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UC San Diego, La Jolla, CA

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## Research Interests

My research interests lie at the intersection of control theory and robotics, encompassing computational modeling, advanced control, AI, and integrated hardware/software for robotic autonomy. I focus on applying these in unstructured environments, including biomedical, manufacturing, industrial, natural, and household settings.

- **Computational Modeling:** includes mechanics, kinematics, dynamics, physics-informed simulation and optimization.
- **Advanced Control and AI:** model-based and data-driven control, inverse problems, perception, human-in-the-loop.
- **Integrated Embedded and Real-Time System :** accelerated computing, cyber-physical systems, mechatronics.

## Education

**Institut National des Sciences Appliquées de Lyon ( [INSA de Lyon](#) )**

Lyon, France

Ph.D. in Robotics

Sep. 2013 – Sep. 2016

*Top [Engineering school](#) in France (Grande école)*

*Top [51-75 worldwide](#) in Mechanical Engineering based on ARWU Ranking*

- **Thesis:** Dual-user Haptic Training System
- **Supervisors:** Prof. Arnaud Lelevé, Prof. Tanneguy Redarce, Dr. Damien Eberard

**Institut National des Sciences Appliquées de Lyon ( [INSA de Lyon](#) )**

Lyon, France

Master of Science in Control System and Automation Engineering

Sep. 2012 – Aug. 2013

- **Thesis:** Teleoperation System Using Port-Hamiltonian Approach
- **Supervisor:** Prof. Arnaud Lelevé

**Northwestern Polytechnical University ( [NWPU](#) )**

Xi'An, China

Bachelor of Science in Control System and Automation Engineering

Sep. 2008 – Jul. 2012

*Top [22nd worldwide](#) in Mechanical Engineering in ARWU Ranking*

*Top [51-75 worldwide](#) in Automation and Control based on ARWU Ranking*

- **Speciality:** Automation and Inertial Navigation

## Appointments

**University of California San Diego ( [UCSD](#) )**

San Diego, US

Postdoctoral Scholar

Dec. 2019 – present

- [Advanced Robotics and Controls Lab](#)
- **Supervisor:** Prof. [Michael Yip](#)

**[Biorobotics Institute](#), [Scuola Superiore Sant'Anna \(SSSA\)](#)**

Pisa, Italy

Senior Research Associate/Postdoc

Apr. 2019 – Nov. 2019

- [Assistive Robotics Laboratory](#)
- **Supervisor:** Prof. [Filippo Cavallo](#)

[Bioinspired Soft Robotics](#), Italian Institute of Technology (IIT)  
Research Associate/Postdoc

Pisa, Italy  
Mar. 2018 – Mar. 2019

[ROBO Medical Technology Co., Ltd](#)  
Senior Control Engineer & Project Director

Shenzhen, China  
Oct. 2016 – Feb. 2018

## Publications



### Preprints & Submitted (\* shares the first author)

- [TRO'24] **Parameter Identification and Motion Control for Articulated Rigid Body Robots Using Differential Position-based Dynamics** [\[ARXIV\]](#)  
[Fei Liu](#), Mingen Li, Jingpei Lu, Entong Su, Michael C. Yip  
*IEEE Transactions on Robotics (T-RO)*.  
[In Revision \(check for PDF preview\)](#)
- [ICRA'24] **Achieving Autonomous Cloth Manipulation with Optimal Control via Differentiable Physics-Aware Regularization and Safety Constraints** [\[ARXIV\]](#)  
[Fei Liu\\*](#), Yutong Zhang\*, Xiao Liang, Michael Yip  
*IEEE International Conference on Robotics and Automation (ICRA), 2024*.  
[Under Submission](#)
- [ICRA'24] **Real-to-Sim Deformable Object Manipulation: Optimizing Physics Models with Residual Mappings for Robotic Surgery** [\[ARXIV\]](#)  
[Fei Liu\\*](#), Xiao Liang\*, Yutong Zhang, Yuele Li, Shan Lin, Michael Yip  
*IEEE International Conference on Robotics and Automation (ICRA), 2024*.  
[Under Submission](#)
- [ICRA'24] **SuPerPM: A Large Deformation-Robust Surgical Perception Framework Based on Deep Point Matching Learned from Physical Constrained Simulation Data** [\[ARXIV\]](#)  
Shan Lin, Albert Miao, Ali Alabiad, [Fei Liu](#), Kaiyuan Wang, Jingpei Lu, Florian Richter, Michael Yip  
*IEEE International Conference on Robotics and Automation (ICRA), 2024*.  
[Under Submission](#)
- [ICRA'24] **Robust Surgical Tool Tracking with Pixel-based Probabilities for Projected Geometric Primitives** [\[PDF\]](#)  
Christopher D'Ambrosia, Florian Richter, Zih-Yun Chiu, Nikhil Shinde, [Fei Liu](#), Henrik Christensen, Michael C. Yip  
*IEEE International Conference on Robotics and Automation (ICRA), 2024*.  
[Under Submission](#)
- [T-MECH] **An Underwater Remote Teleoperation Robot Arm with Rolling Diaphragm Actuation and End Effector Force Reconstruction** [\[PDF\]](#)  
Zhaowei Yu, Dimitri A. Schreiber, [Fei Liu](#), Alexander M. Grant, Michael Yip

