Minghao Guo

guomh2014@gmail.com | github.com/gmh14 | google scholar | homepage

Education

MIT — MA, USA
Ph.D. Student in CSAIL, Electrical Engineering and Computer Science — *Aug. 2021 – Present*

The Chinese University of Hong Kong — Hong Kong, China
M.Phil. in Information Engineering — *Aug. 2019 – July 2021*

Tsinghua University — Beijing, China
B.Eng. in Automation — *Aug. 2014 – July 2018*

Publications

(* indicates equal contribution)

[1] **Minghao Guo***, Bohan Wang*, Kaiming He, Wojciech Matusik, "TetSphere Splatting: Representing High-Quality Geometry with Lagrangian Volumetric Meshes," in *International Conference on Learning Representations (ICLR) 2025* (***oral*** paper, acceptance rate 1.8%).

[2] Michael Sun, Alston Lo, **Minghao Guo**, Jie Chen, Connor W. Coley, Wojciech Matusik, "Procedural Synthesis of Synthesizable Molecules," in *International Conference on Learning Representations (ICLR) 2025*.

[3] **Minghao Guo**, Bohan Wang, Pingchuan Ma, Tianyuan Zhang, Crystal Elaine Owens, Chuang Gan, Joshua B. Tenenbaum, Kaiming He, Wojciech Matusik, "Physically Compatible 3D Object Modeling from a Single Image," in *Conference on Neural Information Processing Systems (NeurIPS) 2024* (***spotlight*** paper).

[4] **Minghao Guo***, Bohan Wang*, Wojciech Matusik, "Medial Skeletal Diagram: A Generalized Medial Axis Approach for Compact 3D Shape Representation," in *SIGGRAPH Asia 2024 (Journal Track)*.

[5] Michael Sun, **Minghao Guo**, Weize Yuan, Veronika Thost, Crystal Elaine Owens, Aristotle Franklin Grosz, Sharvaa Selvan, Katelyn Zhou, Hassan Mohiuddin, Benjamin J Pedretti, Zachary P Smith, Jie Chen, Wojciech Matusik, "Representing Molecules as Random Walks Over Interpretable Grammars," in *International Conference on Machine Learning (ICML) 2024* (***spotlight*** paper).

[6] Pingchuan Ma, Tsun-Hsuan Wang, **Minghao Guo**, Zhiqing Sun, Joshua B. Tenenbaum, Daniela Rus, Chuang Gan, Wojciech Matusik, "LLM and Simulation as Bilevel Optimizers: A New Paradigm to Advance Physical Scientific Discovery," in *International Conference on Machine Learning (ICML) 2023*.

[7] **Minghao Guo**, Veronika Thost, Samuel Song, Adithya Balachandran, Payel Das, Jie Chen, Wojciech Matusik, "Hierarchical Grammar-Induced Geometry for Data-Efficient Molecular Property Prediction," in *International Conference on Machine Learning (ICML) 2023*.

[8] Yu Wang, **Minghao Guo**, Justin Solomon, "Variational Quasi-harmonic Maps for Computing Diffeomorphisms," in *SIGGRAPH 2023 (ACM Transactions on Graphics)*.

[9] **Minghao Guo**, Veronika Thost, Beichen Li, Payel Das, Jie Chen, Wojciech Matusik, "Data-Efficient Graph Grammar Learning for Molecular Generation," in *International Conference on Learning Representations (ICLR) 2022* (***oral*** paper, acceptance rate 1.6%).

[10] Liane Makatura, **Minghao Guo**, Adriana Schulz, Justin Solomon, Wojciech Matusik, "Pareto Gamuts: Exploring Optimal Designs Across Varying Contexts," in *SIGGRAPH 2021 (ACM Transactions on Graphics)*.

[11] **Minghao Guo**, Liane Makatura, Wan Shou, Timothy Erps, Michael Foshey, Wojciech Matusik, "PolyGrammar: A Parametric Context Sensitive Grammar for Polymer Representation and Generation," in *Advanced Science*.

[12] Zhaoyang Lyu, **Minghao Guo**, Tong Wu, Guodong Xu, Kehuan Zhang, Dahua Lin, "Towards Evaluating and Training Verifiably Robust Neural Networks," in *Conference on Computer Vision and Pattern Recognition (CVPR) 2021*.

[13] Rui Xu, **Minghao Guo**, Jiaqi Wang, Xiaoxiao Li, Bolei Zhou, Chen Change Loy, "Texture Memory-Augmented Deep Patch-Based Image Inpainting," in *Transactions on Image Processing (TIP)*.

