

# Yuanshao Yang

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## EDUCATION

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**Aug 2023 - Present**

**University of Michigan - Ann Arbor**

College of Engineering

Mechanical Engineering BSE / Concentration in Robotics

GPA: 4.00/4.00

**Sept 2021 - July 2023**

**Sichuan University, Chengdu**

Sichuan University - Pittsburgh Institute

Bachelor of Engineering in Mechanical Engineering

GPA: 3.84/4.00

## HONORS & AWARDS

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Dec 2023 / May 2024, University of Michigan

University Honors

Dec 2023 / June 2024, University of Michigan - College of Engineering

Dean's List

Oct 2023, Sichuan University

Dean's List (10 % Annual Tuition, 30/230)

Oct 2022, Sichuan University

Academic Star Scholarship (20 % Annual Tuition, 3/230)

Oct 2022, Sichuan University

Comprehensive Academic Scholarship, 2nd Prize (TOP 4 %)

Oct 2022, Sichuan University

Outstanding Student Leader of the Year

## PROJECTS

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**Series Spring Design & Evaluation for Open-Source Leg**

July 2024 - Present

**Instructor: Prof. Elliott J. Rouse, Zach Bons**

[Neurobionics Lab](#), Robotics, University of Michigan

- Literature review of torsional spring design
- Middleware Design to link spring in series
- Testing the performance of the series spring

**New Controller Implementation for Open-Source Leg**

Mar 2024 - Present

**Instructor: Prof. Elliott J. Rouse, Senthur Ayyappan**

[Neurobionics Lab](#), Robotics, University of Michigan

[GitHub Repository](#) [Posted](#)

- Literature reviews on the structure of bionic legs and 3-Phase Brushless DC Motors
- Redesign the Python Library for compatibility with multiple actuators
- Design baseplate for new controller board on the original actuator
- Implementation of the new controller board to expand alternative choices of actuators
- Test actuator functions based on new designs

**Development & Motion Analysis of Robot Swimmer**

Dec 2023 - Present

**Instructor: Prof. Alex K. Shorter**

Mechanical Engineering, University of Michigan

[GitHub Repository](#) [Posted](#)

- Develop an E. coli-based robot swimmer model with a sphere head and quad flagella
- Design & optimize the CAD model for robots' smooth 2-D motion in uniform, viscous flow

- Validate the mechanical design by CFD analysis
- Use correlation analysis towards design parameters to optimize mechanical design
- Develop a path-planning algorithm for obstacle avoidance
- Design the feedback control model to perform reference tracking

## An Automated Vehicle with Tracking System

Mar 2023 - Aug 2023

**Instructor: Prof. Qi Lu**

Sichuan University - Pittsburgh Institute

[GitHub Repository](#) [Posted](#)

- Development of a self-tracking vehicle with tennis-ball-recognition
- Focusing on image recognition algorithm and object tracking method in the Tracking System
- Training and testing the image recognition model (YOLO v3) on the camera module for better effects of tennis ball recognition
- Implementation of a PID controller for the servos in the stabilizer to achieve object tracking
- Implementing and testing the functionality of the tracking system

## Research Intern of Prof. Xiaobo Zhou

Mar 2022 - June 2023

West China Hospital Biomedical Big Data Center, Sichuan University

[GitHub Repository](#) [Posted](#)

- Work on diagnostic data of cardiac patients through feature selection
- Develop regression models (e.g., Random Forest) via Scikit-Learn and PyTorch in Python and use training data sets of clinical diagnostic data
- Test model performance on internal test datasets
- Perform interpretability analysis of built models using variable sensitivity analysis
- Enhance classification processes' precision of the model by analyzing visualized Decision Trees

## EXTRA-CURRICULUM ACTIVITIES

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### M.S.D.M (Math, Science, Data, and Modelling) Club

June 2022 - Present

Co-Founder

Sichuan University

- Establish an academic club aiming to integrate and share math-related resources
- Organize online seminars twice a month, attracted 10 people
- Invite professors to give pre-competition guidance to students planning to compete in MCM/ICM
- Manage member recruiting, seminar content planning

## SKILLS

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- Programming
  - C/C++, Python (PyTorch, Scikit-Learn, etc)
- Tools
  - Keil MDK, MATLAB & Simulink Toolbox, LaTeX, SolidWorks, AutoCAD, MSC Adams

# Research Portfolio

## RESEARCH STATEMENT

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- My primary research focuses on the the mechanical design & control of prosthesis joints, for a better performance of prostheses developed
- My ultimate research goal is to explore the dynamic behaviors of human limbs, and develop approaches (e.g. prosthesis) to aid various human motions
- These goals guides my steps towards more emphasis on human locomotion analysis, and wearable robotics design

## PUBLICATIONS

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### **In Review**

Yang, Yuanshao et al. (2024). “Motion Analysis and Design of Bionic Swimming Robot”.