

Xiuming Zhang

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WORK EXPERIENCE

- Senior Machine Learning Scientist, Autopilot, **Tesla**, Palo Alto, CA Oct. 2022 ~ Now
- Working on 3D computer vision, neural rendering, and NeRF.
- Research Scientist, Nextcam, **Adobe**, San Jose, CA Oct. 2021 ~ Oct. 2022
- Worked on computational photography [C10].
- Research Intern & Student Researcher, Gcam, **Google**, Cambridge, MA May 2020 ~ Feb. 2021
Mentor: Jonathan T. Barron
- Researched relightable NeRF [C8, J7].
- Research Intern & Student Researcher, Gcam, **Google**, Mountain View, CA May 2019 ~ May 2020
Mentors: Yun-Ta Tsai & Jonathan T. Barron
- Researched neural rendering using light stage data [J4, J5, J6].
- Research Engineer, **Institute for Infocomm Research**, Singapore Aug. 2015 ~ Jul. 2016
- Worked on evolutionary algorithms in computer vision.

EDUCATION

- Ph.D. (CS), **Massachusetts Institute of Technology**, Cambridge, MA Sep. 2016 ~ Aug. 2021
Advisor: William T. Freeman
- Dissertation: Shape, Reflectance, and Illumination From Appearance [C1, C2, C4, J5, J6, C8, J7] [thesis]
- Committee: William T. Freeman, Jonathan T. Barron, Antonio Torralba
 - Also worked on program induction from images [C5, C6, C7], portrait shadow manipulation [J4], and editable NeRF [C9].
- S.M. (CS), **Massachusetts Institute of Technology**, Cambridge, MA Sep. 2016 ~ Jun. 2018
Advisor: William T. Freeman
- Dissertation: Motion Sculptures: Automating Artistic Visualization of Shape and Time [C3] [thesis]
- B.Eng. (EE), **National University of Singapore**, Singapore Aug. 2011 ~ May 2015
Advisor: B. T. Thomas Yeo
- Dissertation: Bayesian Models of Brain Disorder Heterogeneity [J1, J2, J3]
 - GPA: 4.97/5.00 (ranked 1st out of 282 and awarded Lee Kuan Yew Gold Medal)
 - Exchange at University of Waterloo, Canada in Spring 2014

PRESS COVERAGE

- Forbes These Researchers Turned 2D Videos Into 3D Motion Sculptures
BBC Creating 3D sculptures from 2D video
Yahoo! Wormlike motion sculptures show how athletes move in 3D

Popular Mechanics	What the heck is a motion sculpture?
MIT News	Creating 3-D-printed “motion sculptures” from 2-D videos
UPI	Brain atrophy patterns may explain diversity in Alzheimer’s symptoms
MGH/HMS	Different brain atrophy patterns may explain variability in Alzheimer’s disease symptoms

PUBLICATIONS

* indicates equal contribution, J journal articles, and C conference proceedings. See also [Google Scholar](#).

- C10 Portrait Reconstruction and Relighting Using the Sun as a Light Stage
Yifan Wang, Aleksander Holynski, [Xiuming Zhang](#), Xuaner (Cecilia) Zhang
arXiv 2022
[\[project\]](#) [\[paper\]](#) [\[video\]](#)
- J7 NeRFactor: Neural Factorization of Shape and Reflectance Under an Unknown Illumination
[Xiuming Zhang](#), Pratul P. Srinivasan, Boyang Deng, Paul Debevec, William T. Freeman, Jonathan T. Barron
ACM Transactions on Graphics (**TOG**) 2021 (Proc. SIGGRAPH Asia)
[\[project\]](#) [\[paper\]](#) [\[video\]](#) [\[code\]](#)
- C9 Editing Conditional Radiance Fields
Steven Liu, [Xiuming Zhang](#), Zhoutong Zhang, Richard Zhang, Jun-Yan Zhu, Bryan Russell
IEEE/CVF International Conference on Computer Vision (**ICCV**) 2021
[\[project\]](#) [\[paper\]](#) [\[video\]](#) [\[code\]](#)
- C8 NeRV: Neural Reflectance and Visibility Fields for Relighting and View Synthesis
Pratul P. Srinivasan, Boyang Deng, [Xiuming Zhang](#), Matthew Tancik, Ben Mildenhall, Jonathan T. Barron
IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**) 2021
[\[project\]](#) [\[paper\]](#) [\[video\]](#)
- J6 Neural Light Transport for Relighting and View Synthesis
[Xiuming Zhang](#), Sean Fanello, Yun-Ta Tsai, Tiancheng Sun, Tianfan Xue, Rohit Pandey, Sergio Orts-Escolano, Philip Davidson, Christoph Rhemann, Paul Debevec, Jonathan T. Barron, Ravi Ramamoorthi, William T. Freeman
ACM Transactions on Graphics (**TOG**) 2021 (Presented at SIGGRAPH)
[\[project\]](#) [\[paper\]](#) [\[video\]](#) [\[code\]](#)
- C7 Multi-Plane Program Induction With 3D Box Priors
Yikai Li, Jiayuan Mao, [Xiuming Zhang](#), William T. Freeman, Joshua B. Tenenbaum, Noah Snavely, Jiajun Wu
Conference on Neural Information Processing Systems (**NeurIPS**) 2020
[\[project\]](#) [\[paper\]](#) [\[video\]](#)
- J5 Light Stage Super-Resolution: Continuous High-Frequency Relighting
Tiancheng Sun, Zexiang Xu, [Xiuming Zhang](#), Sean Fanello, Yun-Ta Tsai, Jonathan T. Barron, Ravi Ramamoorthi
ACM Transactions on Graphics (**TOG**) 2020 (Proc. SIGGRAPH Asia)
[\[project\]](#) [\[paper\]](#) [\[video\]](#)
- J4 Portrait Shadow Manipulation
Xuaner (Cecilia) Zhang, Jonathan T. Barron, Yun-Ta Tsai, Rohit Pandey, [Xiuming Zhang](#), Ren Ng, David E. Jacobs
ACM Transactions on Graphics (**TOG**) 2020 (Proc. SIGGRAPH)
[\[project\]](#) [\[paper\]](#) [\[video\]](#) [\[code\]](#)

