XINHAI HOU

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EDUCATION

University of Michigan, Ann Arbor, U.S.

Ph.D. Candidate, Bioinformatics and Scientific Computing | GPA: 4.0   Sep 2021 - May 2026 (expected)

- Advisor: Prof. Todd Hollon, Prof. Honglak Lee.

The Chinese University of Hong Kong, Shenzhen, China

B.S. with First Class Honours (top 10%), Statistical Science | GPA: 3.6   Sep 2016 - May 2020

PROFESSIONAL EXPERIENCE

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 a ACM challenge: Multimodal Video Advertisement Competition.

RESEARCH HIGHLIGHTS

Visual foundation model for histopathology imaging   Nov 2022 - May 2024

- Developed FastGlioma, a foundation model for fast (10x less) tumor infiltration detection using Vision Transformers (ViT) and hierarchical objective with SimCLR.
- Proposed Slide Pretraining Transformer (SPT), a foundation model with iBot training for gigapixel WSI embeddings.
- Introduced HiDisc, a novel hierarchical learning objective compatible with popular self-supervised learning (SSL) like SimCLR and DINO, outperforming baselines without extra computing requirements.

Multimodal learning for patient prognosis predictions   Aug 2024 - present

- Curated large scale VQA benchmark for histopathology with WSI and report. Built a three-stage vision-language model (LLaVA) for VQA benchmark.
- Conducted survival analysis with pretrained VLM, achieving 84.2% c-index for rare tumor predictions.

Multimodal foundation model for MRI-Radiology report   Jan 2023 - present

- Developed a brain MRI and radiology report processing workflow by pretraining 3D image encoders using VQVAE.
- Optimized vision-language model using contrastive pretraining (CLIP) to enhance MRI feature extraction for diagnostic accuracy, worklist prioritization, and referral recommendations.
- Conducted prospective validation, achieving 93.2% balanced accuracy in radiologic diagnosis and workflow optimization.

SELECTED PUBLICATIONS

Visual foundation models for fast, label-free detection of diffuse glioma infiltration
Nature, 2024
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)
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.

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, R, C/C++, MATLAB
Framework	Pytorch, Tensorflow, Pandas, Scikit-Learn, Matplotlib, OpenMP, MPI, 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

ACADEMIC SERVICE

- Conference reviewer: **ICLR 2025, WACV 2025, NeurIPS 2024, ECCV 2024, CVPR 2024, WACV 2024, NeurIPS 2023, NeurIPS 2022**

- Journal Reviewer: **Journal of Digital Imaging**