

# Guorui Zhao

Wuhan University of Technology Wuhan, China  
(+86)18871887989 gc2mjojo@gmail.com TOEFL (iBT): 99 GRE General Test: 322

## EDUCATION

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**Wuhan University of Technology**, Wuhan, China 2021.09 — 2024.06  
Master Degree in Automobile Engineering Cumulative GPA: 83.1/100.00  
Thesis Title: Reinforcement Learning for Proprioceptive Quadrupedal Locomotion

**Wuhan University of Technology**, Wuhan, China 2017.09 — 2021.06  
Bachelor Degree in Automobile Engineering Cumulative GPA: 81.7/100.00  
Thesis Title: Design of the Braking system for a compact SUV

## ACADEMIC EXPERIENCE

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**Reinforcement Learning for Proprioceptive Quadrupedal Locomotion** (leader) 2023.04 — Present  
Locomotion of the Unitree Go1 quadrupedal robot without perception sensors via reinforcement learning and PPO algorithm.

- Design the reinforcement learning architecture of quadruped locomotion.
- Build the training environment and extra sim2sim for the policy algorithm and.
- Deploy our policy on the Unitree GO1 robot.

**Wheel-legged Robot Dynamics and Control System** (core member) 2022.03 — 2023.10  
A massive quadruped robot with hub motors on its body as driving wheels. This wheel-legged robot can switch mode by standing-up or lying-down.

- Utilizing model predictive control in quadrupedal locomotion control.
- Utilizing kalman filter to realizing state estimation for the controller.
- Test our walking controller in Pybullet simulation then in the robot with ROS.

**Legged Robot with Reconfigurable Jansen Mechanism** (core member) 2021.09 — 2022.10  
A massive robot with reconfigurable leg structure to acquire both load capacity and enough mobility.

- Complete dynamic verification calculations based on vehicle parameters.
- Design the leg structure and complete parts of its component 3D models.
- Build up the robot first and second prototype.

**Wheel-tracked Vehicle Platform** (member) 2022.05  
Validating the system design of a wheel-tracked vehicle platform by simulation.

- Complete dynamic verification calculations based on vehicle parameters.
- Implement hydraulic system simulation in Amesim based on the hydraulic schematic of the suspension system.

**Design of the Braking system for a compact SUV** (leader) 2020.12 — 2021.6  
Designing the main hydraulic system components of a compact SUV.

- Perform hydraulic system and brake design calculations and selection based on automotive parameters.
- Construct a longitudinal dynamics model of the vehicle using Simulink to simulate the working principle of ABS.
- Conduct thermodynamic finite element analysis of the brake disc and friction plate using Abaqus.
- Complete the 3D model design of the brake system and draw engineering blueprints for brake calipers, brake discs, etc.

## HONOR/AWARDS

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**The Second Prize Scholarship of Graduate Student** 2021.10  
**The Second Prize Scholarship of Graduate Student** 2022.10  
**The Second Prize Scholarship of Graduate Student** 2023.10  
**The 9th Energy Equipment Innovative Design Competition for China Postgraduate** 2022.10  
Legged Robot with Reconfigurable Jansen Mechanism National First Prize  
**The 1st National Undergraduate Student Robot Competition** 2023.12  
Terrain Adaptive Wheel-legged Robot National Second Prize

## SKILLS

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- **Programming:** Python, C/C++, Matlab
- **Engineering Software:** Solidworks, AutoCAD, Matlab/Simulink, Abaqus
- **Develope Toolkits and Environments::** Git, Linux, ROS, Cmake, Pytorch, Isaac Gym, Pybullet