Yuan Liao

Postdoc in mobility data science
Division of Physical Resource Theory
Department of Space, Earth and Environment
Chalmers University of Technology
EDIT Building, Rännvägen 6B
412 58, Göteborg, Sweden

Last updated: November, 2022
ORCID: 0000-0002-6982-1654
Email: yuan.liao@chalmers.se
Website: yuanliao.netlify.app

EDUCATION

2017–2021 **PhD in Energy and Environment**, Department of Space, Earth and Environment, Chalmers University of Technology, Sweden

2013–2016 **MSc in Mechanical Engineering**, School of Vehicle and Mobility (formerly Department of Automotive Engineering), Tsinghua University, China

2009–2013 **BE in Mechanical Engineering**, School of Vehicle and Mobility (formerly Department of Automotive Engineering), Tsinghua University, China

PROFESSIONAL APPOINTMENTS

2021– **Postdoc in mobility data science**, Department of Space, Earth and Environment, Chalmers University of Technology, Sweden

2016–2017 **Project Assistant**, Department of Computer Science, Chalmers University of Technology, Sweden

2014 **Intern Researcher**, Nissan Motor Corporation, Japan

ACADEMIC PROJECTS

2021– A Synthetic Sweden Decision Supporting Tool for Future Urban Mobility – Autonomous and Electromobility Infrastructure Planning, Department of Space, Earth and Environment & Department of Computer Science, Chalmers University of Technology, Sweden

In collaboration with Department of Computer Science, University of Virginia, Charlottesville, United States

2020 Comparing social media data with NDR as mobility data sources, CALISTA Hackathon 2020, Centre for Applied Spatial Analysis, Uppsala University, Sweden

2017–2021 Making Cities More Sustainable: Using Big and Continuous Data to Understand Urban Mobility and Congestions, Department of Space, Earth and Environment, Chalmers University of Technology, Sweden

2016–2017 Integrated In-Vehicle Information Providing to Support Safe Trucking, Department of Computer Science, Chalmers University of Technology, Sweden

In collaboration with Volvo Trucks, Sweden

2014–2016 Study on Driver Distractions Indicated by Driving Performance and Eye Movement: from Feature Extraction to Real-time Detection, School of Vehicle and Mobility (formerly Department of Automotive Engineering), Tsinghua University, China

2013–2014 Chinese Driver Behaviour Analysis in Typical Driving Scenarios, School of Vehicle and Mobility (formerly Department of Automotive Engineering), Tsinghua University, China

In collaboration with Toyota Motor Corporation, Japan

HIGHLIGHTED PUBLICATIONS

2022 **Liao, Y**, Ek, K, Wennerberg, E, Yeh, S, Gil, J. A Mobility Model for Synthetic Travel Demand from Sparse Traces. *IEEE Open Journal of Intelligent Transportation Systems*. doi:10.1109/OJITS.2022.3209907.

2021 **Liao, Y**. Ride-sourcing compared to its public-transit alternative using big trip data. *Journal of Transport Geography*. doi:10.1016/j.jtrangeo.2021.103135.

2021 **Liao, Y**, Yeh, S, Gil, J. Feasibility of estimating travel demand using social media data. *Transportation*. doi:10.1007/s11116-021-10171-x.

2020 **Liao, Y**, Gil, J, Pereira, RHM, Yeh, S, Verendel, V. Disparities in travel times between car and transit: Spatiotemporal patterns in cities. *Scientific Reports*. doi:10.1038/s41598-020-61077-0.

2019 **Liao, Y**, Yeh, S, Jeuken, GS. From individual to collective behaviours: exploring population heterogeneity of human mobility based on social media data. *EPJ Data Science*. doi:10.1140/epjds/s13688-019-0212-x.

OTHER PUBLICATIONS

PEER-REVIEWED

2022 Yeh, S, Gil, J, Kyle, P, Kishimoto, P, Cazzola, P, Craglia, M, Edelenbosch, O, Fragkos, P, Fulton, L, **Liao, Y**, Martinez, L, , Miller, J, Pereira, RHM, Teter, J. Improving future travel demand projections: a pathway with an open science interdisciplinary approach. *Progress in Energy*. doi:10.1088/2516-1083/ac86b5.

2021 Li, G, **Liao, Y**, Guo, Q, Shen, C, Lai, W. Traffic Crash Characteristics in Shenzhen, China from 2014 to 2016. *International Journal of Environmental Research and Public Health*. doi:10.3390/ijerph18031176.

2019 Li, G, Li, SE, Zou, R, **Liao, Y**, Cheng, B. Detection of road traffic participants using cost-effective arrayed ultrasonic sensors in low-speed traffic situations. *Mechanical Systems and Signal Processing*. doi:10.1016/j.ymssp.2019.07.009.

