TRAIL PhD Congress 2024

Summaries

Location ------ Start time	Entrance	Gertrudes Kapel (Ground floor)	Willemszaal (between floor)	Zocherzaal (1st floor)
		Co-creation	***Traffic Safety and Congestion***	***Climate, Resilience, Sustainability***
		Chair Sander Lenferink	*Chair Jan Anne Annema*	*Chair Bert van Wee*
10.20		Adaptive and Participatory Mobility Hub Planning for a Sustainable Mobility System *Guy van Nifterik*	A Unified Theory and Learning Approach for Traffic Conflict Detection *Yiru Jiao*	Maladaptation in Supply Chain Management *Yvonne Lont*
10.40		Stakeholder Relations in the Implementation of Land Value Capture to Finance Transport Infrastructure Development in Indonesia *Yescha Danandjojo*	Early-warning framework for railway traffic management with next-generation signalling *Nina Versluis*	Factors and mechanisms influencing the adoption of alternative fuels in the Dutch inland shipping sector *Nuria Coma-Cros*
11.00	**Break**			
11.20		The Success and Failure of Port Governance - A Review of North Jakarta Port After Two Decades of Governance Reform *Lisna Rahayu*	Explaining patterns of cycling speed stability and disruption. *Hong Yan*	Policy learning in split-level logistics control to deal with disruptions *Karel Scheepstra*
11.40		Is holiday destination a positional good? *Steven Yoo*	Mitigating Traffic Congestion with the Least Investment in Infrastructure by Developing and Testing Soft Traffic Management Strategies *Zamzam Alrawahi*	Optimizing Containerized Battery Swapping Station Locations for Sustainable Inland Waterway Transport *Virgilio Ramos*
12.00		Understanding Public Participation in Transport Planning Practice *Sander van Barneveld*		
12.20	**Lunch**			
		Subjective & Experiential Aspects of Travel	***Traffic Management***	***Learning-based Control and Prediction***
		Chair Maarten Kroesen	*Chair Hans van Lint*	*Chair Marco Rinaldi*
14.00		Exploring the Correlation Between Emotions and Uncertainty in Daily Travel *Mervyn Franssen*	Functional requirements for Traffic Management and Control Systems to enable mainline Automatic Train Operation *William Busuttil*	Data-driven Urban Bicycle Travel Time Estimation: A Case Study in Rotterdam, the Netherlands *Ting Gao*
14.20		Therapists' perspectives on experience and treatment of transport-related anxiety disorders *Christian Ratering*	A novel framework for understanding and identifying driving heterogeneity through Action patterns *Xue Yao*	Impact of Pre-training on Deep Reinforcement Learning Ramp Metering Systems *Callum Evans*
14.40		The influence of land use, neighbourhood and individual characteristics on perceived accessibility across destination types *Roberto Ramirez Juarez*	Multi-period railway timetabling to match time-dependent demand *Renate van der Knaap*	Artificial Intelligence Assisted Pedestrian Crowd Forecasting at Scheveningen Beach, Netherlands *Theivaprakasham Hari*
15.00	**Break**			
		Subjective & Experiential Aspects of Travel	***Traffic Management***	***Autonomous Vehicles***
		Chair Anna Grigolon	*Chair Hans van Lint*	*Chair Riender Happee*
15.30		Unravelling night train travel behaviour: A stated preference survey into the influence of operational and personal factors *Thaddaeus Weisshaar*	A hybrid data-driven/optimization heuristic for dynamic boundary perimeter control in network traffic management *Nirvana Pecorari*	Combining Internal and External Communication: The Design of a Holistic Human-Machine Interface for Automated Vehicles *Rutger Verstegen*
15.50		Using XR technologies for Pedestrian behaviour research: a literature review *Abhinav Azad*	Timetable flexibility for real-time railway traffic management *Ziyulong Wang*	Ethical Dilemmas in Weak Trolley Cases: Expert and Public Insights on Meaningful Human Control in Automated Vehicles *Lucas Elbert Suryana*
16.10		Consumer adoption of private lease and car subscriptions – evidence from the Netherlands *Jan-Jelle Witte*	Impact of Trip Distance Distribution Time Dependency and Aggregation Levels in Bathtub Models - A Comparative Simulation Analysis *Jiayi Guo*	Safe and Efficient Intersection Navigation for Autonomous Vehicles: A Hybrid Optimal Control and Reinforcement Learning Approach *Saeed Rahmani*

