

Yongqi Dong



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Junior Research Group Leader @ RWTH Aachen University

Ph.D. Researcher @ Delft University of Technology

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EDUCATIONAL BACKGROUND

PhD in Transportation, 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 [#] 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, Sh., 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. Li, R.[#], & **Dong, Y.^{*,#}**(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]
- 4. **Dong, Y.^{*,#}**, Zhang, L. [#], Farah, H., Zgonnikov, A., & van Arem, B. (2025). Data-driven Semi-supervised Machine Learning with Safety Indicators for Abnormal Driving Behavior Detection, (**accepted** by *Transportation Research Record: Journal of the Transportation Research Board*; **accepted** by and presented at [TRBAM2024](#) and the 35th annual meeting of International Co-operation on Theories and Concepts in Traffic Safety (ICTCT 2023)), [Preprint](#)
- 5. **Dong, Y.^{*,#}**, Lu, X. [#], 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 (**Accepted** by *Transportation Research Record: Journal of the Transportation Research Board*; **accepted** by and presented at [TRB2024](#)), [Preprint](#)

- 6. Farah, H., Postigo, I., Reddy, N., **Dong, Y.**, Rydergren, C., Raju, N., & Olstam, J. (2022). Modelling 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]
- 7. 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]
- 8. Liu, W., Zhang, X., **Dong, Y.**, Xu, L. (2025). A Unified Model Predictive Control Method of Automated Vehicles for Lane Changing and Lane Keeping Maneuvers (Accepted by Journal of Intelligent Transportation Systems, <https://doi.org/10.1080/15472450.2025.2479235>)

Key Conference Proceeding Publications & Presentations:

- 1. Zhang, L.[#], **Dong, Y.**^{*,#}, 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.**^{*,#}, Patil, S.[#], 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) 102nd annual meeting TRB 2023). [TRBAM-23-04409 poster](#)
- 4. Yuan, H., Li, P., van Arem, B., Kang, L., Farah, H., & **Dong, Y.**^{*} (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.[#], **Dong, Y.**[#], Liu, J.^{*}, 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.[#], **Dong, Y.**[#], Liu, J.^{*}, 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.**^{*}, 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](#)

- 3. Huang, Y.[#], **Dong, Y.^{#,*}**, 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.^{#,*}**, Chen, K.[#], & 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. **Dong, Y.**, Farah, H., & van Arem, B. (2025). Towards Developing Socially-Compliant Automated Vehicles: Advances, Experts Insights, and a Conceptual Framework, (**Accepted** by the 104th TRB Annual Meeting (TRB 2025) for poster presentation, and **presented** at *the 4th Symposium on Management of Future Motorway and Urban Traffic Systems (MFTS)*; **Under Review** by *Communications in Transportation Research*), [Preprint](#)
- 3. Patil, S.[#], **Dong, Y.^{#,*}**, 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 Transportation Systems*), [Preprint](#)
- 4. Ji, J., Lu, R., 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, **Under Review** by *International Symposium on Transportation Data & Modelling (ISTDM) 2025*
- 5. Wu, C., Ji, J., Lu, R., Madadi, B., **Dong, Y.**, Varotto, S., Belkessa, L., Saunier, N., MacFarlane, G., Wang, L., Ghosh, B. (2025). Measuring Availability Features for Reproducibility in Transportation Research, to be submitted to *Transportation Research Part C: Emerging Technologies*, **Under Review** by *Transportation Research Symposium*
- 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) 102nd annual meeting TRB 2023*, **Under Review** by *Journal of Advanced Transportation*). [TRBAM-23-04413 poster](#), [Preprint](#)

- 7. **Dong, Y.^{*,}** Reyna, C.F.[#], Klunder, G., Liao, F., & Rasouli, S. (2025). A Benchmarking Framework for Traffic Microsimulation Platforms: Case Study on Dutch Motorways with Dynamic Speed Limits. (Joint first author and corresponding author, *to be submitted to Transportation Research Part C: Emerging Technologies*)
- 8. Zhang, Y., **Dong, Y.^{*}**, Evans, C., Rinaldi, M., Shyrokau, B., & Farah, H. (2025). Coordinated Planning and Control for Connected and Automated Vehicles' On-ramp Merging in Mixed Traffic Through Value Decomposition-based Multiagent Deep Reinforcement Learning. (Corresponding author, *to be submitted to Transportation Research Part C: Emerging Technologies*)
- 9. [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](#)

PATENTS & SOFTWARE COPYRIGHTS

✧ **European and Dutch Patent:**

- **Dong, Y.**, Li, R. Automated lane detection (IDF OCT-22-060, **granted** on May 25, 2024, Patent number 2033551)
- Socially compliant Planning and Control for Automated Vehicles using Model-backend Deep Reinforcement Learning with Driving Risk Field and Model Predictive Contouring Control (OCT-23-056, N2035943, Submitted & **filed**)

✧ **Chinese Invention Patent:**

- Intelligent Demonstration Instrument of Simple Harmonic Oscillation Composition and Five Polarization States of Light, Application ID: 201310123700.5, Date: 2013.08.07, Patent Number **CN103236211B**, **Publication** Date: 2016.07.06

✧ **Software copyright:**

- Spatial-Temporal Attention Integrated Sequential Neural Network Model for Vision-based Robust Lane Detection Using Multi Continuous Image Frames (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

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

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

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

TEACHING ACTIVITIES

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

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

HONORS & AWARDS

- **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 2nd)**
- **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

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, [DFG Research Unit Proposal](#))
- **Realistic Modelling of Cycling Behaviour and Interaction with Other Road Users in Mixed Traffic**
(PI, [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 manoeuvres involving both longitudinal and lateral control
 - Gaze behaviour 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

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:** 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

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 5th 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

- Programming: Python (Tensorflow, PyTorch, Keras), Matlab, R, C/C++, Java, VHDL | Database: MySQL
- [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