2019 Wang, M, **Liao, Y**, Lyckvi, SL, Chen, F. How drivers respond to visual vs. auditory information in advisory traffic information systems. *Behaviour & Information Technology*. doi:10.1080/0144929X.2019.1667439.

2018 **Liao, Y**, Wang, M, Duan, L, Chen, F. Cross-regional driver–vehicle interaction design: an interview study on driving risk perceptions, decisions, and ADAS function preferences. *IET Intelligent Transport Systems*. doi:10.1049/iet-its.2017.0241.

2018 **Liao, Y**, Li, G, Li, SE, Cheng, B, Green, P. Understanding driver response patterns to mental workload increase in typical driving scenarios. *IEEE Access*. doi:10.1109/ACCESS.2018.2851309.

2017 Hu, M, **Liao, Y**, Wang, W, Li, G, Cheng, B, Chen, F. Decision tree-based maneuver prediction for driver rear-end risk-avoidance behaviors in cut-in scenarios. *Journal of Advanced Transportation*. doi:10.1155/2017/7170358.

2016 **Liao, Y**, Li, SE, Wang, W, Wang, Y, Li, G, Cheng, B. Detection of driver cognitive distraction: A comparison study of stop-controlled intersection and speed-limited highway. *IEEE Transactions on Intelligent Transportation Systems*. doi:10.1109/TITS.2015.2506602.

PEER-REVIEWED CONFERENCE PROCEEDINGS

2018 **Liao, Y**, Yeh, S. Predictability in Human Mobility based on Geographical-boundary-free and Long-time Social Media Data. *2018 21st International Conference on Intelligent Transportation Systems (ITSC)*. doi:10.1109/ITSC.2018.8569770.

2017 **Liao, Y**, Li, G, Chen, F. Context-adaptive support information for truck drivers: an interview study on its contents priority. *2017 IEEE Intelligent Vehicles Symposium (IV)*. doi:10.1109/IVS.2017.7995886.

2017 **Liao, Y**, Duan, L, Wang, M, Chen, F. Cross-regional study on driver response behavior patterns and system acceptance with triggered forward collision warning. *2017 IEEE Intelligent Vehicles Symposium (IV)*. doi:10.1109/IVS.2017.7995778.

2016 **Liao, Y**, Li, SE, Li, G, Wang, W, Cheng, B, Chen, F. Detection of driver cognitive distraction: an SVM based real-time algorithm and its comparison study in typical driving scenarios. *2016 IEEE Intelligent Vehicles Symposium (IV)*. doi:10.1109/IVS.2016.7535416.

2015 Li, G, Li, SE, **Liao, Y**, Wang, W, Cheng, B, Chen, F. Lane change maneuver recognition via vehicle state and driver operation signals—Results from naturalistic driving data. *2015 IEEE Intelligent Vehicles Symposium (IV)*. doi:10.1109/IVS.2015.7225793.

2015 **Liao, Y**, Li, SE, Wang, W, Wang, Y, Li, G, Cheng, B. The impact of driver cognitive distraction on vehicle performance at stop-controlled intersections. *2015 IEEE Intelligent Vehicles Symposium (IV)*. doi:10.1109/IVS.2015.7225806.

THESIS

2021 **Liao, Y**. Understanding Mobility and Transport Modal Disparities Using Emerging Data Sources: Modelling Potentials and Limitations. Doctoral thesis. Chalmers University of Technology. research.chalmers.se/en/publication/523982.

MANUSCRIPTS UNDER REVIEW

2022 **Liao, Y**, Tozluoğlu, Ç, Sprei, F, Yeh, S, Dhamal, S. Impacts of charging behaviors on BEV charging infrastructure needs and energy use.

MANUSCRIPTS IN PREPARATION

2022 **Liao, Y**, Yeh, S, Gil, J. Agent-based transport simulation using mobile application data.

2022 Tozluoğlu, Ç, Dhamal, S, **Liao, Y**, Yeh, S, Sprei, F, Dubhashi, D, Marathe, M, Barrett, C. Synthetic Sweden Mobility (SySMo) Model Documentation. research.chalmers.se/en/publication/531094.

PRESENTATIONS

2022 **Liao, Y**. On the impact of EV charging behaviours: Spatiotemporal patterns of demand from user perspective using agent-based modelling, *Hybrid Symposium on Applied Urban Modelling (AUM) 2022*, Cambridge, UK.

Liao, Y. Mobility Data Science: Research framework, examples, and outlook, *Group Meeting at the Research Unit of Cognitive Systems, Department of Applied Mathematics and Computer Science, Technical University of Denmark*, Lyngby, Denmark.