Co-creation

Adaptive and Participatory Mobility Hub Planning for a Sustainable Mobility System by Guy van Nifterik
Mobility hubs are expected to support the transition to a sustainable mobility system, but policymakers are facing uncertainties about e.g. the types of hubs that should come, their capacity to contribute to modal shift, or the preferences of relevant actors to achieve these hubs. Therefore, this research intends to develop and test an approach to collectively cope with these uncertainties in mobility hub planning for a sustainable mobility system'

Stakeholder Relations in the Implementation of Land Value Capture to Finance Transport Infrastructure Development in Indonesia by Yescha Danandjojo
The study maps the factors that could affect stakeholder relationship in the (potential) implementation of land value capture (LVC), and be clarified through in-depth interviews with the related stakeholders. It uses the Mass Rapid Transit (MRT) in Jakarta, Indonesia, as the case study. One of the findings shows that the availability of policies and regulations is indicated as the most influential factors, because it affects the choices of instruments that can be utilized for capturing land values.

The Success and Failure of Port Governance - A Review of North Jakarta Port After Two Decades of Governance Reform by Lisna Rahayu
This research demonstrates how the process of policy integration and inter-organizational coordination can influence the success and failure of port governance in improving port performance. This research focuses on the global south context, by selecting Tanjung Priok International Port in North Jakarta, Indonesia, as a case study

Is holiday destination a positional good? By Steven Yoo
Motivating potential air travelers to travel fly less is crucial for curbing the climate impact of the air transportation sector, especially when no climate neutral energy sources are commercially available. Positionality of holiday destinations may be a contributing factor to choosing holiday destinations accessible by air transportation. We use choice modeling to test positionality of holiday destinations accessible by air among a group of survey respondents in Europe.

Understanding Public Participation in Transport Planning Practice – A Focus on Representativeness by Sander van Barneveld
Public participation in transport planning faces challenges when individuals, groups, or regions are misrepresented, underrepresented, absent, or limited, impacting decision-making outcomes. These issues raise concerns about who constitutes 'the public' and can compromise the legitimacy of public participation. Our research explores these complexities through interviews, with decision-makers and their advisors, with a focus on the importance of representativeness in public participation.

Traffic Safety and Congestion

A Unified Theory and Learning Approach for Traffic Conflict Detection by Yiru Jiao
This study addresses the long-existing call for a consistent and comprehensive methodology to evaluate the collision risk emerging in road user interactions. Experiment results show that our methods provide effective collision warnings, generalise across distinct datasets and traffic environments, cover a broad range of conflict types, and deliver a long-tailed distribution of conflict intensity. Therefore, the theory and learning approach jointly provide an explainable and adaptable methodology for conflict detection among different road users and across various interaction scenarios.

Early-warning framework for railway traffic management with next-generation signalling by Nina Versluis
Next-generation railway signalling systems such as the European Train Control System (ETCS) Level 2 are being developed to increase capacity and to reduce trackside equipment.
However, their implementation poses safety risks due to localisation technology challenges. An early-warning framework is introduced to detect and predict hazardous traffic conditions, featuring modules for short-term hazard detection and medium-term hazard prediction, enhancing conflict detection and resolution models for next-generation railway signalling

Explaining patterns of cycling speed stability and disruption by Hong Yan
Disruption of stable cycling speeds causes high risks, longer travel time and more physical effort, being less preferred by cyclists. Even in the Netherlands, known for its well-designed bicycle infrastructure system, cyclists are subject to repeated disruption of their stable speeds. Therefore, a smooth cycling network is needed.

Mitigating Traffic Congestion with the Least Investment in Infrastructure by Developing and Testing Soft Traffic Management Strategies by Zamzam Alrawahi
This research will explore the effectiveness of combining congestion pricing as a traffic management strategy, with ridesharing as a mobility management approach, to alleviate congestion on urban freeways. Game theory will be applied to evaluate various scenarios and identify possible pure/mixed strategy Nash Equilibria, studying the strategic interactions among different stakeholders in the transport system.

