Yuliang Xiao's CV/Resume

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Education

- **University of Toronto** — Toronto, Canada
  Doctor of Philosophy Candidate - Medical Biophysics; GPA: -/4.00 — 09/2023 - Present
- **Johns Hopkins University** — Baltimore, United States
  Master of Science in Engineering - Robotics; GPA: 3.97/4.00 — 08/2021 - 12/2022
- **University of Pittsburgh** — Pittsburgh, United States
  Bachelor of Science - Computer Science & Mechanical Engineering; GPA: 3.92/4.00 — 08/2018 - 08/2021
- **Sichuan University** — Chengdu, China
  Bachelor of Engineering - Mechanical Engineering; GPA: 3.61/4.00 — 09/2016 - 06/2021

Research Interest

Investigations on MRI pTx development, surgical vision, medical robotics, deep learning and computer vision

Conferences & Abstracts (*: equal contribution)

- Ameen Amanian*, **Yuliang Xiao***, Zhiwei Gong, Manish Sahu, Russell Taylor, Francis Creighton, Masaru Ishii. Statistical Shape Model of the Eustachian Tube for Understanding and Managing Eustachian Tube Dysfunction. *Combined Otolaryngology Spring Meetings 2023*
- Ameen Amanian, Aseem Jain, **Yuliang Xiao**, Manish Sahu, Russell Taylor, Francis Creighton, Masaru Ishii. Automated Sinonasal Computed Tomography Segmentation for Application in Rhinology: A Deep Learning Framework. *Combined Otolaryngology Spring Meetings 2023* (Accept as podium)
- Ameen Amanian*, **Yuliang Xiao***, Chanha Kim, Manish Sahu, Zhiwei Gong, Deepa Galaiya, Russell Taylor, Francis Creighton. Automated Segmentation of the Eustachian Tube for Applications in the Management of Eustachian Tube Dysfunction - A Deep Learning Framework. *Conference on Machine Intelligence in Medical Imaging 2022*
- Ameen Amanian*, **Yuliang Xiao***, Manish Sahu, Zhiwei Gong, Deepa Galaiya, Russell Taylor, Francis Creighton. Automated Segmentation of the Eustachian Tube for Applications in the Management of Eustachian Tube Dysfunction - A Deep Learning Framework. *Canadian Society of Otolaryngology - Head & Neck Surgery 2022*
- Yuanwu He*, **Yuliang Xiao***, Nikhil Bajaj, Neural Network-based Approximation of Model Predictive Control Applied to a Flexible Shaft Servomechanism. *Ingenium, Undergraduate Research at the Swanson School of Engineering, University of Pittsburgh 2020*

Publications (*: equal contribution)

- **Yuliang Xiao***, Xinan Sun*. An Automated Framework for Endoscopic Tool Collision Detection. *IEEE Robotics and Automation Letters* (To Be Submitted)
- **Yuliang Xiao***, Xinan Sun*. HEARTNET: Weakly-Supervised Heart Mesh Generation. *IEEE Transcations on Medical Imaging* (To Be Submitted)
- Ameen Amanian, Aseem Jain, **Yuliang Xiao**, Chanha Kim, Andy S. Ding, Manish Sahu, Russell H. Taylor, Mathias Unberath, Bryan Kevin Ward, Deepa Galaiya, Masaru Ishii, Francis X. Creighton. A Deep Learning Framework for Analysis of the Eustachian Tube and the Internal Carotid Artery. *Otolaryngology-Head and Neck Surgery* (Under Review)
- Manish Sahu*, **Yuliang Xiao***, Jose L. Porras, Ameen Amanian, Aseem Jain, Andrew Thamboo, Russell H. Taylor, Francis X. Creighton, Masaru Ishii. A Label-Efficient Framework for Automated Sinonasal CT Segmentation in Image-Guided Surgery. *Otolaryngology-Head and Neck Surgery* (Under Review)
- Shizhan Gong, Yonghao Long, Kai Chen, Jiaqi Liu, **Yuliang Xiao**, Alexis Cheng, Zerui Wang, Qi Dou. Self-Supervised Cyclic Diffeomorphic Mapping for Soft Tissue Deformation Recovery in Robotic Surgery Scenes. *IEEE Transcations on Medical Imaging* (Under Review)

