# Shixuan Gu

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## EDUCATION

**Master of Science** **Carnegie Mellon University - Pittsburgh, USA** Sep. 2021 – Present

**Major:** Biomedical Engineering and Computer Science

**Advisor: Howie Choset, Keith Cook**

**Biomedical Engineering Department Head's Fellowship**

**Bachelor of Engineering** **Shanghai Jiao Tong University - Shanghai, China** Sep. 2017 – Jun. 2021

**Major:** Computer Science & Artificial Intelligence – IEEE Honor Class

**Outstanding Graduate of Shanghai Jiao Tong University**

**Major GPA: 3.78/4.0**

**Core Courses:** Linear and Convex Optimization (95, top 5%) / Information Theory (95, top 5%) / Data Mining (91, top 10%) / Machine Learning (90, top 10%) / Intelligent Internet of Things (95, top 5%) / Artificial Intelligence (93, top 5%) / Artificial Intelligence System Design and Practice (97, top 1%)

## PUBLICATIONS

First Author, Researcher | **RibSeg Dataset and Strong Point Cloud Baselines for Rib Segmentation from CT Scans** | MICCAI 2021

**Advisor:** Bingbing Ni, Professor at Department of Electronic Engineering Nov.2020 - June. 2021

- Developed a large-scale dataset for rib segmentation and centerline extraction, named RibSeg.
- RibSeg is made available online to facilitate downstream tasks.
- Designed a geometric deep learning-based model RibPoint, to segment ribs on CT scans.

First Author, Researcher | **Point-Based Rib Segmentation, Labeling, and Centerline Extraction: A Dataset and Baselines** | IEEE TMI 2022 (in progress)

**Advisor:** Bingbing Ni, Professor at Department of Electronic Engineering June. 2021 – Present

## RESEARCH AND ENGINEERING EXPERIENCES

Machine learning scientist | **RoboVent Startup Project** | BioRobotics Lab

**Advisor:** Howie Choset, Kavcic-Moura Professor of Computer Science, Robotics Institute

Keith E. Cook, The David Edward Schramm Professor, and Head, Biomedical Engineering Sep. 2021 - Apr. 2022

- Design and build a portable O2 generator and sensor for ICU ventilation.
- Collaborate with doctors at UPMC, and collect patients' breathing data to build a large online dataset.
- Develop DL-based methods to perform lung-related disease alarming tasks, such as hyperinflation prediction and lung impedance estimation.

Operator, programmer, structure engineer | **VEX Robotics Program** | Intelligent Robotics Laboratory

**Advisor:** Chuntao Leng, Professor, Director of Student Innovation Center May. 2018 - Jun. 2020

- Designed and built the ejection structure crossbow, trebuchet, and flywheel for the first, second, and third prototypes, respectively.
- Designed the scoring path and programmed control codes for the automation stage of the competition.
- 2018 China National VEX Robotics competition: **Nominated for Excellence Award**
- 12th Asia-Pacific Robotics Championship: **Create Award, Robot Skills Finalist, Silver Award**
- 2019 VEX U Robotics World Championship: **VEX U Skills Challenge World Champion, VEX U Division Champion, and World Finalist**

Researcher | **Batch QR code scanning for mobile devices** | Shanghai Jiao Tong University

**Advisor:** Xiaohua Tian, Professor, Assistant Director of Department of Electrical Engineering Mar. 2020 - Jun. 2020

- Designed a computationally efficient batch QR code scanning system for devices with CPU.

- Designed and implemented a CNN-based model for batch QR code scanning called QR-net.
- Designed and implemented a conventional Digital Image Processing method for batch QR code scanning using Canny Edge Detection, Gaussian Blur, and a series of Morphological Operations.
- Proposed a complimentary system which allows mobile devices to call QR-Net online and turn the DIP-based model offline.

Research Assistant | **A survey and simulated evaluation of automatic control methods for vehicles** | Shanghai Jiao Tong University Dec. 2018 - Feb. 2019

**Advisor:** Hao Li, Professor at School of Paris Tech Elite Institute of Technology

- Classified and evaluated control methods of automatic control for intelligent vehicles.
- Specifically methods analyzed: pure pursuit control, model predictive control (MPC), proportional-integral-derivative control (PID), Stanley method, and fuzzy logic control (FLC).
- Implemented several control methods, including PID, MPC, FLC in C++.
- Conducted simulations on CyberTorcs.

Research Assistant | **Research on machine learning-based vehicle localization and mapping** | Shanghai Jiao Tong University

**Advisor:** Hao Li, Professor at School of Paris Tech Elite Institute of Technology Sep. 2018 - Nov. 2018

- Proposed machine learning-based methods for vehicle localization and mapping under complex environments, including a genetic algorithm written in Python.
- Implemented a CNN model for vehicle localization and mapping in PyTorch.
- Conducted a comparative study on iterative closest point algorithms, genetic algorithms, and CNNs.

## LEADERSHIP AND ACTIVITIES

Teaching Assistant | **UCLA Extension** | University of California, Los Angeles

July. 2021 - Aug. 2021

- Artificial Intelligence and Data Science COM SCI 960.01
- Research Methodologies ENGL 902
- Academic Writing ENGL 901

Team Leader and Student Ambassador | **Student Learning Festival of C9+1 Symposium** | Hong Kong University

Apr. 2018

- Designed poster for Acemap project, an academic search system that visualizes academic area relationships.
- Facilitated presentations from Shanghai Jiao Tong University students.
- Student representative for symposium between C9 universities and Hong Kong University.
- **Excellent Student Presentation award**

Secretary | **Student Union**, **Department of Overseas Student Center** | Shanghai Jiao Tong University

Feb. 2018 - Jun. 2020

- Hosted events for international students, such as Cultural Exchange Festival, Magic Running, and Touch-China.
- Managed inquiry services for international students.
- Served as a commentator for an e-sports live broadcast at Shanghai Jiao Tong University.

## SKILLS

**Robotics:** Highly skilled in VEX robot design, RobotC, SolidWorks

**Programming:** Proficient in Python (scikit-learn, NumPy, Pandas, SciPy, PyTorch), C++, LaTeX; MATLAB, Javascript, HTML, PHP

**Tools:** Anaconda, TensorFlow, CyberTorcs, MySQL