

# Yongqi Dong



<https://yongqidong.github.io/>

Research Group Leader and PostDoc Researcher @ RWTH Aachen University

Guest Researcher @ Delft University of Technology

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## EDUCATIONAL BACKGROUND

Doctor of Philosophy, Department of Transport & Planning, **Delft University of Technology (TU Delft)** Dec.2019-May.2025

**Thesis:** *Safe, Efficient, and Socially Compliant Automated Driving: Sensing, Anomaly Detection, Planning and Control*

**Advisors:** Prof.dr.ir. [Bart van Arem](#) and Dr.ir. [Haneen Farah](#)

Visiting PhD Researcher, Department of Mechanical Engineering, **University of California, Berkeley** May.2023- Oct.2023

*Topic: Socially Compliant Automated Driving via Deep Reinforcement Learning and Model-based Social-aware MPC*

Master of Control Science and Engineering, Department of Automation, **Tsinghua University** Sep.2014-Jul.2017

Minor: Master Project for Improving Ability in *Big Data*

**Thesis:** *Data-Driven Analysis on Group Behaviors of Taxi Drivers and Ridesourcing Drivers*

*Nominated for Tsinghua University Outstanding Master Thesis Dissertation*

**Advisors:** Prof. [Li Li](#) and Prof. [Zuo Zhang](#)

Bachelor of Telecommunication Engineering Sep.2010-Jul.2014

School of Electronic and Information Engineering, **Beijing Jiaotong University**

**GPA: 91.5/100 | Rank: 1/202** | Postgraduate Recommendation to Tsinghua University without Examination

**Thesis:** *Design of vehicle-mounted data acquisition & communication unit for the WMN-based locomotive remote control*  
*Outstanding Undergraduate Thesis*

## PUBLICATIONS

(*Google Scholar* ID: [L2kD-DwAAAAJ](#). The superscript <sup>#</sup> indicates equal contribution, \* indicates corresponding authors.)

### Key Journal Publications:

- 1. **Dong, Y.**, Patil, S., Van Arem, B., & Farah, H. (2023). A Hybrid Spatial-temporal Deep Learning Architecture for Lane Detection. *Computer-Aided Civil and Infrastructure Engineering*, 38(1), 67-86. <https://doi.org/10.1111/mice.12829> [Top Q1, IF: 8.5, SJR: 2.972, CiteScore: 17.6]
- 2. **Dong, Y.**, Wang, S., Li, L., Zhang, Z. (2018). An Empirical Study on Travel Patterns of Internet Based Ride-Sharing. *Transportation Research Part C: Emerging Technologies*, 86, 1-22. <https://doi.org/10.1016/j.trc.2017.10.022> [Highly cited; Top Q1, IF: 7.6, SJR: 2.86, CiteScore: 15.8]
- 3. **Dong, Y.**, Farah, H., & Van Arem, B. (2025). Towards Developing Socially-Compliant Automated Vehicles: Advances, Experts Insights, and a Conceptual Framework. (Accepted by *Communications in Transportation Research* [Top Q1, IF: 12.5, SJR: 2.836, CiteScore: 15.2] and by 104th TRB Annual Meeting (TRB 2025) for presentation, and presented at the 4th Symposium on Management of Future Motorway and Urban Traffic Systems (MFTS)), [Preprint](#)
- 4. Li, R.<sup>#</sup>, & **Dong, Y.<sup>\*,#</sup>**(2023). Robust Lane Detection Through Self Pre-Training With Masked Sequential Autoencoders and Fine-Tuning With Customized PolyLoss. *IEEE Transactions on Intelligent Transportation Systems*, vol. 24, no. 12, pp. 14121-14132. <https://doi.org/10.1109/TITS.2023.3305015> (Joint first author and corresponding author) [Top Q1, IF:7.9, SJR:2.58, CiteScore: 14.8]
- 5. **Dong, Y.<sup>\*,#</sup>**, Zhang, L. <sup>#</sup>, Farah, H., Zgonnikov, A., & Van Arem, B. (2025). Data-driven Semi-supervised Machine Learning with Safety Indicators for Abnormal Driving Behavior Detection. *Transportation Research Record: Journal of the Transportation Research Board*, 1-16. <https://doi.org/10.1177/03611981241306752>
- 6. **Dong, Y.<sup>\*,#</sup>**, Lu, X. <sup>#</sup>, Li, R., Song, W., Van Arem, B., & Farah, H. (2025). Intelligent Anomaly Detection for Lane

Rendering Using Transformer with Self-Supervised Pre-Training and Customized Fine-Tuning. *Transportation Research Record: Journal of the Transportation Research Board*. <https://doi.org/10.1177/03611981251333341> (accepted by and presented at [TRB2024](#)), [Preprint](#)

