

Yuliang Xiao

PH.D. CANDIDATE IN DEPARTMENT OF MEDICAL BIOPHYSICS

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Education

University of Toronto / Sunnybrook Research Institute

Toronto, Canada

PH.D. CANDIDATE IN MEDICAL BIOPHYSICS

Sep. 2023 - Now

- Thesis topic: 3D Selective Excitation of Arbitrary Reduced FOV for High Resolution and Fast Reconstruction
- Supervisors: **Prof. Mark Chiew** and **Prof. Simon J. Graham**
- CGPA: 3.74/4.00

Johns Hopkins University / Laboratory for Computational Sensing and Robotics

Baltimore, U.S.A

M.Sc. IN ROBOTICS

Sep. 2021 - May. 2023

- Thesis topic: Automatic Segmentation and Registration for Image-guided Surgery
- Supervisors: **Prof. Manish Sahu** and **Prof. Russell H. Taylor**
- CGPA: 3.97/4.00

University of Pittsburgh

Pittsburgh, U.S.A

B.Sc. IN COMPUTER SCIENCE / B.S.E. IN MECHANICAL ENGINEERING

Sep. 2018 - Aug. 2021

- Thesis topic: Neural Network-based Approximation of Model Predictive Control Applied to a Flexible Shaft Servomechanism
- Supervisors: **Prof. Nikhil Bajaj**
- CGPA: 3.92/4.00

Sichuan University

Chengdu, China

B.E. IN MECHANICAL ENGINEERING

Sep. 2016 - Aug. 2021

- CGPA: 3.61/4.00

Conferences (* means equal contribution)

Stage-Aligned Knowledge Distillation for Fast and Memory-Efficient 4D Flow MRI Reconstruction

MICCAI CMRx4DFlow Workshop
2026

YULIANG XIAO, KIAN ANVARI HAMEDANI, ZACH VAVASOUR, SIMON J. GRAHAM, MARK CHIEW

 [Paper](#)

Phase-Coupled State-Space Reconstruction for Ultra-Accelerated 4D Flow MRI

MICCAI CMRx4DFlow Workshop
2026

KIAN ANVARI HAMEDANI, FATEMEH EBRAHIMINIA, YULIANG XIAO, ZACH VAVASOUR, MARK CHIEW

 [Paper](#)

Joint Optimization of Parallel Transmit RF Pulses and Gradient Waveforms for 2D Spatially Selective Excitation (**PowerPitch Oral**)

ISMRM 2026

YULIANG XIAO, JASON ROCK, TIM ZHE WU, JAMIE NEAR, MARK CHIEW, SIMON J. GRAHAM

 [Paper](#)

Multi-shot 2D Selective Excitation for Extracranial Lipid Suppression in MR Spectroscopic Imaging of the Brain

ISMRM 2026

JASON ROCK, YULIANG XIAO, EMILE KADALIE, CHRISTABEL FAYLINN, TIM ZHE WU, MARK CHIEW, SIMON J. GRAHAM, JAMIE NEAR

 [Paper](#)

Self-Supervised Parallel Transmit RF Pulse Design for 2D Spatially Selective Excitation (**Pitch-and-Poster Presentation**)

IGTxImNO 2025

YULIANG XIAO, JASON ROCK, JAMIE NEAR, MARK CHIEW, SIMON J. GRAHAM

 [Paper](#)

Statistical Shape Model of the Eustachian Tube for Understanding and Managing Eustachian Tube Dysfunction

COSM 2023

AMEEN AMANIAN*, YULIANG XIAO*, ZHIWEI GONG, MANISH SAHU, BRAIN WESTERBERG, FRANCIS CREIGHTON

 [Paper](#)

Automated Sinonasal Computed Tomography Segmentation for Application in Rhinology: A Deep Learning Framework (Oral)

COSM 2023

YULIANG XIAO*, AMEEN AMANIAN*, ASEEM JAIN, MANISH SAHU, FRANCIS CREIGHTON, ANDREW THAMBOO, MASARU ISHII

Automated Segmentation of the Eustachian Tube for Applications in the Management of Eustachian Tube Dysfunction - A Deep Learning Framework (Oral)

