

HAOMIN CHEN

LinkedIn: <https://www.linkedin.com/in/haomin-chen-jhu-cs/>

Personal website: <https://haomin-website.netlify.app/>

HACKERMAN HALL, 3400 N CHARLES ST, #137, ◇ Baltimore, Maryland 21218 (open to relocate)
(443) · 630 · 2698 ◇ hchen135@jhu.edu

SUMMARY

Johns Hopkins Computer Science Ph.D. candidate with a background in interpretable computer vision systems with human-computer interaction, image classification, object detection, and segmentation. First author of Nature partner journal paper. Excellent communication skills and ability to work on teams. Interested in and willing to work in any Computer Vision field.

EDUCATIONS

Johns Hopkins University

Jan 2018 - Dec 2022 (expected)

Doctor of Philosophy, Computer Science

Baltimore, MD, USA

Advisors: Dr. Mathias Unberath, Dr. Gregory Hager

First author publications: 5 conference papers, 4 journal papers

First author of one Nature partner journal paper

Columbia University

Sep 2016 - Dec 2017

Master of Arts, Statistics

New York City, NY, USA

Overall GPA: 4.1 / 4.0

Fudan University

Sep 2012 - Jun 2016

Bachelor of Science, Physics

Shanghai, CHINA

Core GPA: 3.6 / 4.0

SKILLS

Python, C++, Linux, Slurm, Docker, PyTorch, Tensorflow, Matlab, R, Machine Learning, Deep Learning, Computer Vision, Medical Image Analysis, Human-Computer Interaction, Interpretable Learning, Classification, Object Detection, Instance Segmentation, Statistical Analysis

EXPERIENCES

Meta, Redmond

Jun 2022 - Oct 2022

Research Intern

Redmond, WA, USA

2D-3D style transfer

Background: Users are willing to customize their virtual 3D space in Metaverse with styles in their favorite images. This project aims to stylize 3D scenes with arbitrary 2D style images.

Contribution: The stylized 3D scene can easily be displayed with real-time VR applications. The stylized 3D scene is also interactive. More importantly, we are the first to preserve 3D reality in 3D stylization. I performed a user study within Meta's group and all participants prefer my method to the other works.

Performance: I quickly learned style transfer, 3D graphics, and rendering from scratch in one week. Internship performance exceeds director/mentor/peers' expectations in review.

NVIDIA, Bethesda

May 2018 - Dec 2018

Applied Research Intern

Bethesda, MD, USA

Multi-Abnormality classification in Chest X-rays

Background: It takes around 30 minutes for radiologists to find all abnormalities in one chest X-ray. Some places even lack clinicians to diagnose scanned chest x-rays. This project aims to create automatic models for abnormality classification in chest x-rays that is explainable to radiologists.

Contribution: We follow clinical taxonomy to build models understandable to clinicians. The performance of abnormality classification outperforms state-of-the-art methods.

Extra: My first-author paper is accepted by MIDL 2019 with an oral presentation. I received special invitation to Journal “Medical Image Analysis” ($IF = 13.8$) and the first-author journal paper is also accepted.

PingAn Technology, Bethesda

Applied Research Intern

May 2019 - Dec 2019

Bethesda, MD, USA

Fracture Detection in Pelvic Trauma X-rays

Background: Pelvic trauma is life-threatening and pelvic x-rays are scanned to detect fractures in the emergency room. A quick diagnosis with high performance is desired. We designed a deep learning method for fracture detection in pelvic x-rays.

Contribution: Our method is deployed in Changzheng Hospital in Taiwan and has been used by over 5 thousand patients. Our methods spend < 1 second to detect fractures in each pelvic x-ray. The results reach 98% AUC, which outperforms previous works. Our method mimicked radiologists’ clinical practice to detect fractures by comparing vertical anatomical regions.

Extra: My first-author paper is accepted by ECCV 2020 with a poster presentation.

PingAn Technology, Shanghai

Data Mining Scientist Intern

May 2017 - Aug 2017

Shanghai, CHINA

Lung nodule detection in CT scans

Background: We attend the Skylake competition sponsored by Intel and Alibaba about lung nodule detection in CT scans.

Contribution: I applied 3D UNet with Pytorch and Faster RCNN with Caffe to detect lung nodules in 1000 CT scans.

Extra: I achieved top 6 out of 2887 teams.

Johns Hopkins University

Research Assistant

Jan 2018 - Dec 2022 (expected)

Baltimore, MD, USA

Systematic Review for Interpretable ML in Medical Image Analysis

Background: Medical images are analyzed for high-stakes decision makings with following treatments impacting lives. Interpretable model design aims to reveal the working mechanism of complex algorithms. However, designers are not clinical stakeholders. A human-centered design is desired to create models that are indeed interpretable to end users.

Contribution: We conducted a systematic review of the literature in 3 databases. We identified 2508 records and included 68 articles. We introduce guidelines that recommend formative user research as the first step to understanding user needs and domain requirements.

Extra: My first-author journal paper is accepted in npj Digital Medicine ($IF = 11.6$)

Interpretable Cancer Subtyping with Cytopathology Images

Background: Uveal Melanoma (UM) is an eye cancer threatening patients’ lives. UM prognostication selects patients for the most suitable follow-up treatments. However, UM cancer subtyping with cytopathology images is beyond pathologists’ ability. We aim to create an automatic and interpretable algorithm for UM cancer subtyping.