- 7. Farah, H., Postigo, I., Reddy, N., **Dong, Y.**, Rydergren, C., Raju, N., & Olstam, J. (2022). Modeling Automated Driving in Microscopic Traffic Simulations for Traffic Performance Evaluations: Aspects to Consider and State of the Practice. *IEEE Transactions on Intelligent Transportation Systems*, 24(6), 6558-6574. <https://doi.org/10.1109/TITS.2022.3200176> [Top Q1, IF:7.9, SJR:2.58, CiteScore: 14.8]
- 8. Berge, S. H., De Winter, J., Dodou, D., Afghari, A. P., Papadimitriou, E., Reddy, N., **Dong, Y.**, Raju, N., & Farah, H. (2025). Understanding Cyclists' Perception of Driverless Vehicles through Eye-Tracking and Interviews. *Transportation Research Part F: Traffic Psychology and Behaviour*, 109, 399-420. <https://doi.org/10.1016/j.trf.2024.11.015> [Top Q1, IF:3.5, SJR:1.262, CiteScore: 7.6]
- 9. Liu, W., Song, L., **Dong, Y.**, Zhang, X., & Xu, L. (2025). Unified Model Predictive Control Method of Automated Vehicles for Lane Changing and Lane Keeping Maneuvers. *Journal of Intelligent Transportation Systems*, 1-21. <https://doi.org/10.1080/15472450.2025.2479235>

#### Key Conference Proceeding Publications & Presentations:

- 1. Zhang, L.<sup>#</sup>, **Dong, Y.**<sup>\*,#</sup>, Farah, H., & Van Arem, B. (2023). Social-aware Planning and Control for Automated Vehicles based on Driving Risk Field and Model Predictive Contouring Control: Driving through Roundabouts as a Case Study. 2023 IEEE International Conference on Systems, Man, and Cybernetics (SMC), Honolulu, Oahu, HI, USA, 2023, pp. 3297-3304. <http://dx.doi.org/10.1109/SMC53992.2023.10394462>. (Co-first author and corresponding author, accepted and presented at *TRB's 2023 Automated Road Transportation Symposium*), [Demo video](#)
- 2. **Dong, Y.**, Detema, T., Wassenaar, V., Van de Weg, J., Kopar, T., & Suleman, H. (2023). Comprehensive Comparison of Deep Reinforcement Learning for Automated Driving on Various Driving Maneuvers with Simulation. *2023 IEEE 26th International Conference on Intelligent Transportation Systems (ITSC)*, Bilbao, Spain, 2023, pp. 6165-6170, <http://dx.doi.org/10.1109/ITSC57777.2023.10422159>
- 3. **Dong, Y.**<sup>\*,#</sup>, Patil, S.<sup>#</sup>, Farah, H., & Hellendoorn, J. (2023). Sequential Neural Network Model with Spatial-Temporal Attention Mechanism for Robust Lane Detection Using Multi Continuous Image Frames (**Presented at the Transportation Research Board (TRB) 102<sup>nd</sup> annual meeting TRB 2023**). [TRBAM-23-04409 poster](#)
- 4. Yuan, H., Li, P., Van Arem, B., Kang, L., Farah, H., & **Dong, Y.**<sup>\*</sup> (2023). Safe, Efficient, Comfort, and Energy-saving Automated Driving through Roundabout Based on Deep Reinforcement Learning. *2023 IEEE 26th International Conference on Intelligent Transportation Systems (ITSC)*, Bilbao, Spain, 2023, pp. 6074-6079, <http://dx.doi.org/10.1109/ITSC57777.2023.10422488> (Corresponding author and PI)
- 5. Xue, C.<sup>#</sup>, **Dong, Y.**<sup>#</sup>, Liu, J.<sup>\*</sup>, Liao, Y., & Li, L. (2023). Design of the Reverse Logistics System for Medical Waste Recycling Part I: System Architecture and Disposal Site Selection Algorithm. *2023 IEEE 26th International Conference on Intelligent Transportation Systems (ITSC)*, Bilbao, Spain, 2023, pp. 1741-1746, <http://dx.doi.org/10.1109/ITSC57777.2023.10422624> (Co-first author)
- 6. Xue, C.<sup>#</sup>, **Dong, Y.**<sup>#</sup>, Liu, J.<sup>\*</sup>, Liao, Y., & Li, L. (2023). Design of the Reverse Logistics System for Medical Waste Recycling Part II: Route Optimization with Case Study under COVID-19 Pandemic. *2023 IEEE 26th International Conference on Intelligent Transportation Systems (ITSC)*, Bilbao, Spain, 2023, pp. 4011-4017. <http://dx.doi.org/10.1109/ITSC57777.2023.10422236> (Co-first author)
- 7. **Dong, Y.**<sup>\*</sup>, Chen, K., Peng, Y., & Ma, Z. (2022). Comparative Study on Supervised versus Semi-supervised Machine Learning for Anomaly Detection of In-vehicle CAN Network. *2022 IEEE 25th International Conference on Intelligent Transportation Systems (ITSC)*, 2022, pp. 2914-2919, <https://doi.org/10.1109/ITSC55140.2022.9922235>

#### Other Journal and Conference Publications:

- 1. Lingam, S. N., De Winter, J., **Dong, Y.**, Tsapi, A., Van Arem, B., & Farah, H. (2024). eHMI on the Vehicle or on the

Infrastructure? A Driving Simulator Study. *European Journal of Transport and Infrastructure Research*, 24(2), 1–24.