## Journal & Book Articles


- [RA-L'23] **Robotic Manipulation of Deformable Rope-like Objects Using Differentiable Compliant Position-based Dynamics**  [\[DOI\]](#)  
[Fei Liu](#)<sup>\*</sup>, Entong Su<sup>\*</sup>, Jingpei Lu, Mingen Li, Michael Yip  
*IEEE Robotics and Automation Letters (RA-L)*, 2023.
- [T-BME'23] **ORRN: An ODE-based Recursive Registration Network for Deformable Respiratory Motion Estimation with Lung 4DCT Images**  [\[DOI\]](#)  
Xiao Liang, Shan Lin, [Fei Liu](#), Dimitri Schreiber, Michael Yip  
*IEEE Transactions on Biomedical Engineering (T-BME)*, 2023.
- [RA-L'21] **Autonomous Robotic Suction to Clear the Surgical Field for Hemostasis Using Image-Based Blood Flow Detection**  [\[DOI\]](#)  
Florian Richter, Shihao Shen, [Fei Liu](#), Jingbin Huang, Emily K. Funk, Ryan K. Orosco, Michael Yip  
*IEEE Robotics and Automation Letters (RA-L)*, 2023.  
**Best Paper Award Nomination at ICRA 2021**
- [App.Sci.'20] **Review of Advanced Medical Telerobots**  [\[DOI\]](#)  
[Fei Liu](#)<sup>\*</sup>, Sarmad Mehrdad<sup>\*</sup>, Minh Tu Pham, Arnaud Lelevé, S. Farokh Atashzar  
*Applied Sciences*, 2020.  
**Invited Article**
- [Robotica'19] **An Energy-Based Approach for n-dof Passive Dual-user Haptic Training Systems**  [\[DOI\]](#)  
[Fei Liu](#), Angel Ricardo Licon, Arnaud Lelevé, Damien Eberard, Minh Tu Pham, Tanneguy Redarce  
*Robotica*, 2019.
- [Hap.Int.'19] **Applications of Haptics in Medicine**  [\[DOI\]](#)  
Angel R. Licon, [Fei Liu](#), David Pinzon, Ali Torabi, Pierre Boulanger, Arnaud Lelevé  
*Haptic Interfaces for Accessibility, Health, and Enhanced Quality of Life*, 2019.

## Conference Proceedings & Workshops

- [ICRA'23] **Image-based Pose Estimation and Shape Reconstruction for Robot Manipulators and Soft, Continuum Robots via Differentiable Rendering**  [\[DOI\]](#)  
[Fei Liu](#)<sup>\*</sup>, Jingpei Lu<sup>\*</sup>, Michael Yip  
*IEEE International Conference on Robotics and Automation (ICRA)*, 2023.
- [ICRA'23] **Suture Thread Spline Reconstruction from Endoscopic Images for Robotic Surgery with Reliability-driven Keypoint Detection Rendering**  [\[DOI\]](#)  
Neelay Joglekar, [Fei Liu](#), Ryan Orosco, Michael Yip