Liao, Y. Synthetic Sweden Mobility Model (SySMo): Optimal charging infrastructure for 100% EV adoption, *MATSim User Meeting 2022*, KU Leuven, Belgium.

2020 **Liao, Y**, Yeh, S. Private Car vs. Public Transit: Spatiotemporal Variations of Travel Time in Cities using Emerging Data Sources, *The Transportation Research Board (TRB) 99th Annual Meeting*, Washington DC, USA.

2019 **Liao, Y**, Yeh, S. Using geotagged tweets to assess human mobility: a comparison with travel survey and GPS log data, *8th Symposium of the European Association for Research in Transportation (hEART)*, Budapest, Hungary.

Liao, Y. Private Car vs. Public Transit: Spatiotemporal Variations of Travel Time in Cities using Emerging Data Sources, *K2 | The Swedish Knowledge Centre for Public Transport, Seminar*, Lund, Sweden.

Liao, Y. Human mobility through the lens of geotagged tweets, *SMoG-group seminar, Department of Architecture and Civil Engineering, Chalmers University of Technology*, Gothenburg, Sweden.

2018 **Liao, Y**. Predictability in Human Mobility based on Geographical-boundary-free and Long-time Social Media Data, *The 21st IEEE International Conference on Intelligent Transportation Systems*, Maui, Hawaii, USA.

Liao, Y. From Individual to Collective Behaviours: Exploring Variations of Human Mobility in Space and Time based on Social Media Data, *International Energy Workshop 2018*, Gothenburg, Sweden.

2017 **Liao, Y**. Exploring the Patterns of Human Movement Using Twitter Data, *Fulbright Day*, Gothenburg, Sweden.

2016 **Liao, Y**. Human factors in intelligent vehicles: Research methods for driver behaviors, workload assessment, and HMI design, *Shenzhen University*, Shenzhen, China.

Liao, Y. Driving safety status and preferences on V2X-based safety assistance of truck drivers - Some implications for interaction design, *SAFER Lunch Seminar*, Gothenburg, Sweden.

TEACHING ASSISTANCE

2018–2020 FFR170: Sustainable Energy Futures
Department of Space, Earth and Environment, Chalmers University of Technology
Roles: TA, TA manager, and Course Administrator

SUPERVISION

2022 Doctoral thesis: Agent-based Transport Models as a Tool for Evaluating Mobility
Department of Space, Earth and Environment, Chalmers University of Technology
Role: co-supervisor

2022 Master thesis: Flows Generation for Synthetic Travel Demand
Department of Space, Earth and Environment, Chalmers University of Technology
Role: supervisor

2021 Master thesis: Exploring socioeconomic factors' impact on human mobility during the COVID-19 pandemic
Department of Space, Earth and Environment& Department of Computer Science, Chalmers University of Technology
Role: co-supervisor

2020 Master thesis: Estimating Travel Demand from Twitter using an Individual Mobility Model
Department of Space, Earth and Environment& Department of Computer Science, Chalmers University of Technology
Role: co-supervisor

ACADEMIC SERVICE & AFFILIATIONS

REVIEWER

International Journal of Digital Earth, Frontiers in Built Environment, Complexity, GIScience & Remote Sensing, International Journal of Transportation Science and Technology, Transactions in GIS, IEEE Transactions on Intelligent Transportation Systems, IEEE Access, Transportation, IEEE Intelligent Transportation Systems Magazine, International Journal of Human Factors and Ergonomics, IEEE Transactions on Human-Machine Systems

AFFILIATIONS

2015–2021 IEEE Student Member

OTHER

2018–2020 Vice-chair of IEEE Young Professional Sweden Section

2013–2015 Student mentor of the bachelor students in Class 2011, School of Vehicle and Mobility (formerly Department of Automotive Engineering), Tsinghua University, China

2012–2013 Manager of Tsinghua Bauhinia Econo-power Team, Tsinghua University, China

AWARDS & HONORS

2018 Chalmers Area of Advance - Energy, **Travel Grant** to present at 21st IEEE International Conference on Intelligent Transportation Systems, November 4-7, 2018, Maui, Hawaii, USA

2016 **Excellent Master Thesis** of the Year (TOP 5%), Tsinghua University, China

2016 **Excellent Postgraduate Student** of the Year (TOP 5%), Tsinghua University, China

2014 **First Class Scholarship**, Tsinghua University, China

2013 **Excellent Undergraduate Thesis** of the Year (TOP 5%), Tsinghua University, China

2012 **First Class Scholarship**, Tsinghua University, China

TECHNICAL SKILLS

Data	Machine learning, data mining, Python, SQL, R, SPSS, MATLAB
Mobility	Spatial analysis, GIS techniques, ArcMap, QGIS

LANGUAGES

Mandarin	Native
English	Advanced