Yongqi Dong

https://yongqidong.github.io/

Junior Research Group Leader @ RWTH Aachen University

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EDUCATIONAL BACKGROUND

PhD in Transportation, Department of Transport and Planning, **Delft University of Technology** (**TU Delft**) Dec.2019-Present

    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

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

Visiting 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*

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**]

2. 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, doi: https://doi.org/10.1109/TITS.2023.3305015. (Joint first author and corresponding author)   [**Top Q1**, *IF*:**7.9**, *SJR*:**1.119**]

3. 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*, 2022, https://doi.org/10.1109/TITS.2022.3200176

4. **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**]

Key Conference Presentation & Proceeding Publications:

1. **Dong, Y.**[#,*], Zhang, L.[#], Farah, H., Zgonnikov, A., & van Arem, B. (2023). Data-driven Semi-supervised Machine Learning with Surrogate Safety Measures for Abnormal Driving Behavior Detection, (**Accepted** by TRBAM2024 and presented at *the 35th annual meeting of International Co-operation on Theories and Concepts in Traffic Safety*, ***under third-round review*** by *Journal of Transportation Research Board*, **minor revision**), Preprint

2. 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

3. **Dong, Y.**[#,*], Lu, X. [#], Li, R., Song, W., van Arem, B., & Farah, H. (2023). Intelligent Anomaly Detection for Lane Rendering Using Transformer with Self-Supervised Pre-Training and Customized Fine-Tuning (**Accepted** and presented at TRB2024 and ***under second-round review*** by *Transportation Research Record: Journal of the Transportation Research Board*, **minor revision**), Preprint

4. **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

5. **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

6. 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)

7. 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)

8. 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)

9. **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 *2024 IEEE 27th International Conference on Intelligent Transportation Systems (ITSC)*, Preprint *[Conference]*

3. **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]*

4. 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*, https://doi.org/10.1177/03611981221077085 *[Journal]*

5. **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]*

6. 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]*

7. **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]*

8. **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]*

Under Review and Working Papers:

1. **Dong, Y.**, van Arem, B., & Farah, H. 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. Towards Developing Socially-Compliant Automated Vehicles: State of the Practice, Experts Expectations, and a Conceptual Framework (**Accepted** and presented at *the 4th Symposium on Management of Future Motorway and Urban Traffic Systems 2022 (MFTS2022)*, to be submitted to Journal of *Transport Reviews*).

3. Patil, S.#, **Dong, Y.**#,*, Farah, H, & Hellendoorn, J. Sequential Neural Network Model with Spatial-Temporal Attention Mechanism for Robust Lane Detection Using Multi Continuous Image Frames (Joint first author and corresponding author, Journal of *Transportation Research Part C*: *Emerging Technologies*, **Under Review**), Preprint

4. 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 *Conference in Emerging Technologies in Transportation Systems (TRC-30)* for presentation, to be submitted for a journal, Preprint

5. Zhang, Y., **Dong, Y.**,* (2023). 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 *Transportation Research Record: Journal of the Transportation Research Board*). TRBAM-23-04413 poster, Preprint

6. Liu, W., Zhang, X., **Dong, Y.**, Xu, L. (2023). A Unified Model Predictive Control Method of Automated Vehicles for Lane Changing and Lane Keeping Maneuvers (**Under Review** by *Journal of Intelligent Transportation Systems*)

7. Berge, B., de Winter, J., Dodou, D., Pooyan Afghari, A., Papadimitriou, E., Reddy, N., **Dong, Y.**, Raju, N., & Farah, H., (2023). Understanding cyclists' perception of driverless vehicles through eye-tracking and interviews (**Accepted** for presentation at *the 35th annual meeting of International Co-operation on Theories and Concepts in Traffic safety (ICTCT Catania 2023)*, under review by Journal of *Safety Science*), Preprint

8. Wu, G., **Dong, Y.**,* Sequential Multimodal Deep Learning for Anomaly Detection in Weakly-Labeled Videos (Corresponding author, in preparation for Journal of *IEEE Transactions on Robotics*)

9. The Age of Smart Integrated Transportation: Practice 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 Automated Vehicles and Human-driven Vehicles

PATENTS & SOFTWARE COPYRIGHTS

❖ *European Patent:*

Automated lane detection through self pre-training with masked sequential auto-encoders, fine-tuning with customised PolyLoss, and post-processing with clustering and curve fitting (IDF OCT-22-060, submitted & **filed**)

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, Publication Patent Number CN103236211B, 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, Submitted & **filed**)
  - ➤ Vision-Based Lane Detection System With Self-supervised Pre-training Through Masked Sequential Auto-encoders (Computer Software Copyright Registration in China, 2024R11L1180902, submitted and **under review**)

ACADEMIC SERVICES

Technical Committee (Chair) | Automated Mobility in Mixed Traffic | IEEE ITSS   May.2024-Present

  Establishing the interdisciplinary community: "Automated Mobility in Mixed Traffic"

Workshop Organizer (Primary coordinator) | 27th IEEE ITSC 2024, Edmonton, Canada   Sep.24, 2024

  Workshop title: [Automated Mobility in Emerging Mixed Traffic](#) [*Approved, to be held*]

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
  - ➤ 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-*ongoing*

  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-*ongoing*

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 2nd 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

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

- **[Chinese Government 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

Traffic and Transportation Safety Lab | Department of Transport and Planning **| TU Delft**   Dec.2019- June.2024

   Advisors: Dr.ir. Haneen Farah and Prof.dr.ir. Bart van Arem

    ✦ **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 peculiarities identification, recognition, and 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

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

   Advisor: Prof. Masayoshi Tomizuka

    ✦ **Socially Compliant Automated Driving via Deep Reinforcement Learning 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**

       ➢ The 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/fraud detection (Unsupervised): Auto-Encoder, Hierarchical Extreme Learning Machines

       ➢ Kaggle Competition: Employ LSTM, LightGBM and 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 Monitoring: Adopt Convolutional Neural Network 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   Sep.2014-May.2018
and Technology (TNList) | Advisors: Prof. Zuo Zhang and Prof. Li Li (*IEEE Fellow*)

   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 versus traditional taxi based on machine learning and big data analytics**

       ➢ Uncovered the differences between taxi service and ridesourcing using big data analyzing and clustering methods

       ➢ 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 and 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 in China

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 as well as the core control circuit based on MC9S12XS256
- **Software Aspect:** Developed a specific control strategy and algorithm for the intelligent car to follow a given trajectory
- **Actuator:** Customized specific steering linkage and applied different PID algorithms to control diversion and speed

WORKING EXPERIENCE

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

- Lead the group, supervise the PhD/MSc students, and support the course of *Machine Learning in Civil Engineering*
- Research proposal initialization, preparation, and writing: German Research Foundation ([DFG](#)) and [mFUND](#)

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

Test Engineer Assistant | China Unicom southern district IPv6 renovation project, MIIT CTTL   Nov.2013-Dec.2013

- Tested all kinds of typical applications on the Internet under the IPv6 environment

Research Intern | Broadband Network & Digital Media: Qionghai Dai's Lab, Tsinghua University   Jul.2013-Aug.2013

- Review of technical investigation for controlling waves in space and time for imaging and focusing in complex media

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 Universit**y**   Jun.2011

SKILLS & MISCELLANEOUS

- Programming: Python (Tensorflow, PyTorch, Keras), Matlab, R, C/C++, Java, VHDL | Database: MySQL
- [Deep Learning](#), [Deep Reinforcement Learning](#)
- 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, Meditation, Kung Fu**, Yoga, Chess, Reading, Mountain climbing