- [IROS IPPC'23] **Shape Reconstruction of Soft, Continuum Robots using Differentiable Rendering with Geometrical Shape Primitive**  [LINK]  
[Fei Liu](#), Michael Yip  
*IROS Workshop on Integrated Perception, Planning, and Control for Physically and Contextually-Aware Robot Autonomy, 2023.*
- [IROS IPPC'23] **Bridging Real-to-Sim Gaps through Online Material Property Optimization with Perception-Enabled Residual Mapping**  [LINK]  
[Fei Liu](#)<sup>\*</sup>, Xiao Liang<sup>\*</sup>, Yutong Zhang, Yuele Li, Michael Yip  
*IROS Workshop on Integrated Perception, Planning, and Control for Physically and Contextually-Aware Robot Autonomy, 2023.*
- [ICRA'21] **Real-to-Sim Registration of Deformable Soft-Tissue with Position-Based Dynamics for Surgical Robot Autonomy**  [DOI]  
[Fei Liu](#)<sup>\*</sup>, Zihan Li<sup>\*</sup>, Yuhai Han, Jingpei Lu, Florian Richter, Michael Yip  
*IEEE International Conference on Robotics and Automation (ICRA), 2021.*
- [ICRA'21] **Model-Predictive Control of Blood Suction for Surgical Hemostasis using Differentiable Fluid Simulations**  [DOI]  
[Fei Liu](#)<sup>\*</sup>, Jingbin Huang<sup>\*</sup>, Florian Richter, Michael Yip  
*IEEE International Conference on Robotics and Automation (ICRA), 2021.*
- [ACIRS'21] **Simulated Data Generation Through Algorithmic Force Coefficient Estimation for AI-Based Robotic Projectile Launch Modeling**  [DOI]  
Sajiv Shah, Ayaan Haque, [Fei Liu](#)  
*IEEE 6th Asia-Pacific Conference on Intelligent Robot Systems (ACIRS), 2021.*
- [IROS'20] **Dynamically Constrained Motion Planning Networks for Non-Holonomic Robots**  [DOI]  
Jacob J. Johnson, Linjun Li, [Fei Liu](#), Ahmed H. Qureshi, Michael Yip  
*IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2021.*
- [IROS CRS'20] **A 2D Surgical Simulation Framework for Tool-Tissue Interaction**  [ARXIV]  
Yunhai Han, [Fei Liu](#), Michael Yip  
*IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) Workshop on Cognitive Robotic Surgery, 2020.*
- [ICMCE'18] **Collaborative Hands-on Training on Haptic Simulators**  [DOI]  
Angel Ricardo Licona Rodriguez, [Fei Liu](#), Arnaud Lelevé, Damien Eberard, Minh Tu Pham  
*7th International Conference on Mechatronics and Control Engineering, Nov. 2018.*
- [IROS'16] **An Energy Based Approach for Passive Dual-user Haptic Training Systems**  [DOI]  
[Fei Liu](#), Arnaud Lelevé, Damien Eberard, Tanneguy Redarce  
*IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Oct. 2016.*
- [EBMC'15] **A Dual-user Teleoperation System with Online Authority Adjustment for Haptic Training**  [DOI]

[Fei Liu](#), Arnaud Lelevé, Damien Eberard, Tanneguy Redarce  
*37th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), Aug. 2015.*

- [MESROB'15] **A Dual-user Teleoperation System with Adaptive Authority Adjustment for Haptic Training**  [DOI]  
[Fei Liu](#), Arnaud Lelevé, Damien Eberard, Tanneguy Redarce  
*4th International Workshop on Medical and Service Robots, Jul. 2015.*

## In-Preparation (with results)

- [RAL] **Continuum Robot Shape Reconstruction and Tracking from Monocular Endoscopic Image Sequences**  
[Fei Liu](#), Florian Richter, Michael Yip  
*IEEE Robotics and Automation Letters (RAL)*. [to submit](#)
- [T-RO] **SuPer-Robust: A Robust Long-term Deformation Tracking and Reconstruction Framework for Endoscopic Videos**  
Kaiyuan Wang, Shan Lin, Jingpei Lu, [Fei Liu](#), Florian Richter, and Michael Yip  
*IEEE Transactions on Robotics (TRO)*. [to submit](#)
- [RAL] **Deformation Tracking-based Online Jacobian Estimation for Deformable Object Manipulation**  
Shan Lin, Jingpei Lu, [Fei Liu](#), Florian Richter, and Michael Yip  
*IEEE Robotics and Automation Letters (RAL)*. [to submit](#)

