Yuan Liao

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in Mobility Data Science
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DEGREES

2017–2021 **PhD in Energy and Environment**, Department of Environmental and Energy Sciences (formerly Department of Space, Earth and Environment), Chalmers University of Technology, Sweden

Project: Making Cities More Sustainable: Using Big and Continuous Data to Understand Urban Mobility and Congestions [Link] (Formas 2016-01326)

Contribution: As a doctoral researcher, she delved into the challenges and opportunities of large-scale mobility data in travel demand modeling and in understanding transport modal disparities. Her research was published in five journal articles and one conference paper, with first authorship on each and including a journal paper she authored independently. One of these papers has been cited nearly 200 times.

Thesis: Understanding Mobility and Transport Modal Disparities Using Emerging Data Sources: Modelling Potentials and Limitations [Link]

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

Project: Study on Driver Distractions Indicated by Driving Performance and Eye Movement: from Feature Extraction to Real-time Detection

Contribution: During her master's studies, she oversaw a driving simulator, designed and executed driver experiments, analyzed the data, and authored my thesis. This project led to the publication of two journal articles and one conference paper, all of which she was the first author. One journal article from this project has been cited over 140 times.

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

Project: Chinese Driver Behaviour Analysis in Typical Driving Scenarios

In collaboration with Toyota Motor Corporation, Japan

Contribution: During her bachelor's thesis project, she designed and executed driver experiments, analyzed the data, and authored her thesis. This project led to the publication of two journal articles.

LANGUAGE SKILLS

Native	Mandarin Chinese
Other language skills	English (Proficient), Swedish (Basic)

CURRENT EMPLOYMENT

2026– **Postdoc**, Department of Human Geography, Lund University, Sweden

GeoAI and Economic Geography

In collaboration with Centre for Mathematical Sciences, Lund University, Sweden

PREVIOUS WORK EXPERIENCE

2023–2026 **Visiting postdoc**, Department of Applied Mathematics and Computer Science, Technical University of Denmark, Denmark (host institute) and **Postdoc**, Department of Space, Earth and Environment, Chalmers University of Technology, Sweden (employer, administrating institute)

Project: Understanding social segregation through the lens of big data on human mobility [Link] (VR International postdoc grant, 2022-06215, 3,600,000 SEK)

In collaboration with Department of Space, Earth and Environment & Department of Architecture and Civil Engineering, Chalmers University of Technology, Sweden

Contribution: As the principal investigator and grantee, she oversees all aspects of the project, including budget allocation, funding management, and data curation. She coordinates meetings with our four collaborators to ensure smooth progression. Her role involves leading the design and execution of our research series. Through this project, she has published one review article and two original research articles in top-tier journals, including Transportation Research Part A.

2021–2023 **Postdoc**, Department of Space, Earth and Environment, Chalmers University of Technology, Sweden

Project: A Synthetic Sweden Decision Supporting Tool for Future Urban Mobility – Autonomous and Electromobility Infrastructure Planning [Link]

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

Contribution: She specializes in transport agent-based simulations, crafting and conducting studies that employ simulated agents to analyze the demand for charging infrastructure. This resulted in a journal article and two open data repositories as the first author. She co-supervised a PhD student, resulting in two published journal papers, both stemming from her supervisory role.

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

Project: Integrated In-Vehicle Information Providing to Support Safe Trucking, Department of Computer Science and Engineering, Chalmers University of Technology, Sweden

In collaboration with Volvo Trucks, Sweden

Contribution: She led the research on truck drivers' demand for in-vehicle information design, publishing two journal articles and two conference papers, as the first author on three of these contributions.

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

Contribution: As an intern researcher, she analyzed naturalistic driving data from 100 drivers, using data mining to identify distinct driving signatures and define key autonomous-driving parameters.

CAREER BREAKS

2021/08/09–2021/12/17 **Maternity leave**, Department of Space, Earth and Environment, Chalmers University of Technology, Sweden (100%, ∼4 months)

2021/12/18–2022/09/13 **Parental leave**, Department of Space, Earth and Environment, Chalmers University of Technology, Sweden (60%, ∼5.5 months)

RESEARCH FUNDING AND GRANTS

2023-2026 **International Postdoc grant** (2022-06215), Swedish Research Council (VR), 3 600 000 SEK (328,440 Euro)

Role: Project Leader

Understanding social segregation through the lens of big data on human mobility

Under review **Research Grants Open call 2026 (Humanities and Social Sciences)**, Swedish Research Council (VR)

Role: Project Leader

All Places Count: Social Exposure Shaped by Institutional Contexts, Daily Mobility, and Urban Structure

In collaboration with the Institute for Analytical Sociology (IAS), Linköping University

Under review **Nordic call for exploratory networks within humanities and social sciences (NOS-HS) 2026**, NordForsk

Role: Project Leader

In collaboration with the Technical University of Denmark (DTU), the Swedish National Road and Transport Research Institute (VTI), DiverCities (Denmark), Aalborg University (Denmark), the Institute of Transport Economics (TØI, Norway), Aalto University (Finland), and the University of Iceland.

