

# Xiuming Zhang

<https://xiuming.info>  
<https://github.com/xiumingzhang>

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## WORK EXPERIENCE

- Research Scientist, Nextcam, **Adobe**, San Jose, CA Oct. 2021 ~ Now
- Working on a computational photography-powered camera app [C10].
- Research Intern & Student Researcher, Gcam, **Google**, Cambridge, MA May 2020 ~ Feb. 2021  
Mentor: Jonathan T. Barron
- Worked on relightable NeRF [C8, J7].
- Research Intern & Student Researcher, Gcam, **Google**, Mountain View, CA May 2019 ~ May 2020  
Mentors: Yun-Ta Tsai & Jonathan T. Barron
- Worked on neural rendering with 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, $\text{\TeX}$
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, <b>Massachusetts Institute of Technology</b> , Cambridge, MA	Sep. 2017 ~ Dec. 2017
Instructor, MATLAB Workshop <b>Nanyang Technological University</b> , Singapore	Dec. 2015
Teaching Assistant, CS1010E Programming Methodology School of Computing, <b>National University of Singapore</b> , Singapore	Aug. 2012 ~ Aug. 2013