Xu Han

CS Graduate Student, Huazhong University of Science and Technology
Visiting Student, King Abdullah University of Science and Technology, Saudi Arabia
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Education

King Abdullah University of Science and Technology (KAUST) — *Kingdom of Saudi Arabia*

Visiting Student, CEMSE — *Jun. 2025 - Dec. 2025*

- Supervised by **Prof. Peter Wonka**.
- Conducting research on text-to-intrinsic generation, developing a unified diffusion approach that can synthesize a scene and its aligned intrinsic maps directly from text.

Huazhong University of Science and Technology (HUST) — *Wuhan, China*

Master of Science (M.Sc.), Computer Science, School of Computer Science and Technology — *Sep. 2023 - Jun. 2026 (expected)*

- Supervised by **Prof. Xianzhi Li**.
- **GPA: 3.91 (3/166)**, **National Scholarship**, **Tencent Scholarship**, **BYD Scholarship**, **First Prize Scholarship**, **Innovation Scholarship**.

Shandong University (SDU) — *Qingdao, China*

Bachelor of Engineering (B.Eng.), Artificial Intelligence, School of Computer Science and Technology — *Sep. 2019 - Jun. 2023*

- Supervised by **Prof. Mengbai Xiao**, Institute of Intelligent Computing.
- **GPA: 3.87** (88.7), **Honours Degree (1/52)**, **National Scholarship** (Top 0.2% nationwide), **Outstanding Thesis** (Top 6 grads in CS, 2%).

Research Interest

My research focuses on the intersection of **vision & graphics**, **representation learning**, and **generative modeling**, with an emphasis on **structured and efficient world modeling**. I am broadly interested in how inductive biases and physically grounded principles can make representation models and generative systems more coherent, controllable, and interpretable.

1. **World Modeling: Structured and Principled Representation Learning and Generative Modeling**
2. **Multimodal and Physically Based 3D Understanding and Generation**
3. **Efficient Architectures: Structured Matrix, Sparsity, Tensor Factorization**

Ultimately, my goal is to design **principled generative systems** that unify perception and synthesis, enabling models to understand not only *how the world looks* but also *how it works*.

Publication

[1] LumiX: Structured and Coherent Text-to-Intrinsic Generation — *Submitted to CVPR 2026*

Xu Han, Biao Zhang, Xiangjun Tang, Xianzhi Li, Peter Wonka — *Paper GitHub*

- We present LumiX, a structured diffusion framework for coherent text-to-intrinsic generation. Conditioned on text prompts, LumiX jointly generates a comprehensive set of intrinsic maps (e.g., albedo, irradiance, normal, depth, and final color), providing a structured and physically consistent description of an underlying scene.

[2] MoST: Efficient Monarch Sparse Tuning for 3D Representation Learning — *CVPR 2025*

Xu Han, Yuan Tang, Jinfeng Xu, Xianzhi Li — *Paper GitHub*

- We introduce Monarch Sparse Tuning (MoST), the first reparameterization-based parameter-efficient fine-tuning (PEFT) method tailored for 3D point cloud representation learning.

[3] Mamba3D: Enhancing Local Features for 3D Point Cloud Analysis via State Space Model — *ACM MM 2024*

Xu Han*, Yuan Tang*, Zhaoxuan Wang, Xianzhi Li (*equal contribution) — *Paper GitHub*

- We present Mamba3D, a state space model tailored for point cloud learning. Mamba3D surpasses existing methods in multiple tasks, achieving multiple SoTA, with only linear complexity.

[4] More Text, Less Point: Towards 3D Data-Efficient Point-Language Understanding — *AAAI 2025*

Yuan Tang*, **Xu Han***, Xianzhi Li†, Qiao Yu, Jinfeng Xu, Yixue Hao, Long Hu, Min Chen (*equal contribution, †corresponding author) — *Paper GitHub*

- We introduce a new task, 3D Data-Efficient Point-Language Understanding. Our proposed GreenPLM uses text data to compensate for the lack of 3D data, achieving superior 3D understanding with only 12% or even without 3D data.

[5] PointDreamer: Zero-Shot 3D Textured Mesh Reconstruction From Colored Point Cloud *TVCG 2025*

Qiao Yu, Xianzhi Li, Yuan Tang, **Xu Han**, Jinfeng Xu, Long Hu, Yixue Hao, Min Chen *Paper GitHub*

- We propose PointDreamer, a framework that adapts 2D diffusion models to 3D point clouds via a novel project–inpaint–unproject pipeline, achieving superior texture quality over prior text- or image-driven methods.