[14] **Minghao Guo***, Yuzhe Yang*, Rui Xu, Ziwei Liu, Dahua Lin, "When NAS Meets Robustness: In Search of Robust Architectures against Adversarial Attacks," in *Conference on Computer Vision and Pattern Recognition (CVPR) 2020*.

[15] Chen Lin*, **Minghao Guo***, Chuming Li, Xin Yuan, Wei Wu, Junjie Yan, Dahua Lin, Wanli Ouyang, "Online Hyper-parameter Learning for Auto-Augmentation Strategy," in *International Conference on Computer Vision (ICCV) 2019*.

[16] Chuming Li, Xin Yuan, Chen Lin, **Minghao Guo**, Wei Wu, Junjie Yan, Wanli Ouyang, "AM-LFS: AutoML for Loss Function Search," in *International Conference on Computer Vision (ICCV) 2019*.

[17] **Minghao Guo**, Zhao Zhong, Wei Wu, Dahua Lin, Junjie Yan, "IRLAS: Inverse Reinforcement Learning for Architecture Search," in *Conference on Computer Vision and Pattern Recognition (CVPR) 2019*.

[18] **Minghao Guo**, Jiwen Lu, Jie Zhou, "Dual-Agent Deep Reinforcement Learning for Deformable Face Tracking," in *European Conference on Computer Vision (ECCV) 2018* (***oral*** paper, acceptance rate 2.4%).

[19] Hao Liu, Jiwen Lu, **Minghao Guo**, Suping Wu, Jie Zhou, "Learning Reasoning-Decision Networks for Robust Face Alignment," *Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*.

[20] Haitian Zheng, **Minghao Guo**, Haoqian Wang, Yebin Liu, Lu Fang, "Reference-based Light Field Super-resolution Using a Hybrid Imaging System," in *International Conference on Computer Vision Workshops (ICCVW) 2017*.

Working Experience

Roblox, *San Mateo, CA* May 2024 – Aug. 2024
Research Intern mentored by Dr. Hsueh-Ti Derek Liu

- Worked on graph grammar-based articulated shape generation.

Meta Platforms, Inc., *Burlingame, CA* June 2023 – Sep. 2023
Research Intern mentored by Dr. Christian Häne and Dr. Tong Xiao

- Worked on 3D hair generation for Codec Avatars in VR applications.

Computational Design & Fabrication Group, *CSAIL MIT* Aug. 2021 – Present
PhD Student supervised by Prof. Wojciech Matusik

- Worked on computational design, data-driven molecule discovery, and geometry processing.

MultiMedia Lab (MMLab), *The Chinese University of Hong Kong* Aug. 2019 – July 2021
M.Phil. Student supervised by Prof. Dahua Lin and Prof. Ziwei Liu

- Worked on neural architecture search, automated machine learning, and network adversarial robustness.

Fundamental Research Group, *SenseTime* Aug. 2018 – July 2019
Research Intern of Model Team

- Worked on neural architecture search and automated machine learning.

Intelligent Vision Group (IVG), *Tsinghua University* Mar. 2017 – July 2018
Advised by Prof. Jiwen Lu

- Undergraduate thesis; worked on face alignment, facial landmark detection, and tracking.

Broadband Network & Digital Media Lab, *Tsinghua University* Aug. 2016 – Feb. 2017
Advised by Prof. Yebin Liu

- Worked on gigapixel video and light field imaging.

Teaching

· **Teaching Assistant**, 6.S978 Deep Generative Models Fall Term, 2024
EECS, MIT

· **Project Mentor**, Summer Geometry Institute Summer, 2024
EECS, MIT

· **Teaching Assistant**, 6.4400 Computer Graphics Fall Term, 2023
EECS, MIT

· **Teaching Assistant**, Electronic Circuit Design Laboratory Term 1, 2019-2020
Department of Information Engineering, The Chinese University of Hong Kong

· **Teaching Assistant**, Linear Algebra and Vector Calculus for Engineers Term 2, 2019-2020
Department of Information Engineering, The Chinese University of Hong Kong

· **Teaching Assistant**, Electronic Circuit Design Laboratory Term 1, 2020-2021
Department of Information Engineering, The Chinese University of Hong Kong

Award

MathWorks Fellowship, $105,000 2023-2024
Roblox Fellowship, Final List 2024-2025
Meshy AI Fellowship, Outstanding Prize 2025

Technical Skills

Programming: C/C++, Python, MATLAB, CUDA, PyTorch, JAX
Languages: English (proficient), Mandarin (native)