Nordic Network for Sustainable and Inclusive X-Minute Cities

RESEARCH OUTPUT

PUBLICATIONS

Of the 30 publications she has authored, 23 are peer-reviewed original journal articles, one is a peer-reviewed review article, and six are peer-reviewed conference papers published in proceedings. Below are five highlighted publications, all published in peer-reviewed international journals, with an open-access format.

2025 **Liao, Y**, Yeh, S, Gil, J, Pereira, RHM, Alessandretti, L. Socio-spatial segregation and human mobility: A review of empirical evidence. *Computers, Environment and Urban Systems*. doi:10.1016/j.compenvurbsys.2025.102250.

2025 **Liao, Y**, Gil, J, Yeh, S, Pereira, RHM, Alessandretti, L. The Effect of Limited Mobility on the Experienced Segregation of Foreign-born Minorities. *npj Sustainable Mobility and Transport*. doi:10.1038/s44333-025-00046-4.

2025 **Liao, Y**, Torbjörnsson, C, Gil, J, Pereira, RHM, Yeh, S, Gohl, N and Schrauth, P, Alessandretti, L. Uncovering the Social and Spatial Effects of Fare Cuts on Public Transport with Mobile Geolocation Data. *Transportation Research Part A: Policy and Practice*. doi:10.1016/j.tra.2025.104647.

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.

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.

OPEN DATA

2024 **Liao, Y**, Tozluoğlu, Ç, Ghosh, K, Dhamal, S, Sprei, F, Yeh, S. Integrated Agent-based Modelling and Simulation of Transportation Demand and Mobility Patterns in Sweden. doi:10.5281/zenodo.10648078.

2023 **Liao, Y**, Tozluoğlu, Ç, Sprei, F, Yeh, S, Dhamal, S. Open synthetic data on travel and charging demand of battery electric cars: An agent-based simulation on three charging behavior archetypes. doi:10.5281/zenodo.7549847.

RESEARCH SUPERVISION AND LEADERSHIP EXPERIENCE

RESEARCH SUPERVISION

She has supervised or co-supervised 7 master's students and 1 PhD student.

2022–2024 Çağlar Tozluoğlu. Doctoral thesis: Agent-based Transport Models as a Tool for Evaluating Mobility [Link]
Department of Space, Earth and Environment, Chalmers University of Technology
Role: co-supervisor, main supervisor - Frances Sprei

2024 Carl Torbjörnsson. Master thesis: Evaluating the Impact of the 9-Euro Ticket on Activity Patterns and Social Mixing in Germany
Department of Computer Science and Engineering, Chalmers University of Technology
Role: supervisor

2023 Diana Salim, Mattias Rydström. Master thesis: Simulating Mobility of Large Population Using Mobile Application Data [Link]
Department of Computer Science and Engineering, Chalmers University of Technology
Role: supervisor

2022 Cong Hao. Master thesis: Flows Generation for Synthetic Travel Demand [Link]
Department of Space, Earth and Environment, Chalmers University of Technology
Role: supervisor

2021 Erik Magnusson, Peter Gärdenäs. Master thesis: Exploring socioeconomic factors' impact on human mobility during the COVID-19 pandemic [Link]
Department of Space, Earth and Environment& Department of Computer Science and Engineering, Chalmers University of Technology
Role: co-supervisor, main supervisor - Jorge Gil

2020 Eric Wennerberg, Kristoffer Ek. Master thesis: Estimating Travel Demand from Twitter using an Individual Mobility Model [Link]
Department of Space, Earth and Environment& Department of Computer Science and Engineering, Chalmers University of Technology
Role: co-supervisor, main supervisor - Sonia Yeh

LEADERSHIP EXPERIENCE

2024–2025 Data-driven planning of transport consumption and promotion of micromobility [Link]

In collaboration with Department of Architecture and Civil Engineering, Chalmers University of Technology, Sweden

Contribution: She specializes in big data analytics with a focus on integrating micromobility into existing urban transport systems. Her work involves developing reproducible pipelines for processing large-scale mobility data and supervising student research.

2023–2025 Electric Multimodal Transport Systems for Enhancing Urban Accessibility and Connectivity (eMATS) [Link]

In collaboration with Department of Architecture and Civil Engineering, Chalmers University of Technology, Sweden

Contribution: She conducts agent-based simulations examining the potential integration of e-scooters into Sweden's existing mobility patterns. Her role encompasses enhancing accessibility evaluations and managing comprehensive analyses of movement patterns.

