

Meixin Zhu

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INTERESTS	Autonomous Driving, Artificial Intelligence, Big Data Analytics, Driving behavior, Traffic-Flow Modeling and Simulation.	
EDUCATION	Tongji University, Shanghai, China	
	<ul style="list-style-type: none">■ MEng in Communication and Transportation Engineering Sep 2015 – Present<ul style="list-style-type: none">• Thesis: Car-Following Behavior Modeling and Its Application in Intelligent Driving• Focus: Autonomous driving, reinforcement learning, car-following behavior, and naturalistic driving study.• Cumulative GPA: 92 / 100; Integrated Ranking: 1 / 237• Core Courses: Machine Learning, Fundamentals of Software Techniques, Transport Data Analysis, Fundamental of Traffic Flow Theory and Micro Simulation Analysis, Traffic Safety Analysis and Experiment.• Online Courses: Deep Reinforcement Learning (Berkeley EECS), Deep Learning for Self-Driving Cars (MIT EECS)■ BEng in Traffic Engineering Sep 2011 – Jun 2015<ul style="list-style-type: none">• Thesis: Evaluating Advanced Driving Assistance System Based on Naturalistic Driving Data• Cumulative GPA: 92 / 100; Integrated Ranking: 1 / 205• Math Courses: Advanced Mathematics, Linear Algebra, Probability and Mathematical Statistics, Operation Research, Numerical Methods and Computer Algorithms, An Introduction to Matlab and Its Application in Engineering.• Physics Courses: General Physics, Theoretical Mechanics, Structural Mechanics, Mechanics of Materials.• Computer Courses: C/C++ Programming, Database Technology and Applications, Fundamentals of Computers, Mobile Computing Introduction, Operating System (audit), Computer Vision (audit).• Professional Courses: Statistical Analysis in Transportation Engineering, Theory of Transportation System, Traffic Information Engineering, Traffic Management and Control, Traffic Safety Engineering, Transportation Planning.	
	Udacity, Mountain View, US	
	<ul style="list-style-type: none">■ Self-Driving Car Engineer Nanodegree Oct 2016 – Oct 2017<ul style="list-style-type: none">• Core Courses: Deep Learning, Computer Vision, Sensor Fusion, Localization, Control, Path Planning, Semantic Segmentation, Functional Safety, System Integration.• Capstone Project: Programming a Real Self-Driving Car. Include Traffic Light Detection, Control, and Waypoint Following.	
RESEARCH EXPERIENCE	Shanghai Naturalistic Driving Study Data Analyses	Apr 2015 – Present
	<ul style="list-style-type: none">■ General Motors, Active Safety Advance Development Department<ul style="list-style-type: none">• Collected 60 Chinese drivers' real-world driving data, with a total mileage of 161,055 km.• Investigated decision-making mechanisms for essential driving behaviors based on 108,933 car-following events, 17,309 lane-change events, 7,845 cut-in events, and 3,256 vehicle-pedestrian conflicts.• Calibrated, validated, and cross-compared five representative car-following models and found that the full velocity difference model performed best for Shanghai drivers.• Investigated the impact of a forward collision warning system on drivers' car following behavior.• Developed two autonomous car-following algorithms with deep reinforcement learning: one can perform human-like car following; the other is capable of controlling vehicle velocity in a safe, efficient, and comfortable manner.	
	Optimized Design for Combined Road Alignment	Sep 2014 – Present
	<ul style="list-style-type: none">■ Chinese National Science Foundation with Grant No. 51522810.<ul style="list-style-type: none">• Evaluating the safety performance of combined horizontal and vertical alignments in mountainous freeways, to guide the design of safer mountainous freeways.• Replicated the full range of combined alignments used on a mountainous freeway in China using Tongji University driving simulator.• Investigated the effects of combined alignment on lateral acceleration, lane offset, and speed variation.	
	Driving Behavior Research for Intelligent Collision Avoidance Technology	Dec 2011 – Dec 2015
	<ul style="list-style-type: none">■ China First Automobile Work (FAW) Corporation<ul style="list-style-type: none">• Examined the effects of situational urgency on drivers' collision avoidance behaviors using Tongji University's eight-degree-of-freedom driving simulator.• Developed a kinematic-based forward collision warning (FCW) algorithm that is compatible with drivers' risk perceptions and behavioral responses.• Implemented the proposed FCW algorithm in Tongji University driving simulator, and evaluated the system's performance, warning timing, and safety benefits.	