Contribution: We created automatic and interactive algorithm that accelerates > 10 times for high-quality region extraction. Another algorithm for cancer subtyping by analyzing cell composition in cytopathology images is proved to be interpretable to pathologists through a web-based user study.

Extra: My first-author papers are accepted by MICCAI workshop and ICML workshop. A journal extension paper is being reviewed by Nature BME journal.

Automatic Splenic Injury Grading System with CT Scans

Background: Splenic injury is a common injury in adult abdominal trauma and AAST grading guideline is the gold criterion. Automated AAST grading could potentially provide a rapid, objective, and accurate second-reader capability, but no work has described automated AAST grading to date.

Contribution: Following AAST guideline, we first segment and detect the most salient features of the AAST grading system. We further created rule-based symbolic reasoning with these features for splenic injury grading by strictly following AAST guideline.

Extra: My first-author journal paper is accepted in Emergency Radiology (IF=1.59).

SELECTED PUBLICATIONS

Journal papers:

1. **Haomin Chen***, Catalina Gomez*, Chien-Ming Huang, Mathias Unberath. Explainable Medical Imaging AI Needs Human-Centered Design: Guidelines and Evidence from a Systematic Review. (2022) **npj Digital Medicine (IF=11.65)** **5**, 156.
2. **Haomin Chen**, Shun Miao, Daguang Xu, Gregory Hager, Adam Harrison. Deep hierarchical multi-label classification applied to chest X-ray abnormality taxonomies. (2020) **Medical Image Analysis (IF=13.82)** **66**, 101811.
3. T. Y. Alvin Liu*, **Haomin Chen***, Catalina Gomez, Zelia Correa, Mathias Unberath. Direct Gene Expression Profile Prediction for Uveal Melanoma from Digital Cytopathology Images via Deep Learning. (2022) **Ophthalmology Science (IF=7.18)** 100240.
4. **Haomin Chen**, David Dreizin, Mathias Unberath. Toward automated interpretable AAST grading for blunt splenic injury. (2022) **Emergency Radiology (IF=1.59)**
5. David Dreizin, Bryan Nixon, Jiazhen Hu, Benjamin Albert, Chang Yan, Gary Yang, **Haomin Chen**, Yuanyuan Liang, Nahye Kim, Jean Jeudy, Guang Li, Elana B. Smith, Mathias Unberath. A pilot study of deep learning-based CT volumetry for traumatic hemothorax. (2022) **Emergency Radiology (IF=1.59)** DOI:10.1007/s10140-022-02087-5.

Conference papers:

1. **Haomin Chen***, Yirui Wang*, Kang Zheng, Weijian Li, Chi-Tung Chang, Adam P. Harrison, Jing Xiao, Gregory D. Hager, Le Lu, Chien-Hung Liao, Shun Miao. Anatomy-aware siamese network: Exploiting semantic asymmetry for accurate pelvic fracture detection in x-ray images. **ECCV** 2020.
2. **Haomin Chen**, Shun Miao, Daguang Xu, Gregory D. Hager, Adam P. Harrison. Deep hierarchical multi-label classification of chest X-ray images. **MIDL** 2019.
3. **Haomin Chen**, T. Y. Alvin Liu, Catalina, Gomez, Mathias Unberath. An Interpretable Algorithm for Uveal Melanoma Subtyping from Whole Slide Cytology Images. **IMLH**, 2021. (*ICML workshop*).

4. **Haomin Chen**, T. Y. Alvin Liu, Zelia M. Correa, Mathias Unberath. An Interactive Approach to Region of Interest Selection in Cytologic Analysis of Uveal Melanoma Based on Unsupervised Clustering. **OMIA**, 2020 (*MICCAI workshop*).
5. David Dreizin, **Haomin Chen**, Alexander Upegui, Guang Li, Mathias Unberath. Blunt splenic trauma: accuracy of automated active bleed and contained vascular injury detection on CT with Faster R-CNN. **ASER 2022** and **RSNA 2022**.
6. David Dreizin, **Haomin Chen**, Alexander Upegui, Guang Li, Mathias Unberath. Blunt splenic trauma: automated splenic parenchymal disruption volumes for decision making in patients with no vascular injuries on CT. **ASER 2022** and **RSNA 2022**.
7. Yifan Gao*, **Haomin Chen***, Catalina Gomez*, Sophie Cai, Craig K. Jones, Adrienne Scott, Mathias Unberath. An Interpretable Approach to Identifying Sea Fan Neovascularization in Ultra-Widefield Color Fundus Photographs of Patients With Sickle Cell Hemoglobinopathy. **SPIE**, 2021.
8. T. Y. Alvin Liu, Hongxi Zhu, **Haomin Chen**, J. Fernando Arevalo, Ferdinand K. Hui, Paul H. Yi, Jinchi Wei, Mathias Unberath, Zelia M. Correa. Gene Expression Profile Prediction in Uveal Melanoma Using Deep Learning: A Pilot Study for the Development of an Alternative Survival Prediction Tool. **Ophthalmology Retina**, 2020.

AWARDS

Mentor award in the Howard County Public School.	<i>April 2022</i>
National College Students Mathematics Competition, National Silver Medal.	<i>Oct 2013</i>
National College Students Mathematics Model Contest, the third prize of Shanghai.	<i>Oct 2014</i>
Second-class scholarship of Fudan University.	<i>May 2015</i>
Mensa Member in China.	<i>May 2016</i>