## Dissertations and Technical Papers

- [PHD'16] **Dual-user Haptic Training System**  [LINK]  
[Fei Liu](#), PhD Dissertation, INSA de Lyon, 2016.
- [Master'13] **Teleoperation System Using Port-Hamiltonian Approach**  
[Fei Liu](#), MSc Thesis, INSA de Lyon, 2013.
- [IARC'12] **Northwestern Polytechnical University Team Entry for the AUVSI International Aerial Robotics Competition**  [LINK]  
[Fei Liu](#), Yinan Sang, Jie He, Jie Fan, Ruichao Li, Xiongyi Cui, Haoyu Li, Jie Chen  
*International Aerial Robotics Competition (IARC) Symposium, Aug. 2012.*  
**Innovative Design Award**
- [MCM'11] **Modeling of the Snowboard Course**  [PDF]  
[Fei Liu](#), Haoyu Li, Li Li  
*International Mathematical Contest in Modeling (MCM) Symposium, Apr. 2011*  
**Meritorious Winner Award**

## Patents

- [PCT/US22/22820] **Real-to-Simulation Matching of Deformable Soft Tissue and Other Objects with Position-based Dynamics for Robot Control**  [PATENT]  
[Fei Liu](#), Michael C. Yip, Florian Richter, 2022.
- [CN215651505U] **Flexible Mechanical Arm and Surgical Equipment**  [PATENT]  
Jialin Yang, Qinghao Hu, Jianxiao Chen, [Fei Liu](#), Fei Long, 2021.
- [CN216603056U] **Main Hand Control Unit and Auxiliary Robot for Digestive Tract Operation**  [PATENT]  
Jialin Yang, Qinghao Hu, Jianxiao Chen, [Fei Liu](#), Fei Long, Luchen Shen, Liyang Lin, 2021.
- [CN215273291U] **Main Operator and Force Feedback Device**  [PATENT]  
Jialin Yang, Qinghao Hu, Jianxiao Chen, [Fei Liu](#), Fei Long, Luchen Shen, Liyang Lin, 2021.
- [CN114129228A] **Operation Executor**  [PATENT]  
Jialin Yang, Qinghao Hu, Jianxiao Chen, [Fei Liu](#), Fei Long, Luchen Shen, Liyang Lin, 2021.
- [CN209713128U] **A Kind of Flexible Joint Mechanism**  [PATENT]  
Junjie Gao, [Fei Liu](#), Shunzheng Meng, Sihao Zuo, Jialin Yang, 2018.
- [CN209574762U] **Lifting Operation Instrument**  [PATENT]  
Jialin Yang, Xilong Hou, Lijuan Yao, [Fei Liu](#), 2018.

## Research Experiences

Advanced Robotics and Controls Lab, UCSD

Dec. 2019 – present

Postdoc Scholar, [ARCLab](#)

San Diego, USA

- Spearheading the development of a comprehensive framework for modeling, simulating, and controlling deformable, rigid, articulated, and fluid objects using position-based dynamics (PBD). Focus areas include articulated manipulation (impedance control, trajectory optimization, rope shape control, etc.) and applications in surgery (soft tissue, membrane, blood, and tools).
- Employing the adjoint method based on chain-rule and Autodiff tools to establish differentiability for the PBD simulation.
- Collaborating on the creation of a constrained-based solver and software architecture, integrating with NVIDIA Flex and Warp technologies.
- Implementing real-to-sim transfer techniques involving non-rigid perception, registration, and tracking.
- Designing closed-loop controllers, developing motion plans, and validating them using diverse field robots like the da Vinci Research Kit (DVRK), 7-dof Baxter Robotic Arm, 7-dof Franka Panda Arm, catheter robot, non-holonomic mobile robot, hydraulic-driven underwater robotic arm, haptic device, etc.
- Leading the **Continuum Robot Project**, which involves shape reconstruction through the projection of geometrical primitives (cylinders, circles, etc.), differentiable rendering, and executing visual servoing control.