Journal Articles Under Review

- [1] **M. Zhu**, and X. Wang, "Reinforcement learning based velocity control for autonomous driving with multi-objectives: safety, efficiency, and comfort," *Computer-Aided Civil and Infrastructure Engineering*, submitted, under the first round review, Oct 2017.
- [2] **M. Zhu**, X. Wang, and Y. Wang, "Human-like autonomous car-following planning by deep reinforcement learning," *Transportation Research Part C: Emerging Technologies*, submitted, under the first round review, Oct 2017.
- [3] **M. Zhu**, and X. Wang, "Impact on car following behavior of a forward collision warning system with headway monitoring," *Transportation Research Part C: Emerging Technologies*, submitted, under the first round review, Oct 2017.
- [4] **M. Zhu**, X. Wang, A. Tarko, and S. Fang, "Modeling car-following behavior on urban freeways in Shanghai: a naturalistic driving study," *Transportation Research Part C: Emerging Technologies*, submitted, under the second round review, Sep 2017.

Journal Articles Published

- [1] X. Wang, **M. Zhu**, M. Chen, and P. Tremont, "Drivers' rear end collision avoidance behaviors under different levels of situational urgency," *Transportation Research Part C: Emerging Technologies*, vol. 71, pp. 419–433, Oct 2016 (IF: 3.805).
- [2] X. Wang, M. Chen, **M. Zhu**, and P. Tremont, "Development of a kinematic-based forward collision warning algorithm using an advanced driving simulator," *IEEE Transactions on Intelligent Transportation Systems*, vol. 17, no. 9, pp. 2583–2591, Sep 2016 (IF: 3.724).
- [3] X. Wang, and **M. Zhu**, "Calibrating and validating car-following models on urban expressways for Chinese drivers using naturalistic driving data," *China Journal of Highway and Transport*, in press, Oct 2017 (in Chinese, EI).
- [4] M. Yang, X. Wang, and **M. Zhu**, "Driving behavior research based on naturalistic driving study," *Traffic and Transportation*, vol. 33, no. 3 pp. 7–9, Mar 2017 (in Chinese).
- [5] X. Wang, **M. Zhu**, and M. Chen, "Dimension reduction and multivariate analysis of variance for drivers' forward collision avoidance behavior characteristic," *Journal of Tongji University*, vol. 44, no. 12 pp. 1858–1866, Dec 2016 (in Chinese, EI).
- [6] X. Wang, **M. Zhu**, and Y. Xing, "Impacts of collision warning system on car-following behavior based on naturalistic driving data," *Journal of Tongji University*, vol. 44, no. 7 pp. 1045–1051, Jul 2016 (in Chinese, EI).
- [7] X. Wang, **M. Zhu**, and M. Chen, "Impacts of situational urgency on drivers' collision avoidance behaviors," *Journal of Tongji University*, vol. 44, no. 6 pp. 876–883, Jun 2016 (in Chinese, EI).

Conferences

- [1] **M. Zhu**, X. Wang, and Y. Wang, "Human-like autonomous car-following planning by deep reinforcement learning," *Accepted for Presentation at the 97th Annual Meeting of the Transportation Research Board*, Washington D.C., USA, Jan 2018.
- [2] X. Wang, M. Yang, and **M. Zhu**, "An exploration of cut-in behavior and gap acceptance using Shanghai Naturalistic Driving data," *Accepted for Presentation at the 97th Annual Meeting of the Transportation Research Board*, Washington D.C., USA, Jan 2018.
- [3] R. Yu, H. Lin, and **M. Zhu**, "Reinforcement learning based velocity control for autonomous driving with multi-objectives: safety, efficiency, and comfort," *Accepted for Presentation at the 97th Annual Meeting of the Transportation Research Board*, Washington D.C., USA, Jan 2018.
- [4] **M. Zhu**, X. Wang, and Y. Wang, "Human-like autonomous car-following model by deep deterministic policy gradient reinforcement learning," *ASCE International Conference on Transportation and Development*, Pittsburgh, Pennsylvania, Jul 2018.
- [5] **M. Zhu**, X. Wang, and A. Tarko, "Calibrating car-following models on urban expressways for Chinese drivers using naturalistic driving data," *Oral Presentation at the 96th Annual Meeting of the Transportation Research Board*, Washington D.C., USA, Jan 2017.
- [6] **M. Zhu**, and X. Wang, "Impact of a forward collision warning system on headway and reaction time during car following," in *Proceedings of the 14th World Conference on Transport Research*, Shanghai, China, Jul 2016.