CMIMI 2022

AMEEN AMANIAN*, YULIANG XIAO*, ZHIWEI GONG, DEEPA GALAIYA, RUSSELL TAYLOR, MATHIAS UNBERATH, MANISH SAHU, FRANCIS CREIGHTON

 Paper

Journals (* means equal contribution)

A Vision-Based Cross-Platform Framework for Force Estimation in Robot-Assisted Minimally Invasive Surgery with Instrument Constraints

IEEE TIM 2026

XINAN SUN, YULIANG XIAO, GUOWEI WANG, TAO LIANG, SHUXIN WANG, YUAN XING

Under Review

Semi-HeRe: Semi-Supervised Learning for Whole Heart Mesh Reconstruction

MIA 2026

YULIANG XIAO*, XINAN SUN*, JIALUN PEI, SHI QIU, SHUXIN WANG, PHENG-ANN HENG

Under Review

Simulations Supporting a Deep Neural Network for Markerless, Sub-millimeter Head Pose Estimation for Motion Correction in Brain MRI

Medical Physics 2026

MARINA SILIC, YULIANG XIAO, SIMON J. GRAHAM

Revised and Submitted

SelfExNet: A Self-Supervised Physics-Informed Framework for Multi-Channel Joint RF and Gradient Waveform Optimization in 2D Spatially Selective Excitation

MRM 2026

YULIANG XIAO, JASON ROCK, ZHE WU, JAMIE NEAR, MARK CHIEW, SIMON J. GRAHAM

 Project

Self-Supervised Cyclic Diffeomorphic Mapping for Soft Tissue Deformation Recovery in Robotic Surgery Scenes

IEEE TMI 2024

SHIZHAN GONG, YONGHAO LONG, KAI CHEN, JIAQI LIU, YULIANG XIAO, ALEXIS CHENG, ZERUI WANG, QI DOU

 Project

A Label-Efficient Framework for Automated Sinonasal CT Segmentation in Image-Guided Surgery

Otolaryngology-HNS 2024

MANISH SAHU*, YULIANG XIAO*, JOSE L. PORRAS, AMEEN AMANIAN, ASEEM JAIN, ANDREW THAMBOO, RUSSELL H. TAYLOR, FRANCIS X. CREIGHTON, MASARU ISHII

 Project

Deep Learning Framework for Analysis of the Eustachian Tube and the Internal Carotid Artery

Otolaryngology-HNS 2024

AMEEN AMANIAN, ASEEM JAIN, YULIANG XIAO, CHANHA KIM, ANDY S. DING, MANISH SAHU, RUSSELL TAYLOR, MATHIAS UNBERATH, BRYAN K. WARD, DEEPA GALAIYA, MASARU ISHII, FRANCIS X. CREIGHTON

 Project

Professional Experience

Contrastive Multimodal Learning for Robust Cardiac MRI Reconstruction

Toronto, Canada

UNIVERSITY OF TORONTO / SUNNYBROOK RESEARCH INSTITUTE

Apr. 2026 - Aug. 2026

- Designed a multimodal CMR reconstruction framework that integrates undersampled k-space, sampling masks, coil sensitivity maps, anatomical semantics, and acquisition-related information for joint reconstruction of magnitude images and velocity fields.
- Developed a shared-encoder, dual-branch architecture to disentangle anatomy-aware and acquisition-aware representations, enabling structured modeling of anatomical content and acquisition variability.
- Incorporated CLIP-style contrastive alignment between anatomical text labels and imaging embeddings, together with acquisition-pair supervision, to improve robustness and generalization across centers and organs.

Joint Optimization of pTx RF and Gradient Pulses for 2D Spatially Selective Excitation

Toronto, Canada

UNIVERSITY OF TORONTO / SUNNYBROOK RESEARCH INSTITUTE

Oct. 2024 - Dec. 2025

- Design a **unified self-supervised framework** for 2D RF pulse optimization using physical information.
- Extend the framework for parallel transmit pulse design.
- Involve the improvement of the pulse design for B1 and B0 inhomogeneity.

