

# Chenyu Gu

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## EDUCATION

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### Georgia Institute of Technology

*M. S. in Bioengineering (ECE);*

Atlanta, United States

*Aug 2024 - now*

### Southern University of Science and Technology

*B. S. in Intelligent Medical Engineering; GPA: 3.82/4.00*

Shenzhen, China

*Aug 2020 – Jun 2024*

**Relevant coursework:** Medical Robotics, Principles of Electrical Circuits, Signals and Systems, Digital Signal Processing, Medical Imaging, Machine Learning, Neural Engineering and Brain-computer Interface.

### KTH Royal Institute of Technology

*Exchange student in Electrical Engineering and Computer Science*

Stockholm, Sweden

*Sep 2023 – Jan 2024*

**Relevant coursework:** Principles of Wireless Sensor Networks, Social Robotics.

### Imperial College London

*Data Science Bachelor Summer School; Grade: B-merit*

London, United Kingdom

*Jun 2022 – Aug 2022*

## RESEARCH INTERESTS

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**Wearable Technology, Human Movement, Bioelectronics, and Medical Robots.**

## PUBLICATIONS

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- **C. Gu\*** et al., “IMU-based motion capture system for rehabilitation applications: A systematic review,” *Biomimetic Intelligence and Robotics*, vol. 3, no. 2, p. 100097, 2023, doi: 10.1016/j.birob.2023.100097.
- **C. Gu\*** et al., “A Portable Inertial Navigation System for Total Hip Arthroplasty Targeting Direct Anterior Approach” (Accepted by *IEEE Transactions on Instrumentation and Measurement*).

## EXPERIENCE

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### Hydraulic Tendon Driven Guidewire

*Project Leader in RobMed Lab*

Atlanta, United States

*Oct 2024 – Now*

- Design a hydraulic tendon driven guidewire which is non-conductive, MRI safe, and could be steerable in 3D.
- Modeling the steerable guidewire static and kinematic, and conduct experiments to verify the model.

### Movement analysis using IMU sensors

*Visiting Student in Intelligent Heart Technology Lab (I-HeaL)*

Stockholm, Sweden

*Oct 2023 – Jan 2024*

- Extracting gait parameters and human center of mass to explore the relationship between human movement and cardiovascular function.
- Deploy a Kalman filter for orientation estimation and calibrate the angle and direction of the IMU. Also, develop algorithms to extract gait parameters and COM.

### Motion Capture for rehabilitation

*Project leader in Brain-robot Rehabilitation Lab*

Shenzhen, China

*April 2022 – May 2024*

- Integrate ultra-wide band (UWB) technology and inertial measurement unit (IMU) to develop a motion capture system to recovery human motion.
- Help develop Unity visualization and design the python code for signal transmission Apply deep learning enabling sparse motion capture.
- Apply the system on healthy subjects for rehabilitation exercise and evaluate the effectiveness of the system.

### Navigation system for surgeries

*Project leader in Brain-robot Rehabilitation Lab*

Shenzhen, China

*Feb 2022 – Oct 2023*

- Design a surgery navigation system consisting of an on-handle module and an on-body module, equipped with a 9-axis IMU and a gyroscope, respectively.
- Evaluate the effectiveness of the system at both the sensor and system levels.

- Our proposed system has shown effectiveness in meeting the requirements of total hip arthroplasty surgeries via direct anterior approach.

## Center of mass estimation and rehabilitation applications

Shenzhen, China

*Project Assistant in Brain-robot Rehabilitation Lab*

*Oct 2022 – Aug 2023*

- Use IMU motion capture to estimate human three-dimensional center of mass for rehabilitation application.
- Analysis human center of mass to extract the feature of human motion and perform rehabilitation assessment.

## Review on motion Capture for rehabilitation

Shenzhen, China

*Researcher in Brain-robot Rehabilitation Lab*

*Jun 2022 – Oct 2022*

- Investigate the current application of IMU inertial motion capture technology in rehabilitation and write a review.

## PROJECTS

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### Design a prototype of a cardiopulmonary resuscitation robot

Course Project **Grade: A**

*Project Leader*

*Apr 2023 – May 2023*

- Designed a prototype of medical robot for cardiopulmonary resuscitation.
- Finish 3D modeling the drone robot in Solidworks and design robot kinematic and control flow.

### Road network visualization of taxi data

Course Project **Grade: A**

*Project Leader*

*May 2023 – Apr 2023*

- Visualize the data of taxi driver of Shenzhen and analysis the taxi data.
- Finish data washing to clean the original data and extract the origin-destination data and analyze the density of taxi order and give possible urban construction plan.

### Word representation in biomedical domain

Summer School **Grade: B**

*Project Assistant in Imperial College London*

*Jul 2022 – Aug 2022*

- Build deeplearning model for word representation in medical field, using n-gram and skip-gram for modeling and t-SNE for visualization

## AWARDS & ACHIEVEMENTS

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(School-level)Excellent Graduation Thesis Award

Jul 2024

(School-level)Outstanding Student Scholarship of Zhicheng College

2021, 2022, 2023

(Provincial-level)"Internet Plus" College Student Innovation and Entrepreneurship Competition

Aug 2023

(School-level)"Internet Plus" College Student Innovation and Entrepreneurship Competition

Jul 2022

(School-level)Excellent Team of "Sycamore Tree" Campus Entrepreneurship Star Competition

May 2022

(National-level)RoboMaster 2021 Mecha Master Super Competition First Prize

Sep 2021

(Top 3 in the major)"Fu Turui" Fellowship, Department of Biomedical Engineering

Oct 2021

(Top 4 of the province)First Prize of Scholarship for Freshmen

Sep 2020

## SKILLS

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- **Laboratory:** 3D printing, PCB design, Soldering, Oscilloscope, Signal generator, Motion capture system, Force plate.
- **Programming:** Python(Proficient in data analysis and machine learning), C(For embedded system design), MATLAB(For data analysis), Rust(For system design), Java.
- **Software:** Solidworks(For 3D modeling), JLC-EDA(For PCB design), Unity(Game interface design), Blender
- **Tools:** Git, Neovim, Docker, Jupyter, VS Code, Microsoft Office.

## EXTRACURRICULAR ACTIVITIES

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**South university of science and technology archery team**

Oct 2020 – Oct 2021

*Members of School Archery Team*

*Shenzhen, China*

Join the school-level archery team and organize archery training and competition activities.

**Student Union of Zhicheng College, Southern University of Science and Technology**

Sep 2020 – Jun 2021

*Member of the propaganda department The propaganda department of the student union.*

*Shenzhen, China*

Organize various activities, such as the New Year's Eve party, Nanke Voice, etc.

## LANGUAGES

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- **Chinese:** Native speaker
- **English:** Fluent (TOEFL: 100)
- **Japanese and Germany:** Elementary