**Biorobotics Institute, Scuola Superiore Sant'Anna**  
Senior Research Associate/Postdoc, [Assistive Robotics Lab](#)

**Apr. 2019 – Nov. 2019**  
Pisa, Italy

- Conducted Simultaneous Localization and Mapping (SLAM) for a mobile robotic platform under ROS.
- Implemented autonomous initialization using computer vision approaches with aruco markers (QR codes).
- Executed autonomous navigation for the mobile robot, incorporating path planning and obstacle avoidance.
- Developed and implemented shared control theory for the mobile platform.
- Designed a PHP/HTML-based web user interface.
- Conducted experimental tests with field robots at a hospital in Verona, Italy.

**Bioinspired Soft Robotics@SSSA**  
Research Associate/Postdoc, [Istituto Italiano di Tecnologia](#)

**Mar. 2018 – Apr. 2019**  
Pisa, Italy

- Implemented modeling and control for the KUKA LWR4+ robotic arm using ROS and Gazebo, covering motion control, trajectory planning, and master-slave operations.
- Conducted modeling and control of a flexible continuum surgical tool, involving a static tension-deflection model, Euler-Lagrange dynamics, and port-Hamiltonian-based control.
- Analyzed various continuum structure prototypes, exploring design variations such as notches, single-backbone configurations, and articulated structures.
- Developed a teleoperation framework using haptic devices (Sigma.7).
- Conducted a preliminary study of a simulation platform for flexible surgical tools using SOFA ([Simulation Open Framework Architecture](#)).

**Senior Control Engineer & Project Director**  
[ROBO Medical Technology Co., Ltd](#)

**Oct. 2016 – Feb. 2018**  
Shenzhen, China

- Led the development of teleoperation for a single-port abdominal robotics surgical system using haptic devices (PHANTOM Omni, Novint Falcon, Omega.3) and joysticks (Logitech G Extreme 3D, Microsoft Xbox).
- Modeled and controlled a tendon-driven articulated end-effector, addressing kinematics, motion control, and master-slave operations.
- Identified and compensated model-based uncertainties, including hysteresis and friction.
- Managed the modeling and control of a 4 DOFs positioning arm (parallel mechanisms) covering kinematics, motion control, and master-slave operations.
- Calculated the Remote Center of Motion (RCM) point for the positioning arm.
- Oversaw the modeling and control (based on gait analysis) of a powered lower limb orthosis for rehabilitation.
- Implemented a SLAM algorithm (built on ROS) for autonomous mobile robots used in medical transportation within hospitals.

**PHD Thesis: Dual-user Haptic Training System**

**Sep. 2012 – Sep. 2016**

Advisors: Prof. Tanneguy Redarce, Prof. Arnaud Lelevé, Dr. Damien Eberard    Lyon, France

- Focused on modeling and control aspects with/without time delays.
- Developed real-time experiments using Matlab/Simulink, ROS, and Chai3D.
- Published several international conference papers and journal papers.

**Master Thesis: Cooperative Haptic Hands-on MIS Trainer**  
 Internship at [Ampère Laboratory](#)

**Sep. 2012 – Aug. 2013**  
 INSA de Lyon, France

- Designed a teleoperation system using a port-Hamiltonian approach.
- Implemented control algorithms with haptic devices (PHANTOM Omni).
- Conducted real-time experiments using Matlab/Simulink.

**Undergraduate Thesis**  
 Laboratory Research Assistant

**Sep. 2011 – Jun. 2012**  
 NPU, Xi'an, China

- Implemented image processing and classification algorithms.
- Extraction of image metadata features for retrieving images based on content and context.

**Funded Student Project by Chinese Ministry of Education**  
 Project Leader

**Nov. 2010 – Jun. 2012**  
 NPU, Xi'an, China

- Implemented statistical and computing algorithms related to data mining (SVM etc).
- Implemented path planning algorithms for a mobile robot ( $A^*$ , genetic algorithm, fuzzy control, etc.).

## Competitions

**DJI RoboMasters Mobile Manipulation Challenge**  
 Team Leader  
[Dajiang Innovations Technology Co., Ltd \(DJI\)](#)

**Aug. 2014**  
 Shenzhen, China

- Design of autonomous mobile robot using SLAM and ROS.
- Implemented fast on-board object tracking and recognition algorithms.
- Developed multi-robot coordination and searching algorithms.

**International Aerial Robotics Competition (IARC)**  
 Team Leader

**Aug. 2012**  
 Peking, China

- Mathematical modeling of a self-made low-cost laser rangefinder based on geometric calculation for environment mapping.
- Autonomous control of the quadrotor using environment mapping and detection algorithms (wall and window detection using point cloud analysis).
- Awarded **Innovative Design**.

