

Xiuming Zhang

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WORK EXPERIENCE

- Senior Machine Learning Scientist, **Tesla Autopilot**, Palo Alto, CA Oct. 2022 ~ Now
- Working on 3D computer vision, neural rendering, and NeRF.
- Research Scientist, **Adobe Emerging Products Group**, San Jose, CA Oct. 2021 ~ Oct. 2022
- Worked on computational photography [C10].
- Intern & Student Researcher, **Google Research**, Cambridge, MA May 2020 ~ Feb. 2021
Host: Jonathan T. Barron
- Researched relightable NeRF [C8, J7].
- Intern & Student Researcher, **Google Research**, Mountain View, CA May 2019 ~ May 2020
Hosts: 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] [pdf]
- Committee: William T. Freeman, Jonathan T. Barron, Antonio Torralba
 - Also worked on program induction from images [C5, C6, C7] and editable NeRF [C9].
- S.M. (CS), **Massachusetts Institute of Technology**, Cambridge, MA Sep. 2016 ~ Jun. 2018
Advisor: William T. Freeman
- Thesis: Motion Sculptures: Automating Artistic Visualization of Shape and Time [C3] [pdf]
- B.Eng. (EE), **National University of Singapore**, Singapore Aug. 2011 ~ May 2015
Advisor: B. T. Thomas Yeo
- Thesis: Bayesian Models of Brain Disorder Heterogeneity [J1, J2, J3] [pdf]
 - GPA: 4.97/5.00 (ranked 1st out of 282 and awarded Lee Kuan Yew Gold Medal)
 - Exchange at the University of Waterloo, Canada in Spring 2014.

SELECT 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

RECENT PUBLICATIONS

* indicates equal contribution, J journal articles, and C conference proceedings. See also [the 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
ISMRM Magna Cum Laude Award	2016
Lee Kuan Yew Gold Medal	2015
Institution of Engineers Singapore Gold Medal	2015
Texas Instruments Book Prize on DSP & Systems	2015
The Institution of Engineering & Technology Prize	2013

LANGUAGES, TOOLS, & SOFTWARES

Programming Languages	Python, Bash, C++, \TeX
Domain-Specific Languages	PyTorch, TensorFlow, Halide
Tooling	Bazel, pybind11
Modeling & Rendering	MeshLab, Blender (with 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