

Xiaoling Hu

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Current Position	<ul style="list-style-type: none">• Harvard Medical School, Boston, USA Aug. 2023 - Present <i>Postdoctoral Research Fellow</i> - Hosted by Prof. Juan Eugenio Iglesias and Prof. Bruce Fischl
Research Interests	<p>My research interest lies in the intersection of medical imaging, computer vision and machine learning. In particular, I am interested in:</p> <ul style="list-style-type: none">• Topology-Driven Deep Image Analysis• Uncertainty Estimation and Its Applications• Learning with Imperfect Data
Education	<ul style="list-style-type: none">• Stony Brook University, Department of CS, USA Jan. 2018 - Aug. 2023 <i>Doctor of Philosophy</i> - Advisor: Chao Chen - Thesis: Learning Topological Representations for Deep Image Understanding - Committee: Chao Chen, Dimitris Samaras, Haibin Ling, Li Fuxin• Tsinghua University, Department of EE, China Sep. 2014 - June 2017 <i>Master of Science</i>• Huazhong University of Science and Technology, Department of EE, China Sep. 2010 - June 2014 <i>Bachelor of Science</i>
Selected Publications	<p>(* indicates equal contribution, [†] denotes students working closely with me)</p> <ul style="list-style-type: none">[1] Topology-Aware Uncertainty for Image Segmentation Saumya Gupta[†], Yikai Zhang, <u>Xiaoling Hu</u>, Prateek Prasanna, Chao Chen <i>Thirty-seventh Conference on Neural Information Processing Systems (NeurIPS)</i>, 2023[2] Calibrating Uncertainty for Semi-Supervised Crowd Counting Chen Li[†], <u>Xiaoling Hu</u>, Shahira Abousamra, Chao Chen <i>International Conference on Computer Vision (ICCV)</i>, 2023[3] Enhancing Modality-Agnostic Representations via Meta-Learning for Brain Tumor Segmentation Aishik Konwer[†], <u>Xiaoling Hu</u>, Xuan Xu, Joseph Bae, Chao Chen, Prateek Prasanna <i>International Conference on Computer Vision (ICCV)</i>, 2023[4] Learning Probabilistic Topological Representations Using Discrete Morse Theory <u>Xiaoling Hu</u>, Dimitris Samaras, Chao Chen <i>International Conference on Learning Representations (ICLR)</i>, 2023 (Spotlight, notable-top-25%)[5] Confidence Estimation Using Unlabeled Data Chen Li[†], <u>Xiaoling Hu</u>, Chao Chen <i>International Conference on Learning Representations (ICLR)</i>, 2023

- [6] **Structure-Aware Image Segmentation with Homotopy Warping**
Xiaoling Hu
Thirty-sixth Conference on Neural Information Processing Systems (NeurIPS), 2022
- [7] **Learning Topological Interactions for Multi-Class Medical Image Segmentation**
 Saumya Gupta^{*†}, Xiaoling Hu^{*}, James Kaan, Michael Jin, Mutshipay Mpoy, Katherine Chung, Gagandeep Singh, Mary Saltz, Tahsin Kurc, Joel Saltz, Apostolos Tassiopoulos, Prateek Prasanna, Chao Chen
European Conference on Computer Vision (ECCV), 2022 (**Oral, 2.7%**)
- [8] **Trigger Hunting with a Topological Prior for Trojan Detection**
Xiaoling Hu, Xiao Lin, Michael Cogswell, Yi Yao, Susmit Jha, Chao Chen
International Conference on Learning Representations (ICLR), 2022
- [9] **A Manifold View of Adversarial Risk**
 Wenjia Zhang, Yikai Zhang, Xiaoling Hu, Mayank Goswami, Chao Chen, Dimitris Metaxas
International Conference on Artificial Intelligence and Statistics (AISTATS), 2022
- [10] **Topology-Attention ConvLSTM Network for 3D Image Segmentation**
 Jiaqi Yang^{*†}, Xiaoling Hu^{*}, Chao Chen, Chialing Tsai
International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI), 2021
- [11] **Topology-Aware Segmentation Using Discrete Morse Theory**
Xiaoling Hu, Yusu Wang, Li Fuxin, Dimitris Samaras, Chao Chen
International Conference on Learning Representations (ICLR), 2021 (**Spotlight, 5.6%**)
- [12] **3D Topology-Preserving Segmentation with Compound Multi-Slice Representation**
 Jiaqi Yang^{*†}, Xiaoling Hu^{*}, Chao Chen, Chialing Tsai
IEEE International Symposium on Biomedical Imaging (ISBI), 2021
- [13] **Topology-Preserving Deep Image Segmentation**
Xiaoling Hu, Li Fuxin, Dimitris Samaras, Chao Chen
Thirty-third Conference on Neural Information Processing Systems (NeurIPS), 2019
- [14] **Saliency Detection based on Integration of Central Bias, Reweighting and Multi-Scale for Superpixels**
Xiaoling Hu, Wenming Yang, Fei Zhou, Qingmin Liao
IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2016