<https://doi.org/10.59490/ejtir.2024.24.2.7273> [Journal]

- 2. **Dong, Y.**, Liu, C., Wang, Y., & Fu, Zh. (2024). Towards Understanding Worldwide Cross-cultural Differences in Implicit Driving Cues: Review, Comparative Analysis, and Research Roadmap. Accepted by and [presented at the 2024 IEEE 27th International Conference on Intelligent Transportation Systems \(ITSC\)](#), [Preprint](#) [Conference]
- 3. Huang, Y.<sup>#</sup>, **Dong, Y.<sup>#,\*</sup>**, Tang, Y., & Li, L. (2024). Leverage Multi-source Traffic Demand Data Fusion with Transformer Model for Urban Parking Prediction. **Accepted** by [the 28th International Conference Of Hong Kong Society For Transportation Studies \(HKSTS 2024\)](#) and the [Conference in Emerging Technologies in Transportation Systems \(TRC-30\)](#) for presentation, [Preprint](#) [Conference]
- 4. **Dong, Y.<sup>#,\*</sup>**, Chen, K.<sup>#</sup>, & Ma, Z. (2023). Comparative Study on Semi-Supervised Learning Applied for Anomaly Detection in Hydraulic Condition Monitoring System. *2023 IEEE International Conference on Systems, Man, and Cybernetics (SMC)*, Honolulu, Oahu, HI, USA, 2023, pp. 1702-1708, <http://dx.doi.org/10.1109/SMC53992.2023.10394193> [Conference]
- 5. Raju, N., Schakel, W., Reddy, N., **Dong, Y.**, & Farah, H. (2022). Car-Following Properties of a Commercial Adaptive Cruise Control System: A Pilot Field Test. *Transportation Research Record: Journal of the Transportation Research Board*, 2676(7), 128-143. <https://doi.org/10.1177/03611981221077085> [Journal]
- 6. **Dong, Y.**, Yang, Z., Yue, Y., Pei, X., & Zhang, Z. (2018). Revealing Travel Patterns of Sharing-bikes in a Spatial-temporal Manner Using Non-negative Matrix Factorization Method. In *CICTP 2018: Intelligence, Connectivity, and Mobility* (pp. 1665-1674). Reston, VA: American Society of Civil Engineers. <https://doi.org/10.1061/9780784481523.165> [Conference]
- 7. Yue, Y., Pei, X., Yang, Z., **Dong, Y.**, & Yao, D. (2018). A Trip Building and Chaining Methodology Using Traffic Surveillance Data. In *CICTP 2018: Intelligence, Connectivity, and Mobility* (pp. 2254-2262). Reston, VA: American Society of Civil Engineers. <https://doi.org/10.1061/9780784481523.224> [Conference]
- 8. **Dong, Y.**, Zhang, Z., Fu, R., Xie, N. (2016). Revealing New York Taxi Drivers' Operation Patterns Focusing on the Revenue Aspect. (2016) In *12th World Congress on Intelligent Control and Automation (WCICA)*, (pp. 1052-1057). IEEE. <https://doi.org/10.1109/WCICA.2016.7578771> [Conference]
- 9. **Dong, Y.**, Ruan, H., Cai, T., Peng, J, and Wang ,W. (2013). Using LED to Demonstrate the Composition of Simple Harmonic Motions and Five Polarization States of Light. *Physics Experimentation*, 11, 45-48 [Journal in Chinese]

#### **Under Review and Working Papers:**

- 1. **Dong, Y.**, Van Arem, B., & Farah, H. (2025). Safe and Socially-compliant Automated Driving through Integrating Multi-Agent Reinforcement Learning with SVO and MPCC (In preparation, to be submitted to *the Proceedings of the National Academy of Sciences, PNAS*)
- 2. Patil, S.<sup>#</sup>, **Dong, Y.<sup>#,\*</sup>**, Farah, H., & Hellendoorn, J. (2025). Efficient Sequential Neural Network based on Spatial-Temporal Attention and Linear LSTM for Robust Lane Detection Using Multi-frame Images, (Joint first author and corresponding author, **Under Review** by *IEEE Transactions on Intelligent Vehicles*), [Preprint](#)
- 3. **Dong, Y.<sup>#,\*</sup>**, Reyna, C.F.<sup>#</sup>, Klunder, G., Liao, F., & Rasouli, S. (2025). Benchmarking Emerging and Established Traffic Microsimulation Platforms for Dynamic Speed Limit Applications: A Comparative Study on Dutch Motorways. (Joint first author and corresponding author, under review by the *29th International Conference of Hong Kong Society for Transportation Studies*, to be submitted to *Transportation Research Part C: Emerging Technologies*)
- 4. Ji, J.<sup>#</sup>, Lu, R.<sup>#</sup>, Belkessa, L., **Dong, Y.**, Wang, L., Madadi, B., Varotto, S., Saunier, N., MacFarlane, G., & Wu, C. (2025). Exploring Artifacts Availability in Transportation Research Using Large Language Models, **Accepted** by the *2025 Transportation Research Symposium (TRS)*, the *2025 International Symposium on Transportation Data & Modelling (ISTDM)*, and the *2025 Modelling Mobility Conference (MoMo)* for presentation; to be submitted to *Transportation Research Part C: Emerging Technologies*.

