Zhengyang Wan

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EDUCATION

M.E. in Transportation Engineering, Tongji University, China *Sept.2022 - Jun.2025 (Expected)*

B.E. in Vehicle Engineering, Tongji University, China *Sept.2018 - Jun.2022*

PUBLICATIONS

[J1] **Wan ZY**, Zhou HC, Zhang JM. "Development of Driving Simulation Platform for Virtual Track Train." *Urban Rapid Rail Transit*, 2024. (Accepted, In Press)

[J2] Zhou HC, **Wan ZY**, Mei MS, et al. "Study of The Tire Wear of Virtual Track Train." *Proceedings of the Institution of Mechanical Engineers, Part D: Journal of Automobile Engineering*, 2024. (Published online)

PATENTS

[P1] "An Integrated Driving Simulation Platform for Virtual Track Trains" (**Co-inventor**). Patent Publication Number CN118605217A, filed May 2024. (Pending)

RESEARCH EXPERIENCE

Study on Curving Passing Performance of Virtual Track Train (VTT) Based on Integrated Driving Simulation Platform *Sept.2023 – Jun.2025(Expected)*

(Master's thesis. Advisor: Associate Prof. Hechao Zhou, Tongji University)

- Led the development of a driving simulation platform to study VTT's tracking and dynamics performance.
- Implemented model predictive control algorithms to improve VTT's control effort. Integrated SIMPACK-Realtime in Ubuntu to develop human-in-the-loop test rig to simulate driver's behaviour, addressing gaps in research on different driving mode for VTT.
- Developed visualization interface using Unreal Engine, simulating VTT's operation in different scenarios.
- Generated new insights into autonomous control and human-vehicle interaction for VTT, culminating in a peer-reviewed journal publication [J1] and a patent [P1].
- Future work will explore collaborative optimization and multi-body dynamics to improve VTT control in urban environments.

Virtual Track Train Tire Wear Evolution Law and Wear Control Strategy *Jun.2022 - Oct.2023*

(State Key Laboratory Open Funding Project)

- Developed and validated a finite element tire model using ABAQUS, performing quantitative simulations of tire wear based on Steady State Transport methods.
- Provided key insights into the heightened wear rates of VTT tires compared to other rubber-tired vehicles, offering a theoretical basis for VTT maintenance strategies.
- Published related findings in a peer-reviewed journal [J2].

Research on the Pavement Loading Feature of Tire Running Gear and Rutting Formation Law of Virtual Track Train *Apr.2021 - Dec.2022*

(National Key R&D Program of China)

- Developed a VTT-pavement coupling system to systematically evaluate the impact of temperature, speed, and load on rutting formation.

- Conducted field studies and data collection to validate the model and optimize simulation designs.
- Findings revealed that heavy load, low speed, and high temperature conditions greatly accelerate rutting, offering critical insights for the design and maintenance of train systems.

Air-Rail Transportation Technologies for the Eastern Hub *Dec.2023 - now*

(Shanghai Scientific Research Program)

- Contributed to the development of design standards for air-rail transport vehicles at the Eastern Hub, optimizing vehicle design and transportation procedures.
- Conducted field research and literature reviews, helped proposing design recommendations and creating a dynamics model for the new air-rail transport vehicle.
- This project significantly supports the development of air-rail transport system in Shanghai, enhancing freight efficiency by 30%.

Development of Portable Commissioning Equipment for CR200J *Feb.2023 - Apr.2024*

(School-Enterprise Co-operation Project with China Railway Shanghai Group Co., Ltd.)

- Designed the architecture of an intelligent commissioning equipment for CR200J, incorporated LoRa technology to improve remote communication in strong-interference environments.
- Conducted on-site testing and data analysis, contributing to the successful deployment of the equipment by China Railway.

SCHOLARSHIPS AND AWARDS

Outstanding Student Scholarship, Institute of Rail Transit, Tongji University

- Awarded for ranking in the top 10% of the class. (Total award: 300 USD / 2,000 CNY)

CRRC Zhuzhou Scholarship, College of Transportation, Tongji University

- Awarded to students with outstanding achievements in the field of rail transit. (Total award: 700 USD / 5,000 CNY)

First Prize in HARTING Science and Technology Competition, HARTING Technology Group

- Ranked 1st out of 30 participants for the best project. (Total award: 1,400 USD / 10,000 CNY)

RELEVANT EXPERIENCE

Tongji University & Technische Universität Berlin Academic Exchange Programme *Jul.2024*

(Academic Workshop. Berlin, Germany)

- Presented at the academic workshop on “Trajectory Control Algorithm and Dynamic Performance of Virtual Track Train.”

Cargill Investment (China) Co., Ltd. Shanghai, China. *Oct.2021 - Mar.2022*

Data Analyst Intern

- Developed a Python program to automate the extraction of daily trading data and calculated implied volatility using BAW and Black-Scholes option pricing models. Reduced acquisition time from 24 hours to less than 1 hour.

SKILLS

- **Languages**: Fluent in English (IELTS 8.0, GRE 328) and Mandarin (native proficiency).
- **Technical Skills**: Proficient in MATLAB, SIMPACK, Python, with experience in Ubuntu, CAD, ABAQUS, C++, ROS, Origin, and Zotero.
- **Leadership & Teamwork**: Proven leadership as Chairman of Tongji University Football Association and Captain of the college's football team, fostering collaboration, communication skills and teamwork.