

Haocheng Dai

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Summary My research interest is centered on developing specialized and trustworthy machine learning tools. My focus extends to, but is not limited to:

- Large Vision Language Models and Retrieval-Augmented Generation [2, 8]
- Trustworthy Machine Learning [2, 3]
- Multimodal Learning and Diffusion Models [1, 2, 5, 8]
- Geometric Deep Learning and Shape Modeling [4, 7, 9, 10]
- Physics-informed Machine Learning [6, 7]

Work Experience **Amazon** *Seattle, USA*
Applied Scientist-LLM, Shopping Convo Foundation *2024 - Present*
Working on the next generation LLM-based conversational shopping assistant Rufus.


Amazon *Seattle, USA*
Applied Scientist Intern
Design diffusion models for text inpainting [5]. *2023*
Design vision language models for visual documents understanding [8]. *2022*


Education **University of Utah** *Salt Lake City, USA*
Ph.D. in Computer Science *2019 - 2024*
Committee: S.C. Joshi (Advisor), M. Bauer, S.Y. Elhabian, P.T. Fletcher, R.M. Kirby


Tongji University *Shanghai, China*
B.Eng. in Computer Science and Technology *2015 - 2019*

Institut de Mathématiques de Toulouse *Toulouse, France*
Exchange Student in Mathematics *2019*


Technion - Israel Institute of Technology *Haifa, Israel*
Exchange Student in Electrical Engineering *2018*


Publications & Preprints 1. Therapy-Agnostic Prognostication of Prostate Cancer via MR Imaging and Clinical Data Integration. H. Dai, G. Nelson, G. Morrell, J. Tward, S. Joshi, *In Submission to IEEE International Symposium on Biomedical Imaging (ISBI) 2025*, .


2. Refining Skewed Perceptions in Vision-Language Models through Visual Representations. H. Dai, S. Joshi, *In Submission to Conference on Computer Vision and Pattern Recognition (CVPR) 2025*, .


3. The Silent Majority: Demystifying Memorization Effect in the Presence of Spurious Correlations, C. You*, H. Dai*, Y. Min*, J. Sekho, S. Joshi, J. Duncan (*equal contribution), *In Submission to Nature Communications*, .


4. High-Fidelity CT on Rails-Based Characterization of Delivered Dose Variation in Conformal Head and Neck Treatments, H. Dai, V. Sarkar, C. Dial, M. Foote, Y. Hitchcock, S.


Joshi, B. J. Salter, *Applied Radiation Oncology (ARO)* 2023, .


5. Detect AI-generated Images Uploaded for Risk Evidence Collection in Customer Self-Service Workflow, H. Dai, S. Chen, B. Xiao, Y. Chen, *Amazon Machine Learning Conference (AMLC)* 2023, .

6. Neural Operator Learning for Ultrasound Tomography Inversion, H. Dai*, M. Penwarden*, R. M. Kirby, S. Joshi (*equal contribution), *International Conference on Medical Imaging with Deep Learning (MIDL)* 2023, .

7. Modeling the Shape of the Brain Connectome via Deep Neural Networks, H. Dai, M. Bauer, P. T. Fletcher, S. Joshi, *International Conference on Information Processing in Medical Imaging (IPMI)* 2023, Oral Presentation, .

8. Understanding Visual Documents from Customer Self-Service Workflow using Multi-modal Transformer, H. Dai, J. Chou, S. Chen, B. Xiao, Y. Chen, *Amazon Machine Learning Conference (AMLC)* 2022, .

9. Integrated Construction of Multimodal Atlases with Structural Connectomes in the Space of Riemannian Metrics, K. M. Campbell, H. Dai, Z. Su, M. Bauer, P. T. Fletcher, S. Joshi, *Journal of Machine Learning for Biomedical Imaging (MELBA)* 2022, .

10. Structural Connectome Atlas Construction in the Space of Riemannian Metrics, K. M. Campbell, H. Dai, Z. Su, M. Bauer, P. T. Fletcher, S. Joshi, *International Conference on Information Processing in Medical Imaging (IPMI)* 2021, François Erbsmann Prize (**Best Paper Award**), .

Services

Reviewer

- Conferences: *ACM MM*, *AISTATS*, *CVPR*, *ICLR*, *ICML*, *MICCAI*, *MIDL*, *NeurIPS*
- Journals: *ACM TIST*, *IEEE TNNIS*, *Medical Image Analysis*, *MELBA*, *Scientific Reports*
- Workshops: *AI for Differential Equations in Science@ICLR*, *WiCV@ECCV*

Honors & Awards

François Erbsmann Prize (Best Paper Award), *IPMI* 2021
Department Fellowship, *School of Computing, University of Utah*
Scholarship for France Excellence Summer School, *French Embassy in China*
Scholarship for Summer School of Technion, *CHE of Israel & Technion*
Chinese Government Scholarship, *Chinese Scholarship Council*
Tongji Scholarship of Excellence (2016, 2017, 2018), *Tongji University*

Technical Skills

Python, MatLab, C++, PyTorch