Preprints

(* indicates equal contribution)

- [1] **Anomaly-Guided Weakly Supervised Lesion Segmentation on Retinal OCT Images**
 Jiaqi Yang[†], Gozde Merve Demirci[†], Xiaoling Hu, Nitish Mehta, Meera Ramakrishnan, Mina Naguib, Chao Chen, Chialing Tsai
Major revision for Medical Image Analysis
- [2] **Deep Statistic Shape Model for Myocardium Segmentation**
Xiaoling Hu, Xiao Chen, Terrence Chen, Shanhui Sun
Tech Report

Selected Honors and Awards	<ul style="list-style-type: none"> • Catacosinos Fellowship (2 out of 200+ PhD students), 2023 • NeurIPS travel award, 2019 • First-class Scholarship, Tsinghua University, 2016 (5%) • Second-class Scholarship, Tsinghua University, 2015 (10%) 	
Experiences	Stony Brook University, Department of CS, USA <i>Research Assistant</i> Advisor: <i>Prof.</i> Chao Chen	Sep. 2018 - Present
	<ul style="list-style-type: none"> • Topological Data Analysis • Computer Vision, Medical Imaging • Robust Machine Learning 	
	Allen Institute, USA <i>Summer Consultant</i> Mentor: <i>Dr.</i> Matheus Viana	May 2022 - Aug. 2022
	<ul style="list-style-type: none"> • Topology-Aware Image Segmentation 	
	United Imaging Intelligence (UII), USA <i>Research Intern</i> Mentor: <i>Dr.</i> Shanhui Sun	May 2021 - Aug. 2021
	<ul style="list-style-type: none"> • Deep Shape Model Based Network 	
	Tencent Youtu Lab, China <i>Research Intern</i> Mentor: <i>Dr.</i> Yuwing Tai	Jun. 2017 - Jan. 2018
	<ul style="list-style-type: none"> • Clothes Detection, Attribute Prediction 	
Skills	<ul style="list-style-type: none"> • Languages: C/C++, Matlab, Python, Lua, Java • OS: Linux, Mac OS, Windows • Tools: Caffe, Torch, Tensorflow, PyTorch, OpenCV 	
Service	<ul style="list-style-type: none"> • Reviewer, International Conference on Machine Learning (ICML) • Reviewer, International Conference on Learning Representations (ICLR) • Reviewer, Conference on Neural Information Processing Systems (NeurIPS) • Reviewer, Computer Vision and Pattern Recognition (CVPR) • Reviewer, European Conference on Computer Vision (ICCV) • Reviewer, European Conference on Computer Vision (ECCV) • Reviewer, Winter Conference on Applications of Computer Vision (WACV) • Reviewer, Artificial Intelligence and Statistics (AISTATS) • Reviewer, International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI) • Reviewer, Learning on Graphs Conference (LoG) • Reviewer, Medical Imaging with Deep Learning (MIDL) 	

- Program Committee, AAAI Conference on Artificial Intelligence (AAAI)
- Reviewer, Pattern Recognition (PR)

Talks

Learning Topological Representations for Deep Image Understanding

- Department of CS, Florida State University, Apr. 2023
- Department of BMI, Ohio State University, Mar. 2023
- Department of CS, Rochester Institute of Technology, Feb. 2023
- Department of ECE, University of California, Riverside, Feb. 2023
- Athinoula A. Martinos Center for Biomedical Imaging, MGH/Harvard Medical School, Nov. 2022

Topology-Informed Image Analysis

- Center for Computational Neuroscience, Flatiron Institute, Oct. 2022

Topology-Aware Deep Image Segmentation

- Geometry and Topology meet Data Analysis and Machine Learning (GTDAML), Online, Aug. 2021

References

- **Chao Chen**
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- **Dimitris Samaras**
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