**International Mathematical Contest in Modeling (MCM)**  
 Team Leader

**Feb. 2012**  
 NPU, Xi'an, China



- Optimal Design of U-shaped Snowboard Course
- Awarded **Meritorious Winner** (First Prize Mention).

#### **Robocup 3D Simulation Group**

Team Leader

**Sep. 2010 – Jun. 2012**

NPU, Xi'an, China

- Designed gait algorithm of simulated NAO (Humanoid) robot.
- Developed control strategies for simulated soccer competition under the Linux platform.
- Awarded **Third Prize** in China Open 2011.

#### **“Freescale Cup” National Smart Car Design Competition**

Team Leader

**Dec. 2010 – May. 2011**

NPU, Xi'an, China

- Design and control of an intelligent car for path following
- Awarded **Third Prize** in NPU Open 2011.

## Academic Services

#### **Journal Reviewer**

- IEEE Transactions on Robotics (T-RO)
- IEEE Transactions on Mechatronics (T-MECH)
- IEEE Robotics and Automation Letters (RAL)
- IEEE Transactions on Medical Robotics and Bionics
- The International Journal of Robotics Research (IJRR)
- Control Engineering Practice
- Robotica
- Journal of Mechanisms and Robotics (JMR)

#### **Conference Reviewer**

- International Conference on Robotics and Automation (ICRA)
- International Conference on Intelligent Robots and Systems (IROS)
- American Control Conference (ACC)
- International Conference on Learning Representations (ICLR)
- IFAC Workshop on Lagrangian and Hamiltonian Methods for Nonlinear Control (LHMNC)
- IEEE RAS/EMBS Conference on Biomedical Robotics and Biomechanics (BioRob)

## Grants

#### **CAREER: Contextually Informed Autonomous Robotic Surgery**

*National Science Foundation (NSF)*

**Mar. 2021 – Now**

Postdoc Researcher (Grant No. : [2045803](#))

- Modeling and simulating the deformation of soft tissue alongside interactive control of robotic tools.
- Contribute to the grant writing process, meetings and reports.

**EFRI C3 SoRo: Safe Medical Continuum Robots: Sensing, Control and Fabrication**  
*National Science Foundation (NSF)* Nov. 2019 – Jun. 2023  
 Postdoc Researcher (Grant No. : [1935329](#))

- Shape reconstruction of catheter robots using endoscopic images and visual-servoing control.
- Contribute to the meetings and reports.

**National Key R&D Program of China: Design and Kinematic Modeling of Modular Variable Stiffness Continuum Flexible Actuator**  
*Ministry of Science and Technology (MOST) of China* Mar. 2019 – Nov. 2022  
 Sub-project Leader/PI: [ROBO Medical Technology Co. Ltd](#) (Grant No. : 2018YFB1307700)

- Modeling and control of a continuum flexible endoscopic submucosal dissection (ESD) robot using curvature-based approaches.
- Contribute to the grant writing process, meetings and reports.

**National College Student Innovation and Entrepreneurship Training Program**  
*Chinese Ministry of Education* Nov. 2010 – Jun. 2012  
 Student PI

- Implemented statistical and computing algorithms related to data mining (SVM etc).
- Implemented path planning algorithms for a mobile robot ( $A^*$ , genetic algorithm, fuzzy control, etc.).
- Contribute to the grant writing process, meetings and reports.

## Mentoring Experiences

### PhD Students

[Xiao Liang](#), CSE, UCSD Sep. 2021 – present

- **Topic:** Reconstruction of 4D lung motion using neural-ODE integration
- **Achievement:** Published papers at TBME/IROS 2023, and submitted papers to ICRA 2024

[Yu Huan](#), BioRobotics Institute, Scuola Superiore Sant'Anna Mar. 2018 - Mar. 2019

- **Topic:** Design and control of flexible miniature surgical tools (continuum robot)
- **Achievement:** Published papers at IEEE TBME/TMECH

### Master Students

[Yutong Zhang](#), CSE, UCSD Jan. 2021 – present

- **Research Topic:** Developing a simulator using position-based dynamics for various objects (rigid, cloth, deformable) and rendering with libIGL/OpenGL
- **Achievement:** Submitted papers to ICRA 2024