- [7] **M. Zhu**, X.S. Wang, and X.M. Wang, “Car-following headways in different driving situations: a naturalistic driving study,” in *Proceedings of the 16th COTA International Conference of Transportation Professionals*, Shanghai, China, Jul 2016.
- [8] X. Wang, and **M. Zhu**, “Car-following headways in different driving situations: a naturalistic driving study in China,” in *Proceedings of the 5th International Symposium on Naturalistic Driving Research*, Blacksburg, Virginia, USA, Oct 2016.

Patents

- [1] X. Wang, **M. Zhu**, and M. Chen, “A forward collision warning algorithm considering heterogeneity of drivers’ reaction,” *C.N. Patent 105691391 A*, filed Jun 2016, and issued Sep 2017.

AWARDS & SCHOLARSHIPS

- National Graduate Scholarship (twice), Ministry of Education, China Oct 2017, Oct 2016
Top 0.2%, for outstanding graduate students in China.
- Outstanding Student Award, Tongji University Oct 2016
One of 44 awardees from the 13,864 graduate students in Tongji.
- China Post-Graduate Mathematical Contest in Modeling, Second Prize Sep 2016
- ”Inspirational Star,” Tongji University Jun 2015
One of 10 awardees from Tongji University.
- Volvo Group Scholarship, Volvo Group Dec 2014
One of 15 awardees in China, for outstanding engineering students.
- National Competition of Transport Science and Technology for Students, Second Prize May 2014
One of 8 winning groups in China.
Project: Traffic Parameter Analysis Platform based on Unmanned Aerial Vehicle (UAV).
- Mathematical Contest in Modeling, Honorable Mention Jan 2014
Paper: Modeling the Keep-Right-Except-To-Pass Rule Using Cellular Automaton
- National Endeavor Fellowship (twice), Ministry of Education, China Nov 2013, Nov 2012
Top 3% of all the undergraduate students in China.
- China Undergraduate Mathematical Contest in Modeling, Second Prize Sep 2013
Top 5% among over 30,000 competition teams in China.

VOLUNTEER & TEACHING

- The 5th International Symposium on Transportation Safety**, Tongji University, China Sep 2017
- Picked up 13 international symposium attendees at the airport.
 - Prepared the invitation letters, and was in charge of the symposium registration.
- Transportation Safety Discipline “111 Project” Base**, Tongji University, China Sep 2016
- Translated resumes for 21 invited international experts and prepared the presentation files.
- Statistical Analysis in Transportation Engineering**, Teaching Assistant, Tongji University Fall 2017
- Preparing course slides and tutoring students on SAS coding.

WORK EXPERIENCE

- Cloud Base Information Corporation**, Shanghai, China
- Intern, Department of Data Science Sep 2014 – Nov 2014
 - Project: Traffic State Estimation Based on Mobile Phone Signaling Data.
 - Real-time estimation of traveling speed, traveling time and traffic congestion state.

PROFESSIONAL ACTIVITIES

- Accident Analysis & Prevention**, Elsevier
- Reviewer 2017

REFERENCES

- **Professor Xuesong Wang**, Advisor
College of Transportation Engineering, Tongji University
- **Professor Yinhai Wang**, Research Advisor
Department of Civil and Environmental Engineering, University of Washington
- **Professor Andrew P. Tarko**, Research Advisor
Lyles School of Civil Engineering, Purdue University

SKILLS

Python, Julia, MATLAB, TensorFlow, Theano, C, C++, Java, R, SAS, SQL Server.