

# Peiyu Yang

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Personal Website: <https://patrickyang-5.github.io/Patrick-Self-Intro/>

## Education Background

- Delft University of Technology (TUD), Delft, Netherlands** **09/2023-Present**
- **Master Programme:** M.Sc Robotics
  - **GPA:** 8.2/10
- Beijing Institute of Technology (BIT), Beijing, China** **09/2019-06/2023**
- **Undergraduate Major:** B.Eng Automation
  - **GPA:** 87.44/100
- North Carolina State University, North Carolina, US** **06/2021-08/2021**
- 2021 Summer Global Education, Academics, and Research Skills (GEARS) Program
  - **GPA:** 98/100
- ETH Zurich, Zurich, Switzerland** **06/2024-07/2024**
- 2024 Robot Summer School (RSS) Program

## Internship

- Polytechnique Montréal, Montreal, Canada** **07/2022-11/2022**
- 2022 Mitacs Globalink Research Internship

## PUBLICATION

- Qian, Yizhao, **Peiyu Yang**, Weicheng Liu, Shuangyuan Sun, Mengyin Fu, and Wenjie Song. "Generative Design of XingT, A Human-sized Heavy-duty Bipedal Robot." In 2022 IEEE International Conference on Robotics and Biomimetics (ROBIO), pp. 513-518. IEEE, 2022. (**Best Paper in Biomimetics**)

## PATENT

- **Peiyu Yang**, Wenjie Song, Weicheng Liu, et al. A Wheel-legged Robot with a Balancing Device
- Wenjie Song, Yizhao Qian, **Peiyu Yang**, et al. A Five-bar-linkage-based Leg Structure for Bipedal Robots

## CURRENT RESEAECH

- Safe Locomotion For Quadrupedal Robots** **08/2024-Present**

*Supervisor:*

*Dr. C. (Cosimo) Della Santina*

*Delft University of Technology*

*Dr. J. (Jiatao) Ding*

- We propose a coupled terrain, state, and contact estimation system using proprioceptive sensing.
- Providing a CBF-based safe motion guarantee relying only on proprioception.
- Currently exploring reinforcement learning and model-based approaches to safety assurance.

*Manuscripts under review*

- **Peiyu Yang**, Jiatao Ding, Wei Pan, and Cosimo Della Santina, "Towards Terrain-Aware Safe Locomotion for Quadrupedal Robots Using Proprioceptive Sensing", submitted to IROS 2025

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- Jiatao Ding, **Peiyu Yang**, Fabio Boekel, Jens Kober, Wei Pan, Matteo Saveriano, and Cosimo Della Santina, "Versatile, Robust, and Explosive Locomotion with Rigid and Articulated Compliant Quadrupeds", submitted to IJRR
- Edoardo Panichi, Jiatao Ding, Vassil Atanassov, **Peiyu Yang**, Jens Kober, Wei Pan and Cosimo Della Santina, "On-the-Fly Jumping with Soft Landing: Leveraging Trajectory Optimization and Behavior Cloning", submitted to TMECH

## PROJECT EXPERIENCES

### **Two-stage Multi-UAVs Planning and Control** 11/2023-04/2024

*Supervisor: Dr.J.(Javier) Alonso-Mora* *Delft University of Technology*

- Presented a **two-stage multi-UAV path planning and control solution** with modified A\* as global planner, and MPC combining with APF as local planner.
- Simulated the planning and control of **27 UAVs** in dynamic environment.
- The video can be accessed at the following link:
  - <https://youtu.be/RkOqEFh1KFM>
- The code can be accessed at the following link:
  - [https://github.com/PatrickYang-5/MPC\\_drones](https://github.com/PatrickYang-5/MPC_drones)
- **My performance score on this project was 9.4/10.**

### **Design of XingT: A Human-sized Heavy-duty Bipedal Robot** 11/2019-05/2023

*Supervisor: Prof. Wenjie Song* *Beijing Institute of Technology*

- Designed a loadable and multi-mode **bipedal robot** with a height of range 0.9-1.2m.
- Developed an active-passive compliant system for bipedal robots, which can **reduce the impact peak by 76% during the reliability tests** when falling from a height.
- Utilized Simulink to simulate the robot walking gait and verified the effectiveness of the control system, and **the robot's walking speed in simulation reached 0.6m/s.**
- Conducted experiments on the robot leg jumping ability, **the jump height reaches 0.95m, and forward speed reaches 0.3m/s.**
- Realized **robot state estimation system** based on extended Kalman filter (EKF).

### **Design and Fabrication of a Legged Robot Prototype: Phase II** 07/2022-11/2022

*2022 Mitacs Globalink Research Internship*

*Supervisor: Prof. Lionel Birglen* *Polytechnique Montréal, Canada*

- Designed a **self-adaptive robot leg** based on Hoecken's linkage and pantograph.
- Proposed a damping compliant method for adaptive structure of the pantograph, which can **significantly improve the flexibility of the adaptive structure.**
- Conducted experiments on robot's obstacles adaptive ability to approve that robot trajectory linearity has been significantly enhanced.

### **Target Detection and Kinematic Reconstruction Based on** 06/2021-08/2021

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## Computer Vision

**2021 Summer Global Education, Academics, and Research Skills (GEARS) Program;**

**Supervisor: Prof. Andre Mazzoleni**

**North Carolina State University, US**

- Designed a **feature recognition and motion reconstruction system** based on orthogonal vision.
- **My performance score was 98/100, ranking first in a group of 10, which was rated by Prof. Andre Mazzoleni and Administration of North Carolina State University.**

## Intelligent Control Method for Robotic Arms

**02/2024-04/2024**

**Supervisor: Dr. C. (Cosimo) Della Santina**

**Delft University of Technology**

- Course project from the Intelligent Control Systems course, using Python to train LNN (Lagrangian Neural Networks) for obtaining the dynamic model of a robotic arm.
- Developed a torque controller based on the robotic arm's dynamic model using PD and PD+ methods.
- **My performance score on this project was 9.2/10.**

## Vehicle Navigation Based on ENN

**03/2022-07/2022**

**Supervisor: Prof. Chen Chen**

**Beijing Institute of Technology**

- Proposed an evolutionary neural networks (ENN) method for vehicle navigation in mazes.
- Carried out the simulations, and results showed that the vehicle model can achieve path tracking in 10 generations in regular track, and can achieve path tracking in 50 generations in sinusoidal track.

## Honor

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- First Prize, "Challenge Cup" National College Student Curricular Academic Science and Technology Works Competition 05/2023
- First Prize, BIT Century Cup Science and Technology Competition 09/2022
- First Prize, National College Mechanical Innovation Competition 07/2022
- First Prize, BIT Mechanical Innovation Competition 01/2022

## Others

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- Programming C++, Python
- Tools Matlab, ADAMS, SolidWorks, Keyshot, LabView, Multisum, etc
- Simulation Gazebo, PyBullet, Isaac gym, Simulink
- Skills Test and repair of Unitree Go1 robot
- English GRE: 325+3.0  
TOEFL:106