- 6. Zhang, Y., **Dong, Y.\*** (2025). Optimization of coordinated flow restriction and skip-stopping schemes for urban rail stations considering platform carrying capacity (**Presented at the Transportation Research Board (TRB) 102<sup>nd</sup> annual meeting, TRB 2023, Under Review by Journal of Advanced Transportation**). [TRBAM-23-04413 poster](#), [Preprint](#)
- 7. Zhang, Y., **Dong, Y.\***, Evans, C., Rinaldi, M., Shyrokau, B., & Farah, H. (2025). Cooperative Planning and Control for Connected and Automated Vehicles' On-ramp Merging in Mixed Traffic via Value Decomposition-based Multiagent Deep Reinforcement Learning. (Corresponding author, under review by the *29th International Conference of Hong Kong Society for Transportation Studies, to be submitted to Transportation Research Part C: Emerging Technologies*)
- 8. [The Age of Smart Integrated Transportation: Practice of in the Digital Transformation of Transportation Industry](#) [M]. Publishing House of Electronics Industry. [Involved as **reviewer** and **expert editor** for Preface, Chapters 1 & 13]

#### Open resource repository:

- [Datasets, Simulation Platforms, and Relevant Publications on Emerging Mixed Traffic of AVs and HDVs](#)
- List of open datasets and codes: <https://data.4tu.nl/search?search=Yongqi+Dong>

## PATENTS & SOFTWARE COPYRIGHTS

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#### ✧ *European and Dutch Patent:*

- **Dong, Y., & Li, R.** (2024). Automated Lane Detection (Dutch Patent No. [NL2033551](#)). Netherlands: Netherlands Patent Office.
- **Dong, Y., Zhang, L., Farah, H., & Van Arem, B.** (2025). Socially-compliant Automated Driving in Mixed Traffic (Dutch Patent No. NL2035943, submitted & filed, OCT-23-056).

#### ✧ *Chinese Invention Patent:*

- Ruan, H., **Dong, Y.**, Wang, W., & Wang, F. (2016). Intelligent Demonstration Instrument of Simple Harmonic Oscillation Composition and Five Polarization States of Light (Chinese Patent No. [CN103236211B](#)). China: China National Intellectual Property Administration.

#### ✧ *Software copyright:*

- Spatial-Temporal Attention Integrated Sequential Neural Network Model for Vision-based Robust Lane Detection ([i-DEPOT 142731](#), **approved & registered**)
- Vision-Based Lane Detection System With Self-supervised Pre-training Through Masked Sequential Auto-encoders (Computer Software Copyright Registration in China, 2024SR1350911, **approved & registered**)

## ACADEMIC SERVICES

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<b>Technical Committee (Chair)</b>   Automated Mobility in Mixed Traffic   IEEE ITSS	Mar.2025-Present
Establishing and chairing the interdisciplinary community: " <a href="#">Automated Mobility in Mixed Traffic</a> "	
<b>IEEE ITSS New Initiatives Project Principal Investigator (PI)</b>   IEEE ITSS	Mar.2024-Present
Project: <i>Promoting interdisciplinary research toward the deployment of automated vehicles in mixed traffic</i>	
<b>Workshop Organizer (Primary coordinator)</b>   27 <sup>th</sup> IEEE ITSC 2024, Edmonton, Canada	Sep.24, 2024
Workshop title: <a href="#">Automated Mobility in Emerging Mixed Traffic</a>	
<b>Workshop Organizer (Second coordinator )</b>   26 <sup>th</sup> IEEE ITSC 2023, Bilbao, Bizkaia, Spain	Sep. 24, 2023
Workshop title: <a href="#">Data-driven and Empirical Research for Emerging Mixed Traffic of Automated Vehicles and Human-driven Vehicles</a>	
<b>Workshop Organizer (Primary coordinator)</b>   IEEE IV 2023, Anchorage, USA	Jun.4, 2023
Workshop title: <a href="#">Development of Socially-compliant Driving Behavior for Automated Vehicles to Enhance Safety and Efficiency in Mixed Traffic</a>	
<b>IEEE TCoS Seeding Project Leader (PI)</b>   2023 IEEE TAB Committee on Standards (TCoS) seed funding	
Project title: <i>Enhancing the deployment of socially-compliant automated vehicles in mixed traffic</i> ( <a href="#">website</a> )	

