XINHAI HOU

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EDUCATION

University of Michigan, Ann Arbor, U.S.
Ph.D. in Bioinformatics and Scientific Computing | GPA: 4.0 Sep 2021 - May 2026 (expected)

- Advisor: Prof. Todd Hollon, Prof. Honglak Lee.
- Research interests: vision language model, reinforcement learning, agentic system
- Published paper in **Nature** (FastGlioma), **CVPR** (HiDisc, highlight top 2.5%), **NeurIPS** (OpenSRH in D&B track)
- Services: conference reviewer for ICLR 2025, NeurIPS 2022-2025, ECCV 2024, CVPR 2024-2026

The Chinese University of Hong Kong, Shenzhen, China
B.S. in Statistical Science, First Class Honours (top 10%) Sep 2016 - May 2020

PROFESSIONAL EXPERIENCE

Research Assistant | University of Michigan, advised by Prof. Todd Hollon Sep 2021 - present

- Developed FastGlioma, a visual foundation model for fast (10x less) tumor detection. (**Nature, 2024**).
- Proposed Slide Pretraining Transformer (SPT) for gigapixel slide image embeddings. (**NeurIPS 2024, AIM-FM**)
- Introduced HiDisc, a hierarchical self-supervised learning framework for microscopy images. (**CVPR highlight, 2023**)
- Curated and released the first Stimulated Raman Histology dataset and benchmark. (**NeurIPS D&B track, 2022**)
- Build an RL-driven medical agent that autonomously retrieves and memorizes patient EHR trajectory to continuously predict time-to-events (recurrence or decease), outperforming workflow baselines (e.g. Mem0).
- Designed the scalable agent environment for data ingestion and evaluator to support continual learning and personalization.

Applied Scientist Intern | Amazon (Seattle) May 2025 - Aug 2025

- Addressed large-scale production bottlenecks in infographic extraction and multi-object counting.
- Incentivize Qwen2.5-VL-7/32B for agentic visual reasoning on interleaved text, Python code, image with GRPO, boosting performance (by average 3.2%) and achieve SOTA on 10 visual perception and reasoning benchmarks.
- Developed rubric-based reward models and expert SFT pipeline to mitigate unfaithful tool usage and sparse-reward problem, achieving 30% higher faithfulness in tool use.

Machine Learning Engineer | Tencent (Beijing), advised by Dr. Pengfei Xiong Feb 2021 - Aug 2021

- Fine-tuned GPT-2 and UniLM on social media and news corpus for title generation used in WeChat Search.
- Doubled the training speed by distributed training and increased 5% in the ROUGE score by beam search.
- Won **fifth** award out of 4335 participants in an ACM challenge: Multimodal Video Advertisement Competition.

SELECTED PUBLICATIONS

(* for co-first contribution)

Foundation models for fast, label-free detection of glioma infiltration
Nature, 2025
Akhil Kondepudi, Melike Pekmezci, **Xinhai Hou**, ..., Todd Hollon.

A self-supervised framework for learning whole slide representations
Neural Information Processing Systems (**NeurIPS**) Workshop on AIM-FM, 2024
Xinhai Hou, ..., Honglak Lee, and Todd C. Hollon.

Hierarchical discriminative learning improves visual representations of biomedical microscopy
Conference on Computer Vision and Pattern Recognition (**CVPR**), 2023 (Highlight, top 2.5%)
Cheng Jiang*, **Xinhai Hou***, ..., Honglak Lee, and Todd C. Hollon.

OpenSRH: optimizing brain tumor surgery using intraoperative stimulated Raman histology
Conference on Neural Information Processing Systems (**NeurIPS**) Datasets and Benchmarks Track, 2022
Cheng Jiang*, Asadur Chowdury*, **Xinhai Hou***, ..., Honglak Lee, and Todd C. Hollon.

Valproic acid-induced changes of 4D nuclear morphology in astrocyte cells
Molecular biology of the cell, 2021
Alexandr Kalinin, **Xinhai Hou**, ..., Brian Athey.

Step-calibrated diffusion for biomedical optical image restoration
AAAI Conference on Artificial Intelligence, 2025
Yiwei Lyu,..., Xinhai Hou, ..., Honglak Lee, and Todd C. Hollon

Super-resolution of biomedical volumes with 2D supervision
CVPR Workshop on Computer Vision for Microscopy Image Analysis, 2024
Cheng Jiang, ... Xinhai Hou, ..., Honglak Lee, and Todd C. Hollon

CORE COURSEWORK

Machine Learning	Computer Vision, Large Language Modeling, Optimization Theory
Statistics	Data Mining, Statistical Inference, Time Series, Nonparametric Statistics.
Computer Science	Data Structure and Algorithm, Parallel Computing, Database Management.
Bioinformatics	Bioinformatics concepts and algorithms, Biology for computational scientists

SKILLS

Programming languages	Python, Shell, C/C++
Framework	uv, Pytorch, vLLM, VeRL, LangGraph, OpenCV
Tools	Git, Vim, VS Code, AWS, LaTeX, Adobe Illustrator

AWARDS

- **MICDE Graduate Fellowship** 2024-2025
  Michigan Institute for Computational Discovery and Engineering, U of M
- **CVPR 2023 Scholarship** 2023
- **Dean's List** (Top 5%), 2016 - 2020
  The Chinese University of Hong Kong, Shenzhen
- **Undergraduate Research Award** 2016 - 2020
  The Chinese University of Hong Kong, Shenzhen