[Chung-Pang \(Ben\) Wang](#), CSE, UCSD Sept. 2023 – present

- **Research Topic:** Investigating SE(3)-Equivariant mappings for data-efficient learning of robot trajectory planning

Wangyi Liu, ECE, UCSD

July 2022 – Aug 2023

- **Research Topic:** Exploring SE(3)-Equivariant mappings for data-efficient learning of robot trajectory planning
- **Achievement:** Currently working on a paper for IEEE RAL

Alexander Luke, MAE, UCSD

Sep. 2021 – Jun. 2023

- **Research Topic:** Conducting research on motion control and calibration of a steerable continuum robotic catheter with clinical trials
- **Achievement:** Successfully conducted demos with animal trials

Junming Wu, ECE, UCSD

Sep. 2021 – Dec. 2022

- **Research Topic:** Investigating bi-manual close-loop control of dual-arm suturing using physical-based simulation
- **Achievement:** Successfully conducted demos on the dVRK robot

Haaris Rahman, CSE, UCSD

Sep. 2021 – Mar. 2022

- **Research Topic:** Focusing on the reconstruction of deformable soft tissue using occupancy flow
- **Achievement:** Successfully conducted demos in our PBD simulator

Chong He, MAE, UCSD

Sep. 2021 – Aug. 2022

- **Research Topic:** Engaged in shape reconstruction of catheter robot using monocular images
- **Achievement:** Drafted a paper for IEEE RAL

Yunhai Han, MAE, UCSD

Jan. 2021 – Jan. 2022

- **Research Topic:** Developing a deformable objects simulation framework using a constraints-based solver
- **Achievement:** Published a paper at ICRA 2021/IROS 2021

Mingen Li, ECE, UCSD

Jan. 2021 – Jan. 2022

- **Research Topic:** Focused on simulation and control of articulated robots using position-based dynamics
- **Achievement:** Submitted a paper to IEEE TRO

Entong Su, ECE, UCSD

Jan. 2021 – Jan. 2022

- **Research Topic:** Investigating simulation and control of rope-like objects using position-based dynamics
- **Achievement:** Published a paper at IEEE RAL

Harleen Singh, ECE, UCSD

Jan. 2020 – Jul. 2021

- **Research Topic:** Focused on the modeling of the catheter continuum robot for position and orientation motor control
- **Achievement:** Successfully conducted demos with live animal trials

Zihan Li, ECE, UCSD

Jan. 2020 – Nov. 2020

- **Research Topic:** Investigating registration methods for real-to-sim transfer applications of deformable tissue manipulation
- **Achievement:** Published a paper at ICRA 2021

## Undergraduate Students

**Yuelel (Tina) Li**, Mathematics, UCSD Apr. 2023 – present

- **Research Topic:** Developing intrinsic neural mappings from mesh to point cloud for soft tissue registration
- **Achievement:** Submitted a paper to ICRA 2024

**Neelay Joglekar**, ECE, UCSD Jan. 2021 – present

- **Research Topic:** Modeling dynamic behavior of rope-like objects using cosserat rod theory and surgical thread reconstruction
- **Achievement:** Published a paper at ICRA 2023

**Bryan Yuan**, ECE, UCSD Jan. 2021 – May 2022

- **Research Topic:** Computation and validation of backward gradients for position-based dynamics constraints
- **Achievement:** Integrated into our PBD simulator

**Nemanja Babic**, Research Internship, University of Ottawa & INSA de Lyon 2015

- **Research Topic:** Simulating haptic systems using CHAI3D
- **Achievement:** Conducted demos with simulations in CHAI3D

## High School Students

**Ayaan Haque**, Saratoga High School, California Jan. 2021 – Jul. 2021

- **Research Topic:** Generating simulated data through algorithmic force coefficient estimation
- **Achievement:** Published a paper at IEEE ACIRS 2021

**Sajiv Shah**, Saratoga High School, California Jan. 2021 – Jul. 2021

- **Research Topic:** Generating simulated data through algorithmic force coefficient estimation
- **Achievement:** Published a paper at IEEE ACIRS 2021

## Languages

**Chinese:** Native  
**English:** Advanced, Fluent  
**French:** Beginner A2  
**Italian:** Beginner Classroom