### ***Ad-hoc Journal Reviewer Services***

- International Journal of Computer Vision (**IF: 19.5**; Top AI journal)
- IEEE Transactions on Intelligent Transportation Systems
- IEEE Open Journal of Intelligent Transportation Systems
- Transportation Letters: The International Journal of Transportation Research
- Journal of Intelligent Transportation Systems: Technology, Planning, and Operations
- Journal of Transportation Research Record: Journal of the Transportation Research Board
- International Journal of Human-Computer Interaction
- Journal of Advanced Transportation
- Scientific Reports
- Applied Ergonomics
- European Transport Research Review
- ASCE-ASME Journal of Risk and Uncertainty in Engineering Systems, Part A: Civil Engineering

### ***Ad-hoc Conference Reviewer Services***

- IEEE Intelligent Vehicles Symposium (IV) | Associate editor
- IEEE Intelligent Transportation Systems Conference (ITSC)
- Transportation Research Board (TRB) Annual Meeting
- World Congress on Intelligent Control and Automation (WCICA)
- COTA International Conference of Transportation Professionals (CICTP)
- The International Symposium on Transport Network Resilience (INSTR)

## **THESIS SUPERVISION**

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<b>Yuteng Zhang</b>   Master of Science in Transport, Infrastructure & Logistics	Jan.2024-Nov.2024
Thesis title: <a href="#">Coordinated Planning and Control for Connected and Automated Vehicles' On-ramp Merging in Mixed Traffic Through Value Decomposition-based Multiagent Deep Reinforcement Learning</a>	
<b>Cesar Flores Reyna</b>   Master of Science in Sustainable Mobility Transitions, EIT, TU/e	Jan.2024-Nov.2024
Thesis title: Investigating a Benchmarking Framework for the Large-Scale Micro Simulator (LSMS) Platform in Freeways under Dynamic Speed Limits	
<b>Mathijs den Otter</b>   Master of Science in Civil Engineering–Transport and Planning	Sep.2022-Dec.2023
Thesis title: <a href="#">Impact of Improved Lane Marking Properties on the Performance of Lane Keeping Assistance Systems in Varying Circumstances</a>	
<b>Lanxin Zhang</b>   Master of Science in Civil Engineering–Transport and Planning	Oct.2022-Jun.2023
Thesis title: <a href="#">Semi-supervised Machine Learning for Abnormal Driving Behavior Detection</a>	
<b>Henan Yuan</b>   Bachelor in Traffic and Transportation, BJTU&TUDelft TTE	Oct.2022-Jun.2023
Thesis title: Deep Reinforcement Learning for Driving through Roundabouts	
<b>Shiva Nischal Lingam</b>   Master of Science in Civil Engineering–Transport and Planning	Jan.2021-Nov.2021
Thesis title: <a href="#">Effects of External Human Machine Interfaces on Automated Vehicles' Communicative Interactions With Human Drivers (Cum Laude)</a>   Won 2 <sup>nd</sup> <a href="#">Cuperusprijs prieze of KIVI</a>	
<b>Sandeep Patil</b>   Master of Science in Mechanical Engineering (Vehicular Engineering)	Oct.2020-Aug.2021
Thesis title: <a href="#">Lane Detection using SpatioTemporal Attention</a>	
<b>Eline van der Kooij</b>   Master of Science in Transport, Infrastructure & Logistics	Jul.2020-May.2021
Thesis title: <a href="#">Visibility of Lane Markings for Machine Vision</a>	
<b>Sanny Toonen</b>   Bachelor of Science in Civil Engineering–Transport and Planning	Jul.2020-May.2021
Thesis title: <a href="#">Lane Recognition for Automated Vehicles</a>	



## TEACHING ACTIVITIES

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- Project supervisor, Instructor** | EEMCS, TU Delft Nov.2022-Feb.2024  
Courses: [Interdisciplinary Advanced AI Project \(IFEEMCS520200\)](#); [Capstone Applied AI Project \(T13150TU\)](#)  
[Fundamentals of Artificial Intelligence Programme \(IFEEMCS520100\)](#)
- Teaching Assistant, Instructor** | TU Delft and BJTU joint bachelor program Mar.2022 & Mar.2023  
Course: Advanced Lecture "Trends in Transportation" 2022 & 2023
- Lecturer** | DakeOffer online Platform Mar.2020-Jun.2020 & Nov.2020-Jan.2021  
Course: Introduction to Big Data and Artificial Intelligence: Fundamental and Practice
- Teaching Assistant** | Transport and Planning, TU Delft Apr.2020-Aug.2020 & Apr.2021-Aug.2021  
Course: [CIE5805 – Intelligent Vehicles for Safe and Efficient Traffic](#)
- Teaching Assistant** | Department of Automation, Tsinghua University Sep.2016-Jan.2017  
Course: Data Ethics
- Teaching and Lab Assistant** | Electrical and Electronic Lab Center, Tsinghua University Mar.2015-Jul.2016  
Courses: Advanced Labs in Electronic Technology, Fundamentals of Electronics Power Technology
- RSI Tutor** | Center for Excellence in Education, USA Jul.2017-Aug.2017  
Research writing and presentation tutor for the 2017 Research Science Institute Program at Tsinghua University
- Undergraduate Counselor** (Class 2012) | School of EIE, Beijing Jiaotong University Jul.2012- Jul.2014