2023–2026 Decarbonizing Urban Transportation through Behaviour Change? A Novel Incentive Approach

In collaboration with Department of Transportation Engineering, Beihang University, Beijing, China

Contribution: She offers expertise in analyzing large-scale geolocation data and helps form ideas for sustainable urban mobility. She participates in regular meetings to discuss and provide feedback on ongoing progress. She has participated in one manuscript from this project that is currently under review.

2023–2024 Integrated Agent-based Modelling and Simulation of Transportation Demand and Mobility Patterns in Sweden

In collaboration with RISE (El för ännu fler, P119643)

Contribution: As the leading researcher, she conducted agent-based simulations of Swedish travellers and created a data repository with source code for public use.

TEACHING MERITS

PEDAGOGICAL TRAINING

2024–2025 **Certificate of University Teacher Training Programme at DTU (UDTU)**, Technical University of Denmark, Denmark

Scope: This program equips me with the knowledge, methods, and tools needed to teach effectively in higher education, with a particular emphasis on engineering education. It also supports my ongoing professional development by offering strategies to improve my teaching practice and deepen my understanding of student learning and its underlying conditions.

TEACHING EXPERIENCE

2025 Transportation engineering and traffic analysis
Department of Architecture and Civil Engineering, Chalmers University of Technology, Sweden
Role: Invited Lecturer (15 hours)

2025 Transport infrastructure design and planning
Department of Architecture and Civil Engineering, Chalmers University of Technology, Sweden
Role: Invited Lecturer (15 hours)

2025 Summer Institute in Computational Social Science (Digital Trace Data)
Linköping University, Sweden
Role: Invited Lecturer

2025 02467 Computational Social Science
Department of Applied Mathematics and Computer Science, Technical University of Denmark
Roles: Instructor and Course Administrator (20% work time)

2018–2020 FFR170: Sustainable Energy Futures
Department of Space, Earth and Environment, Chalmers University of Technology
Roles: TA, TA manager, and Course Administrator (20% work time)

AWARDS AND HONORS

2025 **Best Data Challenge Award**, *On the Relationship between Space-Time Accessibility and Leisure Activity Participation*, NetMob 2025, Paris, France

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

OTHER KEY ACADEMIC MERITS

REFEREE FOR SCIENTIFIC PUBLICATIONS

PNAS, Nature (co-review), Environment and Planning B: Urban Analytics and City Science, Nature Cities, Cities, Journal of Transport Geography, Transactions in Urban Data, Science, and Technology, Transportation Research Part D: Transport and Environment, Transactions in Urban Data, Science, and Technology, npj Sustainable Mobility and Transport, PLOS ONE, International Journal of Digital Earth, Frontiers in Built Environment, Complexity, GIScience & Remote Sensing, International Journal of Transportation Science and Technology, Transactions in GIS, Transportation

SIGNIFICANT INVITED INTERNATIONAL LECTURES

2024-2025 Transforming Urban Mobility: Towards Data-Informed Environmentally and Socially Sustainable Transport Systems

Invited lecture at Seminars in Data Science Lecture at IT University of Copenhagen, Denmark

2023 Geolocation Data helps us understand segregation (Geolocation Data hjälper oss förstå segregation)

Urban Lunch-time #89 by Urban Futures, Center for Sustainable Urban Development (Centrum för Hållbar Stadsutveckling), Gothenburg, Sweden.

ORGANISING SCIENTIFIC CONFERENCES

2025 The IEEE International Conference on Intelligent Transportation Systems (IEEE ITSC 2025), November 18 – 21, 2025 – Gold Coast, Australia

Workshop organizer: "AI & Geospatial Intelligence: Innovative Methods and Applications in Human Mobility Modeling"

2024-2025 The 11th International Conference on Computational Social Science (IC2S2 2025)

Tutorial chair, helping organize the conference at Norrköping, Sweden

OTHER MERITS

AFFILIATIONS

2026– The Swedish Excellence Centre for Computational Social Science - SweCSS (Upcoming Visiting Fellow)

2025– Nordic Society for Computational Social Science (Founding Member)

2015–2021 IEEE Student Member

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

ACADEMIC SERVICES

2026 Program committee for the SIM Workshop (1st Workshop on The SIM - Social Inequalities in Motion)

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

TECHNICAL SKILLS

AI, machine learning, data mining, Python, SQL, R, Spatial analytics, GIS techniques, ArcMap, QGIS

Certificate Applied Data Science with Python, Data Science (R), Advanced Data Science with IBM, Modern Big Data Analysis with SQL, Deep Learning, Geographic Information Systems (GIS)