Climate, Resilience, Sustainability

Maladaptation in Supply Chain Management by Yvonne Lont
Transport and logistics systems are increasingly disrupted by events like natural disasters, and adaptation has been proposed as a response. However, adaptation efforts may lead to unintended negative consequences. This study explores these effects in supply chains, using an empirical case study of the Dutch military transport and logistics command to develop a framework for analyzing such outcomes and improving adaptation methods

Factors and mechanisms influencing the adoption of alternative fuels in the Dutch inland shipping sector by Nuria Coma-Cros
This paper addresses the need to accelerate the sustainable transition of the Dutch inland shipping sector. The paper combines innovation theory and System Dynamics to map the factors and mechanisms influencing the adoption of biofuels, hydrogen and LNG in the sector. Using causal loop diagrams developed from the analysis of news and scientific articles and expert interviews, the results provide insights for policymakers to develop effective strategies that account for the sector's complex dynamics.

Policy learning in split-level logistics control to deal with disruptions by Karel Scheepstra
This research aims to realize self-learning capabilities for policies in logistic processes where the VRP emerges as the central challenge. The current state represents the first stages of an explorative study into robustifying a generic VRP in a multimodal logistic transport context. The contents cover the scope, literature research and preliminary results on the proposed method.

Optimizing Containerized Battery Swapping Station Locations for Sustainable Inland Waterway Transport by Virgilio Ramos
This research focuses on developing a multi-period, capacitated flow-refueling location model to optimize the placement of battery swapping stations for the Dutch inland waterway sector. By analyzing vessel traffic patterns and operational constraints, the research identifies optimal station placements that maximize coverage and efficiency, providing valuable insights to enhance infrastructure planning and support the transition to alternative energy sources.

Subjective & Experiential Aspects of Travel

Exploring the Correlation Between Emotions and Uncertainty in Daily Travel by Mervyn Franssen
A study will be presented that explored the relationship between uncertainty and emotional states in the context of daily travel. This study observed a significant correlation between negative valence emotions (disappointment and fear) and uncertainty."

Therapists' perspectives on experience and treatment of transport-related anxiety disorders by Christian Ratering
A research study on people with anxiety disorders and the challenges they face when using the mobility system is currently underway. A presentation will be given on the initial findings which are published in two papers.

The influence of land use, neighbourhood and individual characteristics on perceived accessibility across destination types by Roberto Ramirez Juarez
We present a theoretical framework for evaluating perceived accessibility and discuss the findings from the variables influencing perceptions of accessibility based on data from the national travel survey of The Netherlands

Traffic Management (I)

Functional requirements for Traffic Management and Control Systems to enable mainline Automatic Train Operation by William Busuttil

A novel framework for understanding and identifying driving heterogeneity through Action patterns by Xue Yao

Multi-period railway timetabling to match time-dependent demand by Renate van der Knaap
Railway passenger demand changes throughout the day, and hence can be served better if the line plan and timetable change accordingly. We take as input periods with a different demand and matching line plans and aim to create a cyclic railway timetable for each period and transitions between two consecutive cyclic timetables. This talk presents a mixed-integer linear programming model for this multi-period timetabling problem and provides some preliminary case study results

Learning-based Control and Prediction

Data-driven Urban Bicycle Travel Time Estimation: A Case Study in Rotterdam, the Netherlands by Ting Gao
Cycling is an essential eco-friendly mode of transportation, making accurate travel time estimation crucial for efficient traffic management and urban planning. This study presents a novel graph-based deep learning model that leverages GPS data to estimate urban bicycle travel times. Tested on real-world data from Rotterdam, our method achieves higher accuracy compared to baseline models while maintaining lower computational complexity."

Impact of Pre-training on Deep Reinforcement Learning Ramp Metering Systems by Callum Evans
Pre-training is a process used to enhance the learning of deep reinforcement learning algorithms by giving a model initial guidance from an expert demonstrator. This study aims to analyse the impact of pre-training on deep RL algorithms used in ramp metering by performing behaviour cloning, a type of pre-training, for increasing lengths of time and comparing their resulting policy and performance. ALINEA is used as the expert demonstrator for a proposed Proximal Policy Optimisation (PPO)-based system.

Artificial Intelligence Assisted Pedestrian Crowd Forecasting at Scheveningen Beach, Netherlands by Theivaprakasham Hari
This study leverages AI techniques like CatBoost, LightGBM, and XGBoost to forecast pedestrian traffic at Scheveningen Beach, improving crowd management through data-driven insights. The results highlight CatBoost's superior performance, offering a practical solution for enhancing public safety, resource allocation, and visitor experience in tourist-heavy areas.

