

# XINHAI HOU

+1(734) 276-7056 ◇ [xinhaih@umich.edu](mailto:xinhaih@umich.edu) ◇ [Linkedin](#) ◇ [Homepage](#)

## 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.

M.S. Bioinformatics | GPA: 4.0

Sep 2021 - May 2024

- Advisor: Prof. Todd Hollon, Prof. Brian Athey.

**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% on ROUGE score by beam search.
- Won **fifth** award out of 4335 participants in a ACM challenge: [Multimodal Video Advertisement Competition](#) by adopting CLIP and MoCo image encoders and gained 10.3% average precision.

## RESEARCH HIGHLIGHTS

---

**Visual foundation model for tumor infiltration detection with histopathology imaging**

Nov 2022 - May 2024

- Developed and trained FastGlioma, a foundation model for tumor infiltration detection using Vision Transformers (ViT) and hierarchical objective with SimCLR.
- Achieved 92.1% AUC on infiltration detection with 10x less imaging time and zero-shot potentials.
- Proposed Slide Pretraining Transformer (SPT), a general framework for gigapixel WSI representation learning.
- Benchmarked foundation models with the SPT framework, demonstrating SPT robust performance.

**Multimodal learning for patient prognosis predictions**

Aug 2024 - present

- Proposed a novel vision-genomics model by prompting language model with patient clinical data for prototypical learning.
- Reduced the redundancy and improved interoperability using Gaussian mixture and optimal transport kernel embeddings.
- Structured pathology reports with prompt engineering and encoded them using Llama3 and OpenAI embedding models for joint training with pathology images.

**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.

### Super-resolution of biomedical volumes with 2D supervision

CVPR Workshop on Computer Vision for Microscopy Image Analysis, 2024

Cheng Jiang, ..., **Xinhai Hou**, ..., Todd 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

---

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

## SKILLS

---

<b>Programming languages</b>	Python, Shell, R, C/C++, MATLAB
<b>Framework</b>	Pytorch, Tensorflow, Pandas, Scikit-Learn, Matplotlib, OpenMP, MPI, OpenCV
<b>Tools</b>	Git, Vim, VS Code, AWS, L <sup>A</sup> T <sub>E</sub> X, 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**