## TALKS & PRESENTATIONS

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- Promoting Diversity and Leadership in ITS** | IEEE WiE/YP Workshop & Forum, Cairo, Egypt Nov.21.2023  
Presentation topic: Resource Repository: Datasets, Simulation Platforms, and Relevant Publications for Emerging Mixed Traffic of Automated Vehicles and Human-driven Vehicles
- Automated Round Transportation** | TRB ARTS 2023, San Francisco, USA Jul.12.2023  
Presentation topic: Social-aware Planning and Control for Automated Vehicles Based on Driving Risk Field and Model Predictive Contouring Control: Driving through Roundabouts as a Case Study
- AI Applications in Transportation Planning** | TRB 2023, Washington D.C., USA Jan.11.2023  
Presentation topics: (1) Robust Lane Detection through Self Pre-training with Masked Sequential Autoencoders and Fine-tuning with Customized PolyLoss  
(2) Sequential Neural Network Model with Spatial-Temporal Attention Mechanism for Robust Lane Detection Using Multi Continuous Image Frames
- Research into Urban Rail Transit Operations and Design** | TRB 2023, Washington D.C., USA Jan.11.2023  
Presentation topic: Optimization of coordinated flow restriction and skip-stopping schemes for urban rail stations considering platform carrying capacity
- Connected and Automated Vehicles** | MFTS 2022, Dresden, Germany Dec.01.2022  
Presentation topic: Towards Developing Socially-Compliant Automated Vehicles: State of the Practice, Experts Expectations, and a Conceptual Framework
- Automated mobility** | IEEE ITSS Young Professionals Fellowship Symposium, Chania, Greece Nov.25.2022  
Presentation topic: Multi-goal proactive traffic management for mixed traffic of automated vehicles (AVs) and human-driven vehicles (HDVs) using explainable physics-informed Artificial Intelligence
- AI, Security, Privacy and Safety Systems in ITS Applications** | ITSC2022, Macow, China Oct.08.2022  
Presentation topic: Comparative Study on Supervised vs Semi-supervised ML for Anomaly Detection of CAN Network
- Research on AI and Advancing Computing Applications** | TRB 2022, Washington D.C., USA Jan.12.2022  
Presentation topic: A Hybrid Spatial-temporal Sequence-to-one Neural Network Model for Lane Detection
- Challenges of Automated Vehicles and Traffic** | University of Győr, Hungary May.28.2021  
Talk topic: Deep learning for automated vehicles' operational design domain: problems, challenges, and case studies

**SAMEN User Committee Annual Meeting** | Dutch Research Council (NWO), Delft, Netherlands Jan.28.2021  
 Talk topic: Data-driven research for automated vehicles' operational design domain: a case study on perception

**Intelligence, Connectivity, and Mobility** | COTA CICTP 2018, Tsinghua University, China Jul.07.2018  
 Presentation topic: Revealing travel patterns of sharing-bikes in a spatial-temporal manner using the NFM method

**World Congress on Intelligent Control and Automation** | IEEE WCICA 2016, Guilin, China Jun.12.2016  
 Presentation topic: Revealing New York Taxi Drivers' Operation Patterns Focusing on the Revenue Aspect

## HONORS & AWARDS

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- [Chinese CSC Award for Outstanding Self-financed Students Abroad \(6,000 \\$\)](#)
- **TU Delft-Transport Institute Interdisciplinary Research Award (10,500 €)**
- **2023 IEEE TAB Committee on Standards (TCoS) seed funding (6,000 \$)**
- **2024 IEEE ITSS New Initiatives Proposal Funding (5,000 \$)**
- **IEEE ITSS Young Professionals Fellowship (Twice)**
- **Erasmus + mobility Grants (Three times)**
- **Outstanding College Graduates of Beijing (Top 1‰)**
- **National Scholarship (Top 1‰)**
- **First Class Tsinghua University RONG Scholarship**
- **Second-Class Merit Scholarship for Masters Tsinghua University**
- **Merit Student (Four times)**
- **First-Class Academic Fellowship (Top 1%, Twice)**
- **Second Prize in the 2012 & 2013 Undergraduate Electronic Design Contest in Beijing**
- **Bronze award in “Challenge Cup” Entrepreneurship Design Contest in Beijing**
- **First Prize in Freescale Cup University Students Intelligent Car Race (Rank 2<sup>nd</sup>)**
- **Second Prize in the Physical Experiment Competition in Beijing**
- **2019 Microsoft Discover AI Challenge: *Sustainable Life* | [Data-Driven All-in-one Shared Mobility](#) | Top (10%)**