Subjective & Experiential Aspects of Travel

Unravelling night train travel behaviour: A stated preference survey into the influence of operational and personal factors by Thaddaeus Weisshaar
This paper unravels preferences for night train travel in Europe through a stated preference survey. Travel costs, accommodation and booking convenience are key factors influencing the choice of passengers for night trains. The study identifies four distinct passenger groups, highlighting the high heterogeneity among potential night train customers. By offering integrated tickets, competitive pricing and japanese-style capsules, night train operators can align their product to passenger preferences, targeting mainly experienced night train travellers and cost-sensitive ones.

Using XR technologies for Pedestrian behaviour research: a literature review by Abhinav Azad
This literature review compares the use of VR, AR and MR in pedestrian behaviour studies, highlighting key gaps such as inconsistent methodologies and underexplored human factors. The findings emphasize the need for validity, and standardized approaches and advocates leveraging AR and MR technologies

Consumer adoption of private lease and car subscriptions – evidence from the Netherlands by Jan-Jelle Witte
Private lease and car subscriptions are growing more important as modes of accessing a car, but little is known about their consumer adoption and potential societal effects. This research presents findings about who adopts private lease and car subscriptions, explores their relevance for fleet renewal, electrification of the car fleet and the affordability of car access, and contributes a research agenda for this understudied field.

Traffic Management (2)

A hybrid data-driven/optimization heuristic for dynamic boundary perimeter control in network traffic management by Nirvana Pecorari
We introduce a hybrid data-driven/optimization aimed at identifying arising congestion hot spots in the network and altering in real time the boundaries to tackle the propagation of congestion pockets, through perimeter control action.
This heuristic is applied to a real case scenario (macro-mesoscopic simulation on Aimsun using a network replicating a portion of the city of Barcelona).
The results show that the algorithm draws perimeters that a human eye would be able to draw, by looking at the real-time traffic condition of the network.

Timetable flexibility for real-time railway traffic management by Ziyulong Wang
What if we could transform fixed event times (departure/arrival times) in a real-world railway timetable into a Train Path Envelope, allowing multiple possible train paths while keeping scheduled departure and arrival times unchanged? Our novel Conflict Detection and Resolution with Flexibility (CDRF) model introduces this concept to minimise rail traffic conflicts and enhance operational robustness. By extending the triggering criteria for traffic management systems, our approach effectively handles unexpected disturbances, offering a different view for real-time rail traffic management.

Impact of Trip Distance Distribution Time Dependency and Aggregation Levels in Bathtub Models - A Comparative Simulation Analysis by Jiayi Guo
Bathtub models capture aggregated road traffic dynamics within urban regions without requiring the topological structure of the network. In such a relative space, trip distance heterogeneity is represented in the trip distance distribution (TDD), which can considerably influence the accuracy of the bathtub models. This study compares bathtub models under varying TDD conditions by comparing simulation results to link-level dynamic traffic assignment.

Autonomous Vehicles

Combining Internal and External Communication: The Design of a Holistic Human-Machine Interface for Automated Vehicles by Rutger Verstegen

Ethical Dilemmas in Weak Trolley Cases: Expert and Public Insights on Meaningful Human Control in Automated Vehicles by Lucas Elbert Suryana
This study introduces a framework for navigating complicated traffic scenarios by incorporating human reasoning into the decision-making algorithms of automated driving systems (ADS). The incorporated considerations, unlike in previous research, are determined based on interviews with automated vehicle experts from various backgrounds. Our framework provides guidelines to help ADS align its decisions with human reasoning

Safe and Efficient Intersection Navigation for Autonomous Vehicles: A Hybrid Optimal Control and Reinforcement Learning Approach by Saeed Rahmani
We present a hybrid framework combining model predictive control (MPC) and reinforcement learning (RL) to enhance the navigation of automated vehicles at complex urban unsignalized intersections. Building upon our previous work that relied solely on MPC, we integrate RL to improve decision-making capabilities in multi-agent and heterogeneous environments. This integration enables vehicles to handle complex interactions more effectively, resulting in less conservative yet safe behaviors.