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SEE-FAR Workshop at TUM

Recent Advances in Electric and Automated Road Freight Transport: Insights from the DFG and FWF Funded SEE-FAR Project

Date	16 July 2026 (registration deadline 5 July 2026)	 Our location!
Venue	Room-Nr. 2349, Seminar room (0503.02.349), Arcisstr. 21, 80333 München, Technical University of Munich, Germany	
Organiser	SEE-FAR Project Team, Technical University of Munich and BOKU University	
Funding	DFG and FWF funded SEE-FAR Project	

The workshop will focus on recent advances, challenges, and implementation pathways in **road freight electrification and automation**, with particular attention to autonomous electric freight vehicles, charging infrastructure, delivery patterns, agent-based simulation, operational impacts, and policy implications.

Programme

Time	Session
12:00-13:00	Lunch and arrival
13:00-13:15	Welcome and opening remarks (Prof. Dr. Constantinos Antoniou, TUM)
Part A: See-Far Project presentations	
13:15-13:30	SEE-FAR project overview (Prof. Dr. Yusak Susilo, BOKU)
13:30-14:00	Operational Patterns and Impact Analysis of Long-Haul Road Freight: A Case Study of Bavaria and Austria (Denissa Purba, BOKU)
14:00-14:30	Data-