## RESEARCH EXPERIENCE

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- AI & Automated Mobility Group** | Institute of Highway Engineering | **RWTH Aachen University** Jun.2024-Present
- **AI-Enhanced Hierarchical Multi-objects Driving Risk Field Model Integrating Physics-Based and Human Perception-Based Approaches with Drivers' Distraction**  
 (PI, [Individual DFG](#))
  - **Explainable Mathematics-Enhanced AI Model for Multi-Modal Urban Traffic Prediction and Simulation**  
 (Co-PI and coordinator, [DFG Research Unit Proposal](#))
  - **Realistic Modelling of Cycling Behavior and Interaction with Other Road Users in Mixed Traffic**  
 (PI and coordinator, [DFG Package Proposal](#))
  - **Parameter-Efficient Fine-Tuning of Pretrained Multimodal Large Vision Model (LVM) for Privacy-preserving Traffic Anomaly Detection with Thermal Imaging**
- Traffic and Transportation Safety Lab** | Department of Transport and Planning | **TU Delft** Dec.2019-Jun.2024
- **Data-driven and AI-based research for expanding Automated Vehicles' Operational Design Domain in mixed traffic (part of [SAMEN](#) project)**
    - Developed a hybrid sequence-to-one model for lane detection in extremely hard driving scenes
    - Incorporated spatial-temporal attention for automated vehicles' perception
    - Designed reliable data-driven algorithms for anomalies and abnormal behaviors prediction
    - Implemented Deep Reinforcement Learning (DRL) models for safe, reliable, and socially compliant automated driving under challenging maneuvers involving both longitudinal and lateral control

- Gaze behavior of road users when interacting with an automated vehicle at an intersection: *Understanding cyclists' perception of driverless vehicles through eye-tracking and interviews*

**Mechanical Systems Control (MSC) Lab** | Department of Mechanical Engineering | **UC Berkeley** May.2023-Oct.2023

**Advisor:** Prof. [Masayoshi Tomizuka](#)

➤ **Socially Compliant Automated Driving through DRL and Model-based Social-aware MPC**

- Reviewed State-of-the-art Socially Compliant Automated Driving Methods in Literature
- Developed Model-enhance Multi-agent Deep Reinforcement Learning with Social-aware MPC

**Waterloo Artificial Intelligence Institute** | Faculty of Engineering | **University of Waterloo**

May.2018-Sep.2019

➤ **Applied Machine Learning, Artificial Intelligence, and Big Data Research**

- 2018 Railroad Problem Solving Contest: Use CNN-LSTM-Dense Concatenated model to forecast train delays
- A Deep Learning Framework for Traffic Forecasting: Exploring GCN joint with LSTM to predict traffic flow
- Data-driven anomaly detection (unsupervised): Auto-Encoder, Hierarchical Extreme Learning Machines
- Kaggle competition: Employ LSTM, LightGBM, XGBoost models to predict stock movements with news data
- Deep reinforcement learning in traffic control: DQN, A3C, and PPO methods
- Real-time Road Surface Condition (RSC) Monitoring: Adopt CNN to RSC image classification

**Singapore-MIT Alliance for Research and Technology (SMART)**

Aug.2016-Sep.2016

**Future Urban Mobility (FM) IRG** | Project: *SimMobility* | Topic: **Taxi Roaming**

**Advisors:** Prof. [Moshe BEN-AKIVA](#), Postdoctoral Associate [Bat-hen NAHMIAS-BIRAN](#)

➤ **Constructing a model tackling the taxi roaming (taxi service) problem, to be embedded into the *SimMobility* platform**

- Proposed one advisable solution of cruising along hotspots through a cell-based logit-opportunity model improved by a data-driven method
- Participated in building the architecture of the final model embedded in *SimMobility*

**Intelligent Transportation Laboratory, Tsinghua National Laboratory for Information Science and Technology**

(TNList) | **Advisors:** Prof. [Zuo Zhang](#) and Prof. [Li Li](#) (*IEEE Fellow*)

Sep.2014-May.2018

*Transportation Research based on machine learning and data-driven methods*

➤ **Revealing New York taxi drivers' operation patterns focusing on revenue**

- Developed a method for classifying drivers into 3 groups based on their revenue: top, ordinary, low earner
- Excavated the population operation patterns of different taxi driver groups through big data analytics

➤ **Influence of on-demand ridesourcing vs. traditional taxi based on machine learning and big data analytics**

- Uncovered the differences between taxi service and ridesourcing using big data analysis and clustering
- Applied non-negative matrix factorization (NMF) to obtain basis patterns of Taxi, Hitch and Express service

