HAOMIN CHEN

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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

INTERNSHIPS

Meta, Redmond   **Jun 2022 - Oct 2022**

Research Intern   *Redmond, WA, USA*

3D scene style transfer with 2D style image by differential rendering

· Internship performance exceeds director/mentor/peers' expectation in review.

· Learned style transfer, 3D mesh and rendering from scratch in one week.

· Utilized PyTorch3D & nvdiffrast as differential rendering to generate 2D views.

· Optimized texture maps by style transfer between 2D rendered images and style image.

· Preserved object style consistency by semantic style transfer.

NVIDIA, Bethesda   **May 2018 - Dec 2018**

Applied Research Intern   *Bethesda, MD, USA*

Deep Hierarchical Multi-label Classification of Abnormalities in Chest X-rays

· Paper accepted by MIDL 2019 with oral presentation.

· Special invitation to Journal "Medical Image Analysis" and paper accepted.

· Followed clinical taxonomy to construct hierarchical multi-label classification.

· Fit the extreme label imbalance dataset by a two-stage training procedure.

· Derived a numerically stable math formulation to avoid floating point underflow calculating loss.

PingAn Technology, Bethesda   **May 2019 - Dec 2019**

Applied Research Intern   *Bethesda, MD, USA*

Anatomical symmetric learning for Fracture Detection in Pelvic Trauma X-ray
- Paper accepted by ECCV 2020 with poster presentation.
- Mimicked radiologists' practice by comparing vertical asymmetric areas via Siamese network.
- Aligned Siamese features according to GNN-detected pelvic structure landmarks.
- Learned anatomical asymmetry explicitly by novel pixel-wise contrastive loss.

PingAn Technology, Shanghai   **May 2017 - Aug 2017**

Data Mining Scientist Intern   *Shanghai, CHINA*

Lung nodule detection in CT scans
- Top 6 out of 2887 teams in the Skylake competition sponsored by Intel and Alibaba.
- Applied PyTorch, 3D UNet and Caffe, Faster RCNN to detect lung nodules in 1000 CT scans.
- Used fusion method to reduce false positives.

PHD RESEARCH

Systematic Review for IML in Medical Image Analysis   **July 2021 - Sep 2022**
- Paper accepted in npj Digital Medicine journal.
- Proposed guidelines for human-centered design of interpretable ML in medical image analysis.
- Revealed the lack and importance of formative user research to understand end users.
- Screened 1791 papers and full-paper reviewed 68 papers.

Interpretable Cancer Subtyping with Cytopathology Images   **Sep 2018 - Nov 2022**
- Created automatic and human-interactive high-quality ROI extraction in Cytopathology images.
- Analyzed cell composition directly in cytopathology images for cancer subtyping.
- Conducted a web-based user study to assess the explainability of the entire algorithm.

Automatic Splenic Injury Grading System with CT Scans   **Jan 2022 - Oct 2022**
- Segmented laceration, and detected active bleeding and pseudoaneurysm.
- Segmented splenic area with teacher-student learning.
- Followed clinical guidelines for rule-based symbolic learning of Splenic Injury grading.

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.	*April 2022*
National College Students Mathematics Competition, National Silver Medal.	*Oct 2013*
National College Students Mathematics Model Contest, the third prize of Shanghai.	*Oct 2014*
Second-class scholarship of Fudan University.	*May 2015*
Mensa Member in China.	*May 2016*