# 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 system. 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; some experiences in the software and hardware debugging of automotive such as CAN/Ethercat communication, motor control, navigation and positioning modules.

❖ My future research interest lies in combining the vehicle dynamics theory with cutting-edge technologies such as machine learning and large model techniques to improve the motion performances and decision-making behaviors of autonomous vehicles in complex environments.

## ✪ EDUCATION

**Master of Mechanical Engineering (rank 2 in Chinese Soft Science)**          *Sep. 2024 – Jun. 2027*
Beijing Institute of Technology (Project 985), Beijing, China          *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**          *Sep. 2020 – Jun. 2024*
Jilin University (Project 985), Changchun, China          *Supervisor: Nan Xu*

❖ GPA: 3.73/4.0 (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. (**Accepted**)

张钰, **王成烨**, 杜甫, 董明明, 秦也辰 and 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. (**Accepted, IF=6.4, JCR Q2, TOP**)

# ✹ RESEARCH EXPERIENCE

**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. Achieved an active pose control.

**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.
❖ 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 low-latency state transmission between the ego vehicle and the surroundings.
❖ 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

❖ **English:** CET-6 (China's College English Test Band): 544 (passed), writing/reading/speaking
❖ **Chinese:** native language
❖ **Research skills:** Matlab/Simulink, Carsim, Python, Ubuntu/ROS, C++, Hardware and software debugging especially in Automotive, Microsoft office.

# ✺ REFEREES

**Dr Yu Zhang**
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China North Vehicle Research Institute, China
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**Professor Yechen Qin**
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