Semi-Supervised 3D Cardiac Mesh Reconstruction

UNIVERSITY OF TORONTO / TIANJIN UNIVERSITY / THE CHINESE UNIVERSITY OF HONG KONG

- Design semi-supervised U-Net backbone for feature extraction.
- Design the **GCN** to generate heart mesh.
- Combine the output mesh with surgical applications.

Hong Kong, China

Mar. 2023 - Now

Vision-Based Force Estimation in Robot-Assisted Minimally Invasive Surgery

UNIVERSITY OF TORONTO / TIANJIN UNIVERSITY

- Design and finetune the **SAM** network to obtain the tool tip masks.
- Design the mapping of feature points to real-time 3D point cloud.
- Develop the collision detection algorithm based on the 3D point cloud.

Toronto, Canada

Aug. 2024 - Apr. 2025

Self-Supervised Cyclic Diffeomorphic Mapping for Soft Tissue Deformation Recovery

MED-AIR LAB, THE CHINESE UNIVERSITY OF HONG KONG

- Implement the baseline experiments.
- Design the new traditional algorithms for 3D point cloud registration.

Hong Kong, China

Jan. 2023 - Apr. 2024

Automated Segmentation of Advanced Oropharyngeal Squamous Cell Carcinom

LCSR LAB, JOHNS HOPKINS UNIVERSITY

- Develop the supervised deep learning framework (**nnU-Net**) to make automated segmentation for oropharyngeal squamous cell carcinoma.
- Build a completed pipeline to evaluate the performance of model from the clinical views.

Baltimore, U.S.A

Oct. 2022 - Dec. 2022

Video-based Assessment of Intra-operative Surgical Skills in Cataract Surgery

LCSR LAB, JOHNS HOPKINS UNIVERSITY

- Give segmentation on instruments in the video for **self-/semi-supervision** methods.
- Provide skill assessments based on surgical videos.
- Feedback catalog & Usability studies

Baltimore, U.S.A

Sep. 2022 - Dec. 2022

Statistical Shape Modeling for Eustachian Tube Dysfunction Diagnosis

LCSR LAB, JOHNS HOPKINS UNIVERSITY

- Build a pipeline to make **PCA** on the Eustachian Tube.
- Generate mean shape and give a variation analysis among a large population based on principal components.

Baltimore, U.S.A

May. 2022 - Sep. 2022

Automated Segmentation and Registration for the Eustachian Tube and Nasal Cavity

LCSR LAB, JOHNS HOPKINS UNIVERSITY

- Develop the **supervised, semi-** and **weakly-supervised** deep learning algorithms to make automated segmentation and registration on nasal cavity and eustachian tube.
- Build a completed pipeline to evaluate the performance of model from the clinical views.

Baltimore, U.S.A

Jan. 2022 - Apr. 2024

2021-2022 AccelNet Surgical Robotics Challenge

ARCADE LAB, JOHNS HOPKINS UNIVERSITY

- Develop a deep learning algorithm to identify the pose (position and orientation) of the metallic suture needle with respect to the current endoscope pose.
- 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.
- Drive the needle through the phantom from the first entry point to the corresponding exit point.

Baltimore, U.S.A

Oct. 2021 - Apr. 2022

Honors & Awards

INTERNATIONAL

2023-Now PhD Fellowship, Temerty Faculty of Medicine, University of Toronto

Toronto, Canada

2021 Honor Student, School of Information and Computing, University of Pittsburgh

Pittsburgh, U.S.A

2020 Undergraduate Summer Research Scholarship, Swanson School of Engineering, University of Pittsburgh

Pittsburgh, U.S.A

2019 Honor Student, Swanson School of Engineering, University of Pittsburgh

Pittsburgh, U.S.A

2018 Dean's List, Swanson School of Engineering, University of Pittsburgh

Pittsburgh, U.S.A

DOMESTIC

2018 Second Prize Scholarship, Sichuan University

Chengdu, China

2017 Third Prize Winner, China Mathematic Competition for College Student

Chengdu, China