

## Xiaoling Hu

E-mail: xihu3@mgh.harvard.edu, Mobile: 6312028413

Website: <https://huxiaoling.github.io/>

### Current Position

- **Harvard Medical School, Boston, USA**  
*Postdoctoral Research Fellow, Aug. 2023 - Present*  
- Hosted by Prof. Juan Eugenio Iglesias and Prof. Bruce Fischl

### Research Interests

My research interest lies in the intersection of medical imaging, computer vision and machine learning. In particular, I am interested in:

- **Topology-Driven Deep Image Analysis**
- **Uncertainty Estimation and Its Applications**
- **Learning with Imperfect Data**

### Education

- **Stony Brook University, Department of CS, USA**  
*Doctor of Philosophy, Jan. 2018 - Aug. 2023*  
- 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**  
*Master of Science, Sep. 2014 - June 2017*
- **Huazhong University of Science and Technology, Department of EE, China**  
*Bachelor of Science, Sep. 2010 - June 2014*

### Selected

#### Publications

(\* indicates equal contribution, <sup>†</sup> denotes students working closely with me)

- [1] Topology-Aware Uncertainty for Image Segmentation  
Saumya Gupta<sup>†</sup>, Yikai Zhang, **Xiaoling Hu**, Prateek Prasanna, Chao Chen  
*Thirty-seventh Conference on Neural Information Processing Systems (NeurIPS)*, 2023
- [2] Calibrating Uncertainty for Semi-Supervised Crowd Counting  
Chen Li<sup>†</sup>, **Xiaoling Hu**, Shahira Abousamra, Chao Chen  
*International Conference on Computer Vision (ICCV)*, 2023
- [3] Enhancing Modality-Agnostic Representations via Meta-Learning for Brain Tumor Segmentation  
Aishik Konwer<sup>†</sup>, **Xiaoling Hu**, Xuan Xu, Joseph Bae, Chao Chen, Prateek Prasanna  
*International Conference on Computer Vision (ICCV)*, 2023
- [4] Learning Probabilistic Topological Representations Using Discrete Morse Theory  
**Xiaoling Hu**, Dimitris Samaras, Chao Chen  
*International Conference on Learning Representations (ICLR)*, 2023 (**Spotlight, notable-top-25%**)
- [5] Confidence Estimation Using Unlabeled Data  
Chen Li<sup>†</sup>, **Xiaoling Hu**, Chao Chen  
*International Conference on Learning Representations (ICLR)*, 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<sup>\*†</sup>, **Xiaoling Hu**<sup>\*</sup>, 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<sup>\*†</sup>, **Xiaoling Hu**<sup>\*</sup>, 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 Z-dimension multi-resolution representation  
Jiaqi Yang<sup>\*†</sup>, **Xiaoling Hu**<sup>\*</sup>, 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<sup>†</sup>, Gozde Merve Demirci<sup>†</sup>, **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*

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

- 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**  
Assistant Professor, Stony Brook University  
chao.chen.1@stonybrook.edu  
<https://chaochen.github.io/>
- **Dimitris Samaras**  
SUNY Empire Innovation Professor, Stony Brook University  
samaras@cs.stonybrook.edu  
<https://www3.cs.stonybrook.edu/~samaras/>
- **Fuxin Li**  
Associate Professor, Oregon State University  
fuxin.li@oregonstate.edu  
<https://web.engr.oregonstate.edu/~lif/>
- **Prateek Prasanna**  
Assistant Professor, Stony Brook University  
prateek.prasanna@stonybrook.edu  
<https://you.stonybrook.edu/imaginelab/>