

Haocheng Dai

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INFORMATION <https://users.cs.utah.edu/~haocheng/>

SUMMARY My research interest is centered on developing specialized and trustworthy machine learning tools tailored for healthcare settings. My focus extends to, but is not limited to:


- Trustworthy Machine Learning
- Geometric Deep Learning and Shape Modeling
- Multimodal Learning, Vision Language Models, and Diffusion Models
- Physics-Informed Machine Learning


EDUCATION **University of Utah** *Salt Lake City, UT*
Ph.D. Student in Computer Science *2024*
Committee: *SC Joshi (Chair), M Bauer, S Elhabian, PT Fletcher, RM Kirby*


Tongji University *Shanghai, China*
B.Eng in Computer Science *2019*


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


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


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

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

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

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

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. C. Joshi, *Journal of Machine Learning for Biomedical Imaging (MELBA)* 2022, .

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

INDUSTRY EXPERIENCE	Amazon, Inc	<i>Seattle, WA</i>
	<i>Applied Scientist Intern</i>	<i>2023</i>
	<ul style="list-style-type: none"> – Mitigated the diffusion model’s deterioration in tiny text generation, irrespective of resolution, by implementing a multi-stage generation approach and utilizing templates; – Utilized the diffusion model for manipulating text information in visual documents, facilitating efficient data generation for fraud image detection; – Implemented a “legal-edit invariant, illegal-edit variant” fine-tuning strategy to bolster the detection model’s resilience against common customer edits; – Found that GradCAM heatmap masking can fool the detection model substantially, underscoring the significance of this technique in fraud media prevention. 	
	Amazon, Inc	<i>Seattle, WA</i>
	<i>Applied Scientist Intern</i>	<i>2022</i>
	<ul style="list-style-type: none"> – Designed a multimodal transformer model to understand visual documents in various formats; – Our model manifested strong generalization capability beyond human supervision — outperforming the AWS Textract query; – Developed a partially masked visual document understanding framework by incorporating a semantic segmentation module along with the transformer model, standing at a recall rate of 0.85. 	
SERVICES	Reviewer	
	<ul style="list-style-type: none"> – Conferences: <i>ACM MM, CVPR, MICCAI, MIDL</i> – Journals: <i>Medical Image Analysis, MELBA, Scientific Reports</i> – Workshop: <i>ICLR Workshop on AI for Differential Equations in Science</i> 	
TEACHING EXPERIENCE	Teaching Mentor	<i>University of Utah</i>
	<ul style="list-style-type: none"> – CS 4150: <i>Algorithms</i> – CS 3190: <i>Foundations of Data Analysis</i> 	<i>2022</i> <i>2021</i>
	Guest Lecturer	<i>University of Utah</i>
	– CS 4150: <i>Algorithms</i>	<i>2022</i>
HONORS& AWARDS	François Erbsmann Prize (Best Paper Award), <i>IPMI 2021</i> Department Fellowship, <i>School of Computing, University of Utah</i> Chinese Government Scholarship, <i>Chinese Scholarship Council</i> Tongji Scholarship of Excellence (2016, 2017, 2018), <i>Tongji University</i>	
TECHNICAL SKILLS	Python, MatLab, C++, PyTorch, Jax	