➤ **Influence of on-demand ridesourcing on vehicle emissions with big data analytics and PHEM model**

➤ **Fundamental research on intelligent parking guidance and recommendations based on machine learning**

- Forecast models of travel time to parking lots (*Random Forest*); Guidance & optimization models for parking
- Personalized recommendation research on parking (Collaborative Filtering and Content-based algorithm)

➤ **Study on key technology in Intelligent Vehicle Infrastructure Cooperative Systems (IVICS) (863 Program)**

- Contributed to the design report of basic technical framework and the overall demonstration of IVICS

**The Freescale Cup College Students Intelligent Car Race: Intelligent car that can follow**

Jun.2012-Jun.2013

**specific trajectories based on image processing, pattern recognition, and PID controller**

- **Hardware Aspect:** Designed the signal acquisition circuit and the core control circuit based on MC9S12XS256



- **Software Aspect:** Developed specific control strategies/algorithms for intelligent cars to follow given trajectories
- **Actuator:** Customized specific steering linkage, applied and tuned PID algorithms to control diversion and speed

## WORKING EXPERIENCE

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**Junior Research Group Leader** | AI & Automated Mobility Group | **RWTH Aachen University** Jun.2024-Present

- **Research** proposal initialization, preparation, and writing: German Research Foundation ([DFG](#)) and [mFUND](#)
- **(Co-)PI and coordinator:** main responder and drafter for **three** DFG research proposals
- **Lead** the group and supervise the PhD/MSc students
- **Teaching** support for *Road Planning II* and *Machine Learning in Civil Engineering* (master's level)

**PhD Researcher** | [TTS Lab](#) | Department of Transport & Planning | **TU Delft** Dec.2019-Jun.2024

- Carried out PhD research work under the NWO funded [SAMEN](#) project
- Provided teaching assistance and evaluation support for various courses and supervised seven MSc students
- Published scientific papers and patents, presented research works in conferences and organized workshops

**Visiting PhD Researcher** | [MSC Lab](#) | Department of Mechanical Engineering | **UC Berkeley** May.2023-Oct.2023

- Carried out literature review and research work related to Socially Compliant Automated Driving

**Research Assistant** | Waterloo Artificial Intelligence Institute | **University of Waterloo** May.2018-Sep.2019

- Carried out research works related to applied Machine Learning, Artificial Intelligence, and Big Data in Transportation

**Research Assistant** | Transport Big Data Analytics | **ITS Lab, TNList@Tsinghua University** Aug.2017- May.2018

- Cross-domain data fusion for full-time trip chain reconstruction and anomaly detection;
- City Computing: Applying NMF methods to evaluate indicators describing urban function, land use, mobility, etc.
- Revealing collective travel patterns of *Shared Mobility* in a spatial-temporal manner

**Carryout service data analysis Project Manager** | Beijing Gooagoo Technical Service Co., Ltd. Jul.2016-Aug.2016

- Integral process of Big Data Analytics: Crawled carryout service data using Python crawler; executed data storage, data analysis, and data processing in a relational database (MySQL); visualization, clustering, and web application

**Commentator** | China International Congress on Intelligent & Connected Vehicles (CICV) Oct.2015-Oct.2015

- Introduced the i-VICS systems to audiences; received executives from automobile manufacturers BMW, Volvo, VW

## LEADERSHIP & VOLUNTEER EXPERIENCE

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**Webmaster** | **Traffic and Transportation Safety (TTS) Lab Website, TU Delft** Mar.2020-June.2024

- Responsible and volunteering for the [TTS Lab website](#) development and maintenance

**Project Leader** | **Asian Youth Center:** Leadership Development Training Program for Masters Jul.2015-Aug.2016

- Responsible for activities and competitions between overseas and Chinese students in the Asian Youth Center project
- **Volunteer Leader** in the 5<sup>th</sup> Joint School Symposium for the Asian Youth Center Project

**iTalk Group Leader** | International Department, Tsinghua University Postgraduate Association Oct.2014-Oct.2015

- Committed to speech in English given by students or alumni stars, held a special performance for overseas students

**Volunteer** | National Doctor Forum on Traffic and Transportation Engineering, Beijing Jiaotong University Jun.2011

## SKILLS & MISCELLANEOUS

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- Programming: Python (Tensorflow, PyTorch, Keras), Matlab, R, C/C++, Java, VHDL | Database: MySQL
- AI Certificates: [Deep Learning](#), [Deep Reinforcement Learning](#), [TRAIL Research School Diploma](#)
- Hardware circuit design: Altium Designer | Software development on Linux and Windows
- Big data analytics and visualization methods | Cross-domain Data Fusion | Data-driven anomaly/fraud detection
- Languages: Chinese (Native); English (Professional); **Dutch** (Elementary)
- Hobbies: **Tai Chi, Kung Fu, Meditation**, Yoga, Chess, Reading, Mountain Hiking