

RESEARCH INTERESTS	My research lies at the intersection of machine learning, computer vision, data science and healthcare, with a focus on physically and geometrically precise machine learning models with minimal human supervision. I aim to develop foundation models that can scale and extrapolate to advance AI's capacity for accurate, accessible, and transformative medical imaging and healthcare solutions.		
EDUCATION	University of California, Berkeley	Aug. 2018 - May 2023	
	Ph.D. in Vision Science. Track : Computer Vision. Advisors : Stella X. Yu and Meng C. Lin . Thesis : Structure-Aware Representation Learning and Its Application to Healthcare Certificate in Teaching and Learning in Higher Education.		
	Xi'an Jiaotong University	Aug. 2014 - June 2018	
	Bachelor in Electrical Engineering. Visiting student at UC Berkeley from 2017 to 2018.		
RESEARCH EXPERIENCE	California Institute of Technology	Pasadena, CA	
	<i>Postdoctoral Researcher in Computing and Mathematical Sciences</i>	July 2023 - Present	
	Advisor : Anima Anandkumar Topics : AI for science and healthcare, specifically representation learning for inverse problems and imaging with applications to lung and brain imaging with ultrasound and photoacoustic tomography		
	University of California, Berkeley	Berkeley, CA	
	<i>Graduate Student Researcher</i>	Aug. 2018 - May 2023	
	Topics : Real-world representation learning (learning from imperfect data, 3D visual representations and efficient learning), as well as their applications to healthcare (ML for ocular disease diagnosis)		
HONORS AND AWARDS	Finalist, Perpall Speaking Competition, Caltech	2024	
	Best Paper Award, Machine Learning for Health (ML4H) Symposium	2023	
	Vector Institute Fellowship (offered)	2023	
	Best Paper Award, Hong Kong Science & Technology Park (HKSTP)	2019	
	Best Paper Award, CVPR PBVS workshop	2019	
	Seagate Fellowship	2018	
	Outstanding Graduate Award, Xi'an Jiaotong University	2018	
	Top 10 Undergraduate Award, Xi'an Jiaotong University	2017	
	National Scholarship of China	2015 - 2017	
	Meritorious Winner, the International Mathematical Contest in Modeling (top 8%)	2016	
GRANTS (CO-AUTHORED)	NIH-R01, "AI Enhanced Lung Ultrasound Imaging in Acute and Chronic Disease" (submitted)	2024	
	NSF-2313151, "Lie Group Representation Learning for Vision" (200k)	2023	
	NIH-R21EY033881, "Towards a New Paradigm in Meibomian Gland Evaluation Using AI" (250k)	2022	
	BAIR Commons, "Scene Sketch to Photo Synthesis"	2021	
	Berkeley Deep Drive, "Learning Dynamic Point Set Neighbourhoods for 3D Object Detection"	2020	
PREPRINTS	[P1] Beyond Closure Models: Learning Chaotic-Systems via Physics-Informed Neural Operators C. Wang, J. Berner, Z. Lin, D. Zhou, J. Wang , J. Bae, A. Anandkumar <i>In submission to ICLR 2025.</i>		
	[P2] Ultrasound Lung Aeration Map via Physics-Aware Neural Operators J. Wang , O. Ostras, B. Tolooshams, M. Sode, Z. Li, K. Azizzadenesheli, G.F. Pinton, A. Anandkumar <i>In submission to Nature.</i>		
	[P3] Neural Operators Accelerate 3D Photoacoustic Computed Tomography J. Wang , Y. Aborahama, J. Berner, Z. Li, K. Azizzadenesheli, L.V. Wang*, A. Anandkumar* <i>In submission to Nature Communications.</i>		
	[P4] Open-Vocabulary Monocular 3D Object Detection J. Yao, H. Gu, X. Chen, J. Wang , Z. Cheng <i>In submission to CVPR 2025.</i>		
	[P5] Neural Operators for Accelerated Functional Ultrasound Imaging B. Tolooshams, J. Wang , L. Lin, T. Callier, K. Azizzadenesheli, R.A. Andersen, A. Anandkumar <i>In submission to Nature Methods.</i>		

- [J1] [Artificial Intelligence Models Utilize Lifestyle Factors to Predict Dry Eye Related Outcomes](#)
