neural network framework for immunogenicity prediction from peptide-MHC sequence, structure, and biochemical properties.”

Kevin Bijan Givechian, João Felipe Rocha*, Edward Yang*, **Chen Liu***, Kerrie Greene, Rex Ying, Etienne Caron, Akiko Iwasaki, Smita Krishnaswamy.

bioRxiv Preprint (2024). Under review at Nature Machine Intelligence.

2. [arXiv] [PDF]

“Adversarial Focal Loss: Asking Your Discriminator for Hard Examples”.

Chen Liu, Xiaomeng Dong, Michael Potter, Hsi-Ming Chang, Ravi Soni.

arXiv Preprint (2022).

1. [arXiv] [PDF]

“Fourier Transform Approximation as an Auxiliary Task for Image Classification”.

Chen Liu.

arXiv Preprint (2021).

PATENTS

2. [US Patent]

“System and Method for Obtaining Accurate Measurements and Quantification of X-Ray Image from **Estimation of Key Anatomical Locations**.”

Gireesha C Rao, Ravi Soni, Gopal B Avinash, Poonam Dalal, **Chen Liu**, Molin Zhang, Zita Herczeg.

U.S. Patent Application No. 17/975,889.

1. [US Patent]

“**X-Ray Lead Marker Detection System** for X-Ray Imaging System.”

Gireesha C Rao, Ravi Soni, Poonam Dalal, **Chen Liu**, Pati Dibyajyoti, Katelyn Nye.

U.S. Patent Application No. 17/975,878.

TEACHING

Teaching Fellow

Deep Learning Theory and Applications, with **my advisor**

Yale University, Spring 2024

AI Foundation Models, with **Arman Cohan**

Yale University, Fall 2023

Deep Learning on Graph-Structured Data, with **Rex Ying**

Yale University, Fall 2022

INVITED TALKS

ImageFlowNet, Oral Presentation at **NECV 2024**

Yale University, Nov 2024