- C6 Perspective Plane Program Induction From a Single Image
Yikai Li, Jiayuan Mao, Xiuming Zhang, William T. Freeman, Joshua B. Tenenbaum, Jiajun Wu
IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**) 2020
[\[project\]](#) [\[paper\]](#) [\[code\]](#)
- J3 Latent Atrophy Factors Related to Phenotypical Variants of Posterior Cortical Atrophy
Colin Groot, B. T. Thomas Yeo, Jacob W. Vogel, Xiuming Zhang, Nanbo Sun, Elizabeth C. Mormino, Yolande A. L. Pijnenburg, Bruce L. Miller, Howard J. Rosen, Renaud La Joie, Frederik Barkhof, Philip Scheltens, Wiesje M. van der Flier, Gil D. Rabinovici, Rik Ossenkoppele
Neurology 2020
[\[paper\]](#)
- C5 Program-Guided Image Manipulators
Jiayuan Mao*, Xiuming Zhang*, Yikai Li, William T. Freeman, Joshua B. Tenenbaum, Jiajun Wu
IEEE/CVF International Conference on Computer Vision (**ICCV**) 2019
[\[project\]](#) [\[paper\]](#)
- J2 Reconciling Dimensional and Categorical Models of Autism Heterogeneity: A Brain Connectomics and Behavioral Study
Siyi Tang*, Nanbo Sun*, Dorothea L. Floris, Xiuming Zhang, Adriana Di Martino, B. T. Thomas Yeo
Biological Psychiatry 2019
[\[paper\]](#)
- C4 Learning to Reconstruct Shapes From Unseen Classes
Xiuming Zhang*, Zhoutong Zhang*, Chengkai Zhang, Joshua B. Tenenbaum, William T. Freeman, Jiajun Wu
Conference on Neural Information Processing Systems (**NeurIPS**) 2018
Oral Presentation (Oral/Accepted/Submitted: 30/1011/4856)
[\[project\]](#) [\[paper\]](#) [\[talk\]](#) [\[code\]](#)
- C3 MoSculp: Interactive Visualization of Shape and Time
Xiuming Zhang, Tali Dekel, Tianfan Xue, Andrew Owens, Qiurui He, Jiajun Wu, Stefanie Mueller, William T. Freeman
ACM Symposium on User Interface Software and Technology (**UIST**) 2018
Press Coverage: [Forbes](#), [BBC](#), [Yahoo!](#), [Popular Mechanics](#), [MIT](#) (9/19 [MIT Homepage](#))
Outreach: [MIT Museum](#)
[\[project\]](#) [\[paper\]](#) [\[video\]](#) [\[talk\]](#) [\[code\]](#)
- C2 Learning Shape Priors for Single-View 3D Completion and Reconstruction
Jiajun Wu*, Chengkai Zhang*, Xiuming Zhang, Zhoutong Zhang, William T. Freeman, Joshua B. Tenenbaum
European Conference on Computer Vision (**ECCV**) 2018
[\[project\]](#) [\[paper\]](#) [\[code\]](#)
- C1 Pix3D: Dataset and Methods for Single-Image 3D Shape Modeling
Xingyuan Sun*, Jiajun Wu*, Xiuming Zhang, Zhoutong Zhang, Chengkai Zhang, Tianfan Xue, Joshua B. Tenenbaum, William T. Freeman
IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**) 2018
[\[project\]](#) [\[paper\]](#) [\[code\]](#)
- J1 Bayesian Model Reveals Latent Atrophy Factors With Dissociable Cognitive Trajectories in Alzheimer's Disease
Xiuming Zhang, Elizabeth C. Mormino, Nanbo Sun, Reisa A. Sperling, Mert R. Sabuncu, B. T. Thomas Yeo
Proceedings of the National Academy of Sciences (**PNAS**) 2016

Magna Cum Laude Award & Oral Presentation at ISMRM 2016
Press Coverage: [UPI](#), [NUS](#), [MGH/HMS](#)
[\[paper\]](#) [\[code\]](#) [\[poster\]](#)

AWARDS

Snap Research Fellowship	2019
A*STAR National Science Scholarship (Ph.D. fellowship; declined)	2016 ~ 2021
ISMRM Magna Cum Laude Award	2016
Lee Kuan Yew Gold Medal (top graduate)	2015
Institution of Engineers Singapore Gold Medal (top graduate in general proficiency)	2015
Texas Instruments Book Prize on DSP & Systems (top in digital signal processing)	2015
The Institution of Engineering & Technology Prize (top freshman and sophomore)	2013
Science & Technology Undergraduate Scholarship	2010 ~ 2015

TOOLKIT

Languages	Python, C++, Bash, \TeX
Libraries	PyTorch, TensorFlow, Halide
Tools	Bazel, pybind11
Modeling & Rendering	Blender (GUI & Scripting), Mitsuba

TEACHING EXPERIENCE

Teaching Assistant, 6.869 Advances in Computer Vision Department of EECS, Massachusetts Institute of Technology , Cambridge, MA	Sep. 2017 ~ Dec. 2017
Instructor, MATLAB Workshop Nanyang Technological University , Singapore	Dec. 2015
Teaching Assistant, CS1010E Programming Methodology School of Computing, National University of Singapore , Singapore	Aug. 2012 ~ Aug. 2013