

Minghao (Mark) Liu

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Education

Hong Kong University of Science and Technology (HKUST)

2022 – 2026 (Expected)

BEng in Computer Science | Minor in Mathematics

CGA: 3.902 / 4.3 (Top 2%)

Washington University in St. Louis

Fall 2024

Exchange Student, McKelvey School of Engineering

GPA: 3.94 / 4.00

Publications

• MedEBench: Revisiting Text-instructed Image Editing on Medical Domain

Minghao Liu, Zhitao He, Zhiyuan Fan, Qingyun Wang, Yi R. Fung

Findings of EMNLP 2025

• A Benchmark for Evaluating Purchase Intention Comprehension Abilities of Large Language Models in E-commerce

Wenxuan Ding*, Weiqi Wang*, Sze Heng Douglas Kwok, **Minghao Liu**, Tianqing Fang, Jiaxin Bai, Xin Liu, Changlong Yu, Zheng Li, Chen Luo, Qingyu Yin, Bing Yin, Junxian He, Yangqiu Song

Findings of EMNLP 2024

Projects Research Experience

UROP, HKUST

Jun–Aug 2023 Advisor: Dan Xu

- Developed a **conditional diffusion model** for monocular depth estimation from RGB images.
- Built an **Efficient-UNet** with residuals and optimized up/down-sampling to preserve depth structures.
- Designed a two-step **depth infilling algorithm** for handling missing values in NYU Depth V2.
- Applied **Step-Unrolled Denoising (SUD)** and masked losses to mitigate distribution shift on incomplete maps.
- Finetuned under compute limits to improve depth completeness and global scene consistency.

UROP, HKUST

Sep–Dec 2023 Advisor: Yu Hu

- Modeled **brain-wide neural dynamics in zebrafish** using a recurrent **Firing Rate Network**.
- Implemented **firing rate evolution equations** with Poisson inputs and synaptic filtering.
- Simulated large-scale circuits and trained synaptic connectivity via **Partial In-Network Training (PINning)** with Recursive Least Squares.
- Analyzed structural patterns in connectivity to identify potential subnetworks and functional motifs.

KnowComp Group, HKUST

Feb 2024 – Sep 2024 Advisor: Yangqiu Song

- BrainASER (Led by Shi Haochen)**: Studied correspondences between neural activity and **knowledge graph** structures.
- Aligned fMRI data (Narratives dataset) with story-based stimuli to analyze brain-language interactions.
- Developed brain-inspired representations for downstream NLP tasks leveraging structural similarities with knowledge graphs.
- IntentionQA (Led by Ding Wenxuan)**: Built a benchmark to evaluate LMs' understanding of purchase intentions in E-commerce.
- Preprocessed data, aligned products with intentions via ASER, and generated negative distractors.
- Evaluated 19 LMs, identifying reasoning limitations in predicting user intent and handling real-world E-commerce scenarios.

Washington University in St. Louis

Sep 2024 – Dec 2024 Advisor: Marion Neumann

- Developed an **inductive recommendation system** for new e-commerce products using the Amazon Co-Purchasing Network.
- Constructed a co-purchasing graph with 519K nodes and 964K edges, encoding product features, categories, and structural metrics.
- Applied a **modified GraphSAGE** for link prediction to enable recommendations for isolated nodes with limited data.
- Designed scalable, real-time updates for adaptive recommendations on dynamic product catalogs.

RenLab, HKUST

Feb 2025 – June 2025 Advisor: Yi R. (May) Fung

- Researched **text-guided medical image editing** and developed evaluation frameworks for multimodal models.
- Contributed to **MedEBench**, a benchmark of 1,182 clinical image-prompt triplets across 70 tasks and 13 anatomical regions.
- Designed clinically grounded metrics for **Editing Accuracy, Contextual Preservation, and Visual Quality** using ROI-based assessments and attention-grounding analysis.
- Evaluated seven state-of-the-art models, identifying common failure patterns in medically meaningful edits.

RenLab, HKUST

May 2025 – Current Advisor: Yi R. (May) Fung

Collaborator: Li Yuxin

- Formalize physics concepts and statements into **Lean**, enabling rigorous machine-verified reasoning.
- Develop representations of laws and principles to facilitate automated derivations and proofs.

Standardized Tests

- IELTS: 7.0

Awards & Scholarships

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| • First Prize – 37th Chinese Physics Olympiad (Provincial Level) | 2020 |
| • First Prize – 38th Chinese Physics Olympiad (Provincial Level) | 2021 |
| • First Prize – Chinese Mathematical Olympiad in Senior (Provincial Level) | 2021 |
| • Talent Development Scholarship – HKSAR Government Scholarship Fund | 2023 |
| • University’s Scholarship Scheme for Continuing Undergraduate Students | 2023–24 |
| • HKUST Alumni Endowment Fund High Flyers Program Scholarship | 2023–24 |
| • HKSAR Government Scholarship Fund – Reaching Out Award | 2024–25 |
| • Dean’s List | 2022–25 |

Extracurricular Activities

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| • Mechanical Engineer – HKUST RoboMaster Team ENTERPRIZE | Sep 2022 – Feb 2023 |
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