[6] Fancy123: One Image to High-Quality 3D Mesh Generation via Plug-and-Play Deformation *CVPR 2025*

Qiao Yu, Xianzhi Li, Yuan Tang, **Xu Han**, Jinfeng Xu, Long Hu, Yixue Hao, Min Chen *Paper GitHub*

- We propose a SOTA framework for single-image-to-3D-mesh, leveraging 2D deformation, 3D deformation, and unprojection to resolve multiview inconsistency, low fidelity, and blurry coloration.

[7] SASep: Saliency-Aware Structured Separation of Geometry and Feature for Open Set Learning on Point Clouds *CVPR 2025*

Jinfeng Xu, Xianzhi Li, Yuan Tang, **Xu Han**, Qiao Yu, Yixue Hao, Long Hu, Min Chen *GitHub*

- We introduce Saliency-Aware Structured Separation (SASep), an open-set recognition method on 3D point cloud.

[8] MiniGPT-3D: Efficiently Aligning 3D Point Clouds with Large Language Models using 2D Priors *ACM MM 2024*

Yuan Tang, **Xu Han**, Xianzhi Li†, Qiao Yu, Yixue Hao, Long Hu, Min Chen († corresponding author) *Paper GitHub*

- We present MiniGPT-3D, an efficient and powerful 3D-LLM that aligns 3D points with LLMs using 2D priors. It has only 47.8 M learnable parameters and is trained in just 26.8h on a single RTX 3090.

[9] patchDPCC: A Patchwise Deep Compression Framework for Dynamic Point Clouds *AAAI 2024*

Zirui Pan, Mengbai Xiao†, **Xu Han**, Dongxiao Yu, Guanghui Zhang, Yao Liu († corresponding author) *Paper*

- We propose patchDPCC to compress each frame of the point cloud video by divides frames into patch groups, and incorporate a feature transfer module to refine the feature quality.

Experience

King Abdullah University of Science and Technology (KAUST) *Saudi Arabia*

Student Researcher, supervised by **Prof. Peter Wonka**. *Jun. 2025 - Now*

- My research centers on structured content generation, with a focus on text-to-intrinsic generation, in collaboration with Prof. Peter Wonka, Dr. Biao Zhang, and Dr. Xiangjun Tang. I develop scalable diffusion-based methods that produce pixel-aligned geometry, material, and lighting representations, aiming to advance photorealistic generation with applications in multi-map generation, PBR synthesis, and photorealistic world modeling.

Institute of Intelligent Computing, Shandong University *Qingdao, China*

Research Assistant, supervised by **Prof. Mengbai Xiao**. *Oct. 2020 - Jun. 2023*

- We propose a dynamic point cloud upsampling model to reduce the bandwidth consumption of point cloud video streaming. To accelerate inference, we propose reducing inter-frame redundancy by aligning adjacent frames in feature space. This research won the **Outstanding Graduation Thesis Award** from Shandong University. We also applied this method to point cloud video compression, improving the quality of point cloud features, which is accepted by **AAAI 2024**.

Honors & Awards

Scholarships

10/2025	**National Scholarship**, Highest honor for postgraduates, top 0.2% nationwide	*Wuhan, China*
03/2025	**Tencent Scholarship**, HUST	*Wuhan, China*
01/2025	**BYD Scholarship**, The only one in Dept. of CS, HUST	*Wuhan, China*
10/2024	**Xiaomi Scholarship Nomination**, HUST	*Wuhan, China*
10/2024	**Research & Innovation Scholarship**, HUST	*Wuhan, China*
04/2024	**Tencent Scholarship**, HUST	*Wuhan, China*
11/2023	**First Prize Scholarship**, HUST	*Wuhan, China*
10/2022	**National Scholarship**, Highest honor for undergraduates, top 0.2% nationwide	*Qingdao, China*
2021,2022	**Huawei Scholarship**, Two-year continuous	*Qingdao, China*
10/2022	**Second Prize Scholarship**, Top 10% in Department of Computer Science	*Qingdao, China*
10/2022	**Research & Innovation Scholarship**, Shandong University	*Qingdao, China*

Awards

01/2025	**Best Paper Award, HUST School of CS Annual Conference**, Top 10 in School of CS	*Wuhan, China*
07/2023	**Outstanding Graduation Thesis Award**, Top 6 graduates in Department of Computer Science	*Qingdao, China*
06/2023	**Honours Bachelor Degree**, 1/52	*Qingdao, China*
06/2023	**Outstanding Graduates Award**, Shandong University	*Qingdao, China*
2021,2022	**Huawei-MOE (Ministry of Education) Future Star Award**, Two-year continuous	*Qingdao, China*
11/2021	**First Prize in China Undergraduate Mathematical Contest in Modeling**, Top 0.6% in 45K teams	*Qingdao, China*