Research Experience & Projects

- **Endoscopic Tool Collision Detection** 09/2023 - Present
  University of Toronto & Tianjin University
  1. Design and train the SAM network to obtain the tool tip mask
  2. Design the mapping of feature points to real-time 3D point cloud
  3. Develope the collision detection algorithm based on the 3D point cloud

- **Weakly-Supervised Heart Mesh Generation** 03/2023 - Present
  University of Toronto & Tianjin University
  1. Design weakly sueprvised U-Net backbone for feature extraction
  2. Design the GCN network to generate heart mesh
  3. Combine the output mesh with surgical applications

- **Self-Supervised Cyclic Diffeomorphic Mapping for Soft Tissue Deformation Recovery** 01/2023 - 04/2023
  Department of Computer Science, The Chinese University of Hong Kong
  1. Re-build the baseline experiments
  2. Design the new traditional algorithms for 3D point cloud registration

- **Automated Segmentation of Advanced Oropharyngeal Squamous Cell Carcinom** 11/2022 - 12/2022
  University of British Columbia & Johns Hopkins University
  1. Develop the fully-supervised **Deep Learning** algorithms (*nnU-Net*) to make automated segmentation for oropharyngeal squamous cell carcinoma
  2. Build a completed pipeline to evaluate the performance of model from the clinical views

- **Video-based Assessment of Intraoperative Surgical Skills in Cataract Surgery** 09/2022 - 12/2022
  Department of Computer Science, Johns Hopkins University
  1. Give segmentations on instruments in the video for self-/semi-supervision methods
  2. Provide skill assessments based on surgical videos
  3. Feedback catalog & Usability studies

- **2022 ACM/IEEE TinyML Design Contest at ICCAD** 08/2022 - 11/2022
  Johns Hopkins University & University of Pennsylvania
  1. Develop an efficient fully-supervised **Deep Learning** algorithm to detect the life-threatening ventricular arrhythmias on the MCU platform

- **Statistical Shape Modeling for Eustachian Tube** 05/2022 - 04/2023
  Laboratory for Computational Sensing and Robotics, Johns Hopkins University
  1. Build a pipeline to make **Principal Component Analysis** on the Eustachian Tube
  2. Generate mean shape and give a variation analysis among a large population based on principal components

- **Automated Segmentation and Registration for the Eustachian Tube & Nasal Cavity** 01/2022 - 04/2023
  Laboratory for Computational Sensing and Robotics, Johns Hopkins University
  1. Develop the fully-supervised, weakly-supervised and semi-supervised **Deep Learning** algorithms to make automated segmentation and registration on some medical anatomy structures
  2. Build a completed pipeline to evaluate the performance of model from the clinical views

- **2021-2022 AccelNet Surgical Robotics Challenge** 10/2021 - 04/2022
  Advanced Robotics and Computationally AugmenteD Environments, Johns Hopkins University
  1. Develop a Deep Learning algorithm to identify the pose (position and orientation) of the metallic suture needle with respect to the current endoscope pose
  2. Move the large needle driver to grasp the needle and then move the needle tip to the target and drive the needle through the tissue until the tip exits
  3. Drive the needle through the phantom from the first entry point to the corresponding exit point

Skills Summary

- **Languages**: Python, MATLAB, C/C++, JAVA
- **Frameworks**: PyTorch, TensorFlow, Keras, ANTsPy, VoxelMorph, nnUNet, MONAI
- **Tools**: MATLAB, GIT, Unity
- **Soft Skills**: Leadership, Event Management, Writing, Public Speaking, Time Management

Working Experience

- **Graduate Teaching Assistant (part-time), Computer Integrated Surgery I** 08/2022 - 12/2022
  Department of Computer Science, Johns Hopkins University
- **Research Assistant (part-time)** 10/2022 - 12/2022
  Department of Ophthalmology, Johns Hopkins School of Medicine
- **Research Assistant** 02/2023 - 08/2023
  Department of Computer Science, The Chinese University of Hong Kong

Honors and Awards

- Honor List for each year at University of Pittsburgh 08/2018 - 08/2021
- Second Prize Scholarship of Sichuan University 03/2018
- Third Prize in the China Mathematic Competition for College Student 04/2017