

XIAO LIANG

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Education

University of California San Diego

PhD in Electrical and Computer Engineering

Sep. 2023 – present

La Jolla, California

University of California San Diego

MS in Computer Science and Engineering

Sep. 2021 – Jun. 2023

La Jolla, California

University of Washington Seattle

BS in Computer Science and Engineering

Sep. 2017 – Jun. 2021

Seattle, Washington

Publications

[Xiao Liang](#)[†], Fei Liu[†], Yutong Zhang, Yuele Li, Shan Lin, Michael C. Yip. Real-to-Sim Deformable Object Manipulation: Optimizing Physics Models with Residual Mappings for Robotic Surgery. *IEEE International Conference on Robotics and Automation (ICRA)*, 2024. [Under Review](#)

Yutong Zhang[†], Fei Liu[†], [Xiao Liang](#), Michael C. Yip. Achieving Autonomous Cloth Manipulation with Optimal Control via Differentiable Physics-Aware Regularization and Safety Constraints *IEEE International Conference on Robotics and Automation (ICRA)*, 2024. [Under Review](#)

[Xiao Liang](#), Shan Lin, Fei Liu, Dimitri Schreiber, Michael C. Yip. ORRN: An ODE-based Recursive Registration Network for Deformable Respiratory Motion Estimation with Lung 4DCT Images. *IEEE Transactions on Biomedical Engineering (TBME)*, 2023

Research Experience

PhD Student

Sep 2023 – present

Physics simulation and machine learning, UCSD Advanced Robotics and Controls Lab

La Jolla, California

- Bridging the reality to simulation gap for deformable object manipulation through online simulation optimization.
- Safety-awared deformable object manipulation using differentiable cloth simulation.
- Imitation learning by Robot-to-human motion alignment using SE(3)-equivariant neural networks.

Graduate Student Research

Sep 2021 – June 2023

Medical Image analysis, UCSD Advanced Robotics and Controls Lab

La Jolla, California

- Developed a novel learning-based deformable registration algorithm for lungs under respiratory deformation.
- Improved registration accuracy and inference speed upon SOTA learning-based methods.
- This work is published as a journal paper ([paper link](#)) by IEEE Transactions on Biomedical Engineering.

Undergraduate Research Assistant

Jan 2021 – Jun 2021

Computer Vision, UW Graphics and Imaging Laboratory

Seattle, Washington

- Extending a previous research [Background Matting V2](#), developed a novel video matting neural network that generates high-resolution matte and estimates a static background in real time.
- Improved the matte prediction by utilizing motions and developed criteria for selecting key frames for background reconstruction in a video.

Undergraduate Research Assistant

March 2020 – Jun 2021

Human Computer Interaction (Mixed Reality), UW Reality Lab

Seattle, Washington

- Developed a deep learning-enabled Mixed Reality application for augmenting the cooking experience.
- Trained and deployed SOTA object recognition and detection neural networks on a cloud server.
- Developed near real-time communication scheme between an Magic Leap One headset and the cloud machine, providing semantic awareness to the mixed reality device.

Teaching Experience

Teaching Assistant

Mar. 2021 – Jun. 2021

CSE 481V Virtual Reality Capstone, University of Washington

Seattle, Washington

Teaching Assistant

Jun. 2020 – Dec. 2020

CSE 457 Computer Graphics, University of Washington

Seattle, Washington

Other Projects

Neural Process for Safe Exploration | *Neural Process*

- Developed a neural process guided safe exploration algorithm for a movie recommendation problem.

Volume Rendering in Virtual Reality System | *Unity, High Level Shading Language*

- Developed a real-time, interactive, volume rendering algorithm for visualizing 3D medical image in Virtual Reality.

Graph Neural Network Particle Simulator | *Graph Neural Network*

- Implemented a previous work on using Graph neural network for simulating fluid particle dynamics.

Human Pose-controlled Game | *Kinect, Unity, Neural Network*

- Made a Super Mario-like game that is controlled by player's poses classified by a neural network using Kinect's data.

Professional Activities

Journal/Conference reviewer

- IEEE Journal of Biomedical and Health Informatics (JBHI)

Workshop Poster

- Workshop on Integrated Perception, Planning, and Control for Physically and Contextually-Aware Robot Autonomy (IPPC), *IROS 2023*, Detroit, USA

Technical Skills

Languages: Python, Java, C++, Matlab, JavaScript

Tools & libraries: Pytorch, Jax, Numpy, OMPL, Unity, Blender, Slicer, PolyFem...