A.D. Graham, **J. Wang**, T. Kothpalli, J. Ding, H. Tasho, A. Molina, V. Tse, S.M. Chang, S.X. Yu, M.C. Lin
Nature Scientific Reports, 2024
- [J2] [A Machine Learning Approach to Predicting Dry Eye-Related Signs, Symptoms and Diagnoses](#)
A.D. Graham, T. Kothpalli, **J. Wang**, J. Ding, V. Tse, P. Asbell, S.X. Yu, M.C. Lin
Heliyon, 2024
- [J3] [Open Long-Tailed Recognition in a Dynamic World](#)
Z. Liu, Z. Miao, X. Zhan, **J. Wang**, B. Gong, S.X. Yu
IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2022
- [J4] [Predicting Demographics from Meibography Using Deep Learning](#)
J. Wang, A.D. Graham, S.X. Yu, M.C. Lin
Nature Scientific Reports, 2022
- [J5] [Spatial Transformer for 3D Point Clouds](#)
J. Wang, R. Chakraborty, S.X. Yu
IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2021
- [J6] [Quantifying Meibomian Gland Morphology Using Artificial Intelligence](#)
J. Wang, S. Li, T.N. Yeh, R. Chakraborty, A.D. Graham, S.X. Yu, M.C. Lin
Optometry and Vision Science, 2021
- [J7] [A Deep Learning Approach for Meibomian Gland Atrophy Evaluation in Meibography Images](#)
J. Wang, T.N. Yeh, R. Chakraborty, S.X. Yu, M.C. Lin
Translational Vision Science and Technology (TVST), 2019
- [J8] [Insights and Approaches Using Deep Learning to Classify Wildlife](#)
Z. Miao, K.M. Gaynor, **J. Wang**, Z. Liu et al.
Nature Scientific Reports, 2019.
- [J9] [Deep Ranking Model by Large Adaptive Margin Learning for Person Re-identification](#)
J. Wang, S. Zhou, J. Wang, Q. Hou
Pattern Recognition (PR), 2018

- [C1] [Pose-Aware Self-Supervised Learning with Viewpoint Trajectory Regularization](#)
J. Wang, Y. Chen, S.X. Yu
European Conference on Computer Vision (ECCV), **ORAL** (2.3%), 2024
- [C2] [Insight: A Multi-Modal Diagnostic Pipeline using LLMs for Ocular Surface Disease Diagnosis](#)
C.H. Yeh, **J. Wang**, A. D. Graham, A. Liu, B. Tan, Y. Chen, Y. Ma, M.C. Lin
Conference on Medical Image Computing and Computer Assisted Intervention, (MICCAI), 2024
- [C3] [Unifying Subsampling Pattern Variations for Compressed Sensing MRI with Neural Operators](#)
A. Jatyani*, **J. Wang***, Z. Wu, B. Tolooshams, M. Liu-Schiaffini, A. Anandkumar
Conference on Neural Information Processing Systems (NeurIPS) Workshop, 2024
- [C4] [Multi-Modal Self-Supervised Learning for Surgical Feedback Effectiveness Assessment](#)
A. Gupta, R. Kocielnik, **J. Wang**, F. Nasriddinov, C. Yang, E. Wong, A. Anandkumar, A. Hung
Machine Learning for Health. PMLR. SPOTLIGHT, 2024
- [C5] [Recurrent Parameter Generators](#)
J. Wang, Y. Chen, S.X. Yu, B. Cheung, Y. LeCunn
Winter Conference on Applications of Computer Vision (WACV), 2023
- [C6] [Deep Multimodal Fusion for Surgical Feedback Classification](#)
R. Kocielnik, E. Wong, T. Chu, L. Lin, D. Huang, **J. Wang**, A. Anandkumar, A. Hung
Machine Learning for Health. PMLR. BEST PAPER, 2023
- [C7] [3D Shape Reconstruction from Free-Hand Sketches](#)
J. Wang, J. Lin, Q. Yu, R. Liu, Y. Chen, S.X. Yu
European Conference on Computer Vision (ECCV) Workshop, 2022
- [C8] [Unsupervised Scene Sketch to Photo Synthesis](#)
J. Wang, S. Jeon, S.X. Yu, X. Zhang, H. Arora, Y. Lou
European Conference on Computer Vision (ECCV) Workshop, **SPOTLIGHT**, 2022
- [C9] [Tracking the Dynamics of the Tear Film Lipid Layer](#)
T. Kothpalli, C. Shou, J. Ding, **J. Wang**, A.D. Graham, T. Svitova, S.X. Yu, M.C. Lin
Conference on Neural Information Processing Systems (NeurIPS) Workshop, 2022
- [C10] [Orthogonal Convolutional Neural Networks](#)
J. Wang, Y. Chen, R. Chakraborty, S.X. Yu
Conference on Computer Vision and Pattern Recognition (CVPR), 2020

	[C11] Large-scale Long-Tailed Recognition in an Open World Z. Liu, Z. Miao, X. Zhan, J. Wang , B. Gong, S.X. Yu <i>Conference on Computer Vision and Pattern Recognition (CVPR)</i> , ORAL (5%), 2019
	[C12] Sur-Real: Frechet Mean and Distance Transform for Complex-Valued Deep Learning R. Chakraborty, J. Wang , S.X. Yu <i>Conference on Computer Vision and Pattern Recognition (CVPR) Workshop</i> , BEST PAPER , 2019
	[C13] Point to Set Similarity Based Deep Feature Learning for Person Re-identification S. Zhou, J. Wang, J. Wang , Y. Gong, N. Zheng <i>Conference on Computer Vision and Pattern Recognition (CVPR)</i> , 2017
PATENT	[1] Image Generation Based on a Multi-Image Set and Pose Data A. Kheradmand, J. Wang , H. Arora File number : P80654-US01 ; Date : March 20, 2023.
TEACHING	Guest Lecturer, Caltech <i>Machine Learning and Statistical Inference (CS165)</i> Winter 2024 Taught materials covering Bayesian and Neyman-Pearson detection, UMVU estimator and Cramér-Rao lower bound. Mentored student projects on diffusion models for inverse problems.
	Graduate Student Instructor, UC Berkeley <i>Deep Neural Networks (CS182/282)</i> Spring 2023 Designed course materials illustrating both fundamentals of deep neural networks (e.g. regularization, weights and gradients of CNNs at different layers) as well as advanced applications (e.g. to deep learning systems and biomedicine). Held weekly office hours. 400 students are enrolled.
	<i>Machine Learning (CS189/289)</i> Fall 2020 Gave a guest lecture, designed real-world problem-focused homework and exams on EM algorithm, long-tailed distribution, research topics like medical imaging, etc., led discussion sessions, held weekly office hours and helped facilitate course projects. 400 students are enrolled in the class.
	<i>Visual Perception (VS205)</i> Fall 2018 & Fall 2019 Led discussions and lab sessions to help around 70 students understand basic psychophysical and statistical methods in visual perception.
INVITED TALKS	Towards Real-World Representation Learning and Its Applications to Healthcare <ul style="list-style-type: none"> Seminar at Stony Brook University May 2023 Seminar at Northwestern University April 2023 Seminar at Berkeley AI Research Lab April 2023 Seminar at Vector Institute April 2023 Seminar at California Institute of Technology Mar 2023 Seminar at Duke University Jan 2023 Seminar at Apple (Camera Incubation Team) Jan 2023 Seminar at NVIDIA (Self-Driving Team) Jan 2023
	Generate Photos and 3D Models from Sketches <ul style="list-style-type: none"> Bosch-ICSI Research Seminar Aug. 2022 Seminar at Amazon (FitScience Team) June 2022
	Redundancy and Compression in Deep Neural Networks <ul style="list-style-type: none"> Berkeley Oxyopia Seminar Nov. 2021 Berkeley MRI Seminar Sep. 2021
MENTORSHIP	Jin Yao, PhD at UVA. Active. (co-advised with Z. Cheng) Arushi Gupta, undergrad at Caltech. Active. (co-advised with A. Anandkumar) Armeet Jatyani, undergrad at Caltech. Active. (co-advised with A. Anandkumar) Aditi Chandrashekar, undergrad at Caltech. Active. (co-advised with B. Tolooshams and A. Anandkumar) Tejasvi Kothpalli, undergrad at UC Berkeley. Next : PhD at UC Berkeley. (co-advised with S. Yu) Martin Zhai, undergrad at UC Berkeley. Next : Master at Cornell University. (co-advised with S. Yu) Jasmine Li, undergrad at University of Washington. Next : Master at University of Washington. Shixuan Li, undergrad at UC Berkeley. Next : Master at Brown University. (co-advised with S. Yu)

SERVICE AND LEADERSHIP	Session Chair , Caltech Student-Faculty Program Summer Seminar Day	2024
	Member , Caltech AI Graduate Admissions Committee	2023 - Present
	Member , American Association for the Advancement of Science	2023 - Present
	Mentor , Berkeley AI Research Mentoring Program	2022 - 2023
	<i>Mentored underrepresented undergraduates and helped them get started in pursuing a career in AI.</i>	
	Member , Berkeley Diversity, Equity, Inclusion, and Belonging (DEIB) Committee	2022 - 2023
	<i>Helped organize the DEI book club and DEI movie nights for an informal environment where students can freely discuss their thoughts and views on DEI.</i>	
	Volunteer Teacher , Bay Area Scientists in Schools	2019 - 2022
	<i>Taught science lessons on AI and computers to students in public elementary schools.</i>	
	Vice President , Chinese Graduate and Postdoctoral Scholars Association at UC Berkeley	2019 - 2021
INDUSTRIAL EXPERIENCE	Program Committee Chair , Bay Area Vision Research Day (BAVRD)	2019
	<i>Fundraising, planning the conference schedule and overseeing the review of lighting talks and posters</i>	
	Conference & Journal Reviewer : CVPR, ICCV, ECCV, SIGGRAPH, NeurIPS, ICLR, ICML, AAAI, AISTATS, MICCAI, WACV, BMVC, ACCV, CPAL, IEEE-TPAMI, IEEE-TIP, IEEE-TCSVT, IEEE-JBHI, IEEE-JSTARS, IEEE-Access, ACM Comp Surv., ACM TOMM, IJMLC, PLOS One, OVS, TVST, Heliyon, Current Medical Imaging, Scientific Reports, Contact Lens and Anterior Eye, Quantitative Imaging in Medicine and Surgery	
	Editor : Frontiers in Computer Science, Journal of Imaging	
	Program Committee Member , AAAI	2021, 2024
	Aizip	Cupertino, CA
	<i>Founding Member, Research Scientist (part-time)</i>	Oct 2020 - Aug. 2023
	<ul style="list-style-type: none"> • Led core projects towards robust, efficient and scalable real-world AI-IoT solutions • Worked on full-stack machine learning and delivered robust models and products to customers • Built the tiniest human detection system with robust performance under different lighting conditions 	
	Amazon	Sunnyvale, CA
	<i>Applied Scientist Intern</i>	May 2022 - Nov. 2022
REFERENCES	<ul style="list-style-type: none"> • Mentors : Dr. Himanshu Arora and Dr. Amin Kheradmand • Developed multi-view human reposing and virtual try-on system that beats state-of-the-art methods • The work became a patent and was integrated into the Amazon Virtual Try-On product 	
	Aibee	Palo Alto, CA
	<i>Research Intern</i>	May 2020 - Aug. 2020
	<ul style="list-style-type: none"> • Mentors : Dr. Song Cao and Prof. Silvio Savarese • Developed novel algorithms for fine-grained long-tailed vehicle recognition and improved minority class accuracy by 20% 	
	Sensetime	Shenzhen, China
	<i>Research Intern</i>	Feb. 2018 - Aug. 2018
	<ul style="list-style-type: none"> • Developed an RGBD-camera-based 3D portrait animation product, which was featured in Vivo's 2018 latest smartphone model • Developed efficient classification algorithms for long-tailed fine-grained data and ranked 6th in CVPR 2018 Fine-grained Visual Categorization Competition • Proposed novel deep networks for efficient point cloud detection and improved 4% performance 	
	[1] Anima Anandkumar, anima@caltech.edu	
	Bren Professor of Computing and Mathematical Sciences California Institute of Technology	
	[2] Stella X. Yu, stellayu@umich.edu	
	Professor of Electrical Engineering and Computer Sciences University of Michigan Adjunct Professor of Electrical Engineering and Computer Sciences University of California, Berkeley	
	[3] Lihong V. Wang, lihong@caltech.edu	
	Bren Professor of Medical Engineering and Electrical Engineering California Institute of Technology	

- [4] Gianmarco Pinton, gia@email.unc.edu
Associate Professor of Biomedical Engineering
University of North Carolina at Chapel Hill
- [5] Meng C. Lin, mclin@berkeley.edu
Professor of Optometry and Vision Science
University of California, Berkeley
- [6] Yubei Chen, ybchen@ucdavis.edu
Assistant Professor of Electrical and Computer Engineering
University of California, Davis