

# RUIQI GAO

ruiqigao.github.io  
299 Fremont Street, San Francisco, CA 94105  
ruiqingao@gmail.com • (310)592-2361

EDUCATION	<b>University of California, Los Angeles</b> Ph.D. in Statistics Advisor: Song-Chun Zhu GPA: 4.00 / 4.00	Sep 2016 – Jun 2021
	<b>Peking University</b> B.S. in School of Mathematics Major in Statistics <ul style="list-style-type: none"><li>Cumulative GPA: 3.78 / 4.00</li><li>Rank: 8 / 178</li></ul>	Sep 2012 – Jul 2016
RESEARCH INTERESTS	Generative modeling, representation learning.	
EXPERIENCE	<b>Senior Research Scientist</b> Google DeepMind	Jul 2021 –present
	<b>Research Assistant</b> Center for Vision, Cognition, Learning and Autonomy, UCLA Advisor: Prof. Song-Chun Zhu	Sep 2016 – Jun 2021
	<b>Research Intern</b> Google Research, Brain team Mentors: Diederik P. Kingma and Ben Poole	Jun 2020 –Sep 2020
	<b>Research Intern</b> Google Research, Brain team Mentors: Zhen Xu and Andrew M. Dai	Jun 2019 –Sep 2019
	<b>Research Assistant</b> Vision Research Group, Peking University Advisor: Prof. Yizhou Wang	Sep 2015 –Jun 2016
	<b>Research Assistant</b> Junction of Statistics and Biology, UCLA Advisor: Prof. Jingyi Jessica Li	Jun 2015 –Sep 2015
PUBLICATIONS	* denotes equal contributions	
	<b>Ruiqi Gao*</b> , Aleksander Holynski*, Philipp Henzler, Arthur Brussee, Ricardo Martin-Brualla, Pratul Srinivasan, Jonathan T. Barron, Ben Poole*. “CAT3D: Create Anything in 3D with Multi-View Diffusion Models”. <i>Conference on Neural Information Processing Systems (NeurIPS)</i> , 2024. [Oral]	
	Sirui Xie, Zhisheng Xiao, Diederik P Kingma, Tingbo Hou, Ying Nian Wu, Kevin Patrick Murphy, Tim Salimans, Ben Poole, <b>Ruiqi Gao</b> . “EM Distillation for One-step Diffusion Models”. <i>Conference on Neural Information Processing Systems (NeurIPS)</i> , 2024.	
	Chin-Yi Cheng, <b>Ruiqi Gao</b> , Forrest Huang, Yang Li. “CoLay: Controllable Layout Generation through Multi-conditional Latent Diffusion”. <i>arXiv</i> , 2024.	
	Armand Comas-Massagué, Di Qiu, Menglei Chai, Marcel Bühler, Amit Raj, <b>Ruiqi Gao</b> , Qiangeng Xu, Mark Matthews, Paulo Gotardo, Octavia Camps, Sergio Orts-Escolano, Thabo Beeler. “MagicMirror: Fast and High-Quality Avatar Generation with a Constrained Search Space”. <i>European Conference on Computer Vision (ECCV)</i> , 2024.	

Peiyu Yu\*, Dinghui Zhang\*, Hengzhi He\*, Xiaojian Ma, Ruiyao Miao, Yifan Lu, Yasi Zhang, Deqian Kong, **Ruiqi Gao**, Jianwen Xie, Guang Cheng, Ying Nian Wu. “Latent Energy-Based Odyssey: Black-Box Optimization via Expanded Exploration in the Energy-Based Latent Space”. *arXiv*, 2024.

Dehong Xu, **Ruiqi Gao**, Wen-Hao Zhang, Xue-Xin Wei, Ying Nian Wu. “An Investigation of Conformal Isometry Hypothesis for Grid Cells”. *arXiv*, 2024.

Rundi Wu\*, Ben Mildenhall\*, Philipp Henzler, Keunhong Park, **Ruiqi Gao**, Daniel Watson, Pratul P. Srinivasan, Dor Verbin, Jonathan T. Barron, Ben Poole, Aleksander Holynski\*. “ReconFusion: 3D Reconstruction with Diffusion Priors”. *Conference on Computer Vision and Pattern Recognition (CVPR)*, 2024.

Diederik P. Kingma, **Ruiqi Gao**. “Understanding Diffusion Objectives as the ELBO with Simple Data Augmentation”. *Conference on Neural Information Processing Systems (NeurIPS)*, 2023. [Oral]

Peiyu Yu, Yaxuan Zhu, Sirui Xie, Xiaojian Shawn Ma, **Ruiqi Gao**, Song-Chun Zhu, Ying Nian Wu. “Learning Energy-Based Prior Model with Diffusion-Amortized MCMC”. *Conference on Neural Information Processing Systems (NeurIPS)*, 2023.

Chenlin Meng, Robin Rombach, **Ruiqi Gao**, Diederik P. Kingma, Stefano Ermon, Jonathan Ho, Tim Salimans. “On Distillation of Guided Diffusion Models”. *Conference on Computer Vision and Pattern Recognition (CVPR)*, 2023. [Award candidate]

Jonathan Ho\*, William Chan\*, Chitwan Saharia\*, Jay Whang\*, **Ruiqi Gao**, Alexey Gritsenko, Diederik P. Kingma, Ben Poole, Mohammad Norouzi, David J. Fleet, Tim Salimans. “Imagen Video: High Definition Video Generation with Diffusion Models”. *arXiv*, 2022.

Dehong Xu\*, **Ruiqi Gao\***, Wen-Hao Zhang, Xue-Xin Wei, Ying Nian Wu. “Conformal Isometry of Lie Group Representation in Recurrent Network of Grid Cells”. *NeurIPS workshop on Symmetry and Geometry in Neural Representations*, 2022.

Peiyu Yu, Sirui Xie, Xiaojian Ma, Baoxiong Jia, Bo Pang, **Ruiqi Gao**, Yixin Zhu, Song-Chun Zhu, Ying Nian Wu. “Latent Diffusion Energy-based Model for Interpretable Text Modeling”. *International Conference on Machine Learning (ICML)*, 2022.

Peiyu Yu, Sirui Xie, Xiaojian Ma, Baoxiong Jia, Bo Pang, **Ruiqi Gao**, Yixin Zhu, Song-Chun Zhu, Ying Nian Wu. “Conformal Isometry of Lie Group Representation in Recurrent Network of Grid Cells”. *International Conference on Machine Learning (ICML)*, 2022.

Erik Nijkamp\*, **Ruiqi Gao\***, Pavel Sountsov, Srinivas Vasudevan, Bo Pang, Song-Chun Zhu, Ying Nian Wu. “Learning Energy-Based Model with Flow-based Backbone by Neural Transport MCMC”. *International Conference on Learning Representations (ICLR)*, 2022.

**Ruiqi Gao**, Jianwen Xie, Siyuan Huang, Yufan Ren, Song-Chun Zhu, Ying Nian Wu. “Learning Vector Representation of Local Content and Matrix Representation of Local Motion, with Implications for V1”. *AAAI Conference on Artificial Intelligence (AAAI)*, 2022. [Oral]

**Ruiqi Gao**, Jianwen Xie, Xue-Xin Wei, Song-Chun Zhu, Ying Nian Wu. “On Path Integration of Grid Cells: Group Representation and Isotropic Scaling”. *Conference on Neural Information Processing Systems (NeurIPS)*, 2021.

Yaxuan Zhu, **Ruiqi Gao**, Siyuan Huang, Song-Chun Zhu, Ying Nian Wu. “Learning Neural Representation of Camera Pose with Matrix Representation of Pose Shift via View Synthesis”. *Conference on Computer Vision and Pattern Recognition (CVPR)*, 2021.

**Ruiqi Gao**, Yang Song, Ben Poole, Ying Nian Wu, Diederik P. Kingma. “Learning Energy-Based Models by Diffusion Recovery Likelihood”. *International Conference on Learning Representations (ICLR)*, 2021.

**Ruiqi Gao**, Erik Nijkamp, Diederik P. Kingma, Zhen Xu, Andrew M. Dai, and Ying Nian Wu. “Flow Contrastive Estimation of Energy-Based Models”. *Conference on Computer Vision and Pattern Recognition (CVPR)*, 2020. [Oral]  
*NeurIPS workshop on Bayesian Deep Learning*, 2019. [Spotlight]

Jianwen Xie\*, Zilong Zheng\*, **Ruiqi Gao**, Wenguan Wang, Song-Chun Zhu and Ying Nian Wu. “Generative VoxelNet: Learning Energy-Based Models for 3D Shape Synthesis and Analysis”. *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, 2020.

Xianglei Xing, **Ruiqi Gao**, Tian Han, Song-Chun Zhu and Ying Nian Wu. “Deformable Generator Networks: Unsupervised Disentanglement of Appearance and Geometry”. *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, 2020.

Jianwen Xie\*, **Ruiqi Gao\***, Zilong Zheng, Song-Chun Zhu and Ying Nian Wu. “Motion-Based Generator Model: Unsupervised Disentanglement of Appearance, Trackable and Intrackable Motions in Dynamic Patterns”. *AAAI Conference on Artificial Intelligence (AAAI)*, 2020. [Oral]

Jianwen Xie, **Ruiqi Gao**, Erik Nijkamp, Song-Chun Zhu and Ying Nian Wu. “Representation learning: a statistical perspective”. *Annual Review of Statistics and Its Application (ARSIA)*, 2019.

**Ruiqi Gao\***, Jianwen Xie\*, Song-Chun Zhu and Ying Nian Wu. “Learning Grid Cells as Vector Representation of Self-Position Coupled with Matrix Representation of Self-Motion”. *International Conference on Learning Representations (ICLR)*, 2019.

Jianwen Xie\*, **Ruiqi Gao\***, Zilong Zheng, Song-Chun Zhu and Ying Nian Wu. “Learning Dynamic Generator Model by Alternating Back-Propagation Through Time”. *AAAI Conference on Artificial Intelligence (AAAI)*, 2019. [Spotlight]

Xianglei Xing, Tian Han, **Ruiqi Gao**, Song-Chun Zhu and Ying Nian Wu. “Unsupervised disentanglement of appearance and geometry by deformable generator network”. *Conference on Computer Vision and Pattern Recognition (CVPR)*, 2019.

**Ruiqi Gao\***, Yang Lu\*, Junpei Zhou, Song-Chun Zhu and Ying Nian Wu. “Learning Energy-Based Models as Generative ConvNets via Multi-grid Modeling and Sampling”. *Conference on Computer Vision and Pattern Recognition (CVPR)*, 2018. [Spotlight]

Ying Nian Wu, **Ruiqi Gao**, Tian Han and Song-Chun Zhu. “A Tale of Three Probabilistic Families: Discriminative, Descriptive and Generative Models”. *Quarterly of Applied Mathematics (QAM)*, 2019.

Jianwen Xie, Yang Lu, **Ruiqi Gao**, Song-Chun Zhu and Ying Nian Wu. “Cooperative Training of Descriptor and Generator Networks”. *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, 2018.

Jianwen Xie\*, Zilong Zheng\*, **Ruiqi Gao**, Wenguan Wang, Song-Chun Zhu and Ying Nian Wu. “Learning Descriptor Networks for 3D Shape Synthesis and Analysis”. *Conference on Computer Vision and Pattern Recognition (CVPR)*, 2018. [Oral]

Jianwen Xie, Yang Lu, **Ruiqi Gao**, Song-Chun Zhu and Ying Nian Wu. “Cooperative Learning of Energy-Based Model and Latent Variable Model via MCMC Teaching”. *AAAI Conference on Artificial Intelligence (AAAI)*, 2018. [Oral]

Yang Lu, **Ruiqi Gao**, Song-Chun Zhu and Ying Nian Wu. “Exploring Generative Perspective of Convolutional Neural Networks by Learning Random Field Models”. *Statistics and Its Interface*, 2018.

Shuo Li, Xialiang Dou, **Ruiqi Gao**, Xinzhou Ge, Minping Qian, and Lin Wan. “A remark on copy number variation detection methods”. *PLoS One*, 2018.

**Ruiqi Gao** and Jingyi Jessica Li. “Correspondence of *D. melanogaster* and *C. elegans* developmental stages revealed by alternative splicing dynamics of conserved exon”. *BMC Genomics*, 2017.

<b>ACADEMIC HONORS &amp; AWARDS</b>	CVPR award candidate	2023
	CVPR outstanding reviewer	2021
	Most Promising Statistician Award, UCLA	2019
	Doctoral Student Travel Award, UCLA	2017 - 2020
	Excellent College Graduate Award, Peking University	2016
	Guanghua Scholarship, Peking University	2015
	Yizheng Alumni Scholarship, Peking University	2014
	May Fourth Scholarship, Peking University	2013
	Entrance Scholarship, Peking University	2012
<b>INVITED TALKS</b>	CIFAR Deep Learning Reinforcement Learning Summer School	Jul 2024
	Guest lecture at CSE6243: Advanced Topics in Machine Learning, Georgia Institute of Technology.	Oct 2023
	University of Texas Southwestern, Texas.	Sep 2022
	University of Michigan, MIDAS mini-symposium.	Sep 2023
	Guest lecture at CS231n: Deep Learning for Computer Vision, Stanford University.	May 2023
	University of Texas Southwestern, Texas.	Sep 2022
	University of California Irvine, California.	Feb 2022
	Amazon, California.	Jan 2021
	Facebook AI Research, California.	Jan 2021
	Nvidia Research, Mountain View, California.	Nov 2020
	Google Brain, Mountain View, California.	Oct 2020
	Institute for Artificial Intelligence, Peking University.	Oct 2020
	Google Brain, Mountain View, California.	Sep 2019
	Guest lecture at CS276A: Pattern Recognition and Machine Learning, UCLA.	Sep 2018
	Guest lecture at CS266A: Statistical Modeling and Learning in Vision and Cognition, UCLA.	Mar 2018
<b>PROFESSIONAL SERVICES</b>	<b>Conference Organization</b>	
	Organizer, ICML 2024 workshop on “Structured Probabilistic Inference & Generative Modeling”.	
	Organizer, CVPR 2024 workshop on “Efficient and On-Device Generation”.	
	Organizer and Speaker, NeurIPS 2023 tutorial on “Latent Diffusion Models: Is the Generative AI Revolution Happening in Latent Space?”	
	Organizer and Speaker, CVPR 2022 tutorial on “Denoising Diffusion-based Generative Modeling: Foundations and Applications”.	
	<b>Peer-reviewed Journals and Conferences</b>	
	Conference on Neural Information Processing Systems (NeurIPS), 2020-2023	
	International Conference on Machine Learning (ICML), 2022-2024	
	International Conference on Learning Representations (ICLR), 2021-2024	
	Computer Vision and Pattern Recognition (CVPR), 2019-2024	
	European Conference on Computer Vision (ECCV), 2020	
	International Conference on Computer Vision (ICCV), 2019, 2021	
	AAAI Conference on Artificial Intelligence (AAAI), 2019-2022	
	International Conference on Artificial Intelligence and Statistics (AISTATS), 2021	

**STUDENTS  
MENTORED**

- Ruidi Wu, Ph.D. in Computer Science, Columbia University, 2024 Summer
- David Charatan, Ph.D. in EECS, MIT, 2024 Summer
- Stan Szymanowicz, Ph.D. in Engineering Science, University of Oxford, 2024 Summer
- Sirui Xie, Ph.D. in Statistics, UCLA, 2023 Winter - 2024 Summer
- Alex Trevithick, Ph.D. in CSE, UC San Diego, 2024 Spring - present
- Armand Comas-Massagué, Ph.D. in Computer Science, 2023 Summer - 2024 Summer
- Dehong Xu, Ph.D. in Statistics, UCLA, 2020 Fall - present
- Yaxuan Zhu, Ph.D. in Statistics, UCLA, 2018 Winter - present
- Yufan Ren, Master in Computer Science, University of Lausanne, 2019 Fall - 2020 Spring
- Xiaolin Fang, Ph.D. in Computer Science, MIT, 2018 Summer
- Junpei Zhou, Master in Language Technologies, CMU, 2017 Summer
- Wenwen Si, Master in Computer Vision, CMU, 2017 Summer
- Jiawen Wu, Master in Computer Science, USC, 2017 Summer

**SKILLS**

C/C++, Python, Jax/Flax, TensorFlow, PyTorch  
Fluent in English and Chinese