

# Chengye Wang

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## ✿ PROFILE SUMMARY

- ❖ I got a Bachelor's degree in Vehicle Engineering as an outstanding graduate at Jilin University, China. I am now pursuing Master's degree in Mechanical Engineering at Beijing Institute of Technology, China.
- ❖ My research experiences focus on path planning and tracking control of 4WD wheeled robot. I am currently concentrating on improving the path tracking capability of vehicles under extreme conditions, using a combination of vehicle dynamics and learning-based methods.
- ❖ I have a solid grasp of the fundamental theories of vehicle kinematics/dynamics and basic knowledge of trajectory planning and control systems, such as sliding mode control (SMC), model predictive control (MPC), linear quadratic regulation (LQR), and Emplanner. I am good at using the following toolchains and programming languages: Matlab/Simulink, Carsim, Python, office, C++; familiar with programming operations based on: Windows, Ubuntu/ROS, VCU and Speedgoat; proficient in the software and hardware debugging of automotive such as CAN communication, motor control, navigation and positioning modules.
- ❖ My future research interest lies in combining the basic theories of vehicle dynamics with cutting-edge technologies such as machine learning and large model techniques to improve the motion performances and behaviors of autonomous vehicles in complex environments.

## ✿ EDUCATION

### Master of Mechanical Engineering

Beijing Institute of Technology (985/211 project), Beijing, China

*Sep. 2024 – Jun. 2027*

*Supervisor: Yechen Qin*

- ❖ Research interests: path planning and stability control for 4WD wheeled robot under extreme scenarios
- ❖ Thesis: the thesis topic is yet to be determined
- ❖ Main courses: Vehicle Dynamics, Numerical Analysis, Advanced Control, Modern Control Theory
- ❖ Achievements/awards/scholarships: Outstanding Freshman Scholarship (2024.09)

### Bachelor of Vehicle Engineering

Jilin University (985/211 project), Changchun, China

*Sep. 2020 – Jun. 2024*

*Supervisor: Nan Xu*

- ❖ GPA: 3.74/4.0 (top 5%)
- ❖ Thesis: "Vehicle trajectory method planning based on polynomial curve optimization"
- ❖ Main courses: Calculus, Linear Algebra, Automobile Theory, Principles of Control Engineering, Programming Design
- ❖ Achievements/awards/scholarships: Outstanding Graduate (2024.06), First-Class Scholarship (2022.10)

## ✿ PUBLICATION

Chengye Wang, Yu Zhang, Xuepeng Hu, Haipeng Qin, Guoli Wang, Yechen Qin. "Real-time multidimensional vehicle dynamic stability domain calculation and its application in intelligent vehicles", ICVS 2025, Chongqing, China. SAE International. (Under Review)

张钰, 王成烨, 杜甫, 董明明, 秦也辰 和 毛明. "[Dynamic Region of Stability Integrated Path-tracking Control for Intelligent Vehicles](#)". Chinese Journal of Mechanical Engineering. (Accepted, IF=4.5, JCR Q1)

Hu, XuePeng; Zhang, Yu; Wang, Chengye; Wang, Zhenfeng; Qin, Yechen. "MCTP: A Multi-Coupled Dynamics Trajectory Planning Scheme for Autonomous Driving in Extreme Conditions". IEEE Transactions on Automation Science and Engineering. (Under Review, IF=6.4, JCR Q2)

## ✿ RESEARCH EXPERIENCE

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Graduate student & Vehicle Engineer

May. 2025 – Sep. 2025

Vehicle's electrical system setup, controller algorithm design, real-vehicle test and debug.

*Xinxiang Northern Vehicle Instrument Co., Ltd, China*

- ❖ Assisted in building the entire vehicle's electrical system.
- ❖ Designed the driving/braking/steering controller in VCU based on Matlab/Simulink.
- ❖ Realized the communication between the vehicle controller and actuators based on CAN and EtherCAT communication protocols in Speedgoat.
- ❖ Conducted vehicle testing. Achieved a 50 km/h speed and 30° steep slope's climbing which can be controlled manually or remote controller.

Graduate student

May. 2025 – Sep. 2025

**Real-time multidimensional vehicle dynamic stability domain calculation and its application in intelligent vehicles**

*Beijing Institute of Technology, China*

- ❖ Presented an enhanced SOSP-based method for better estimating a vehicle's stability domain.
- ❖ Established a data-driven, multidimensional mapping model (DSR-NET) to achieve a continuous stability-domain description.
- ❖ Built a SMC-based stability controller integrated with DSR-NET and validated its effectiveness and real-time performance on a hardware-in-the-loop platform.
- ❖ Reduced peak tracking error by 35% and boosted maneuverability under extreme conditions by more reasonable triggers of the stability controller.

Graduate student

Nov. 2024 – Jun. 2025

Dynamic Region of Stability Integrated Path-tracking Control for Intelligent Vehicles

*Beijing Institute of Technology, China*

- ❖ Designed a method of calculating stability domain based on Lyapunov functions.
- ❖ Plotted the images of the stable domain of the article.
- ❖ Achieved a better path tracking performance under extreme conditions compared to traditional method.
- ❖ Related results have been accepted by the Chinese Journal of Mechanical Engineering.

Graduate student

Sep. 2024 – Dec. 2024

The dual-vehicle state communication

*BYD Auto Co., Ltd, China*

- ❖ Tested the Newton-M2 and onboard GPS positioning system.
- ❖ Designed the communication algorithms based on Ubuntu20.04/ROS1.
- ❖ Realized the following functions: read the status and positioning information of the ego vehicle and the obstacle vehicle using the serial port, and forward them to Speedgoat via UDP. The whole communication time doesn't exceed 20ms.
- ❖ Designed the hardware layout scheme based on actual vehicle.

Undergraduate student

Jan. 2024 – June. 2024

Vehicle trajectory method planning based on polynomial curve optimization

*Jilin University, China*

- ❖ Derived the polynomial curve calculation method in the Frenet coordinate system.
- ❖ Designed a sampling-based trajectory planning algorithm, achieving functions such as lane changing, acceleration/deceleration, and obstacle avoidance.
- ❖ Designed a quadratic programming-based trajectory planning algorithm, addressing the issues of high computation time and insufficient solution space in sampling-based algorithms.

## ✿ LANGUAGE & SKILLS

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❖ **English:** CET-6(China's College English Test Band):544

❖ **Research skills:** Matlab/Simulink, Carsim, Python, Ubuntu/ROS, C++, Hardware and software debugging especially in Automotive, Microsoft office.

## ☀ REFEREES

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### **Dr Yu Zhang**

Postdoctoral Researcher

School of Mechanical Engineering

Beijing Institute of Technology, China

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### **Associate Professor Yechen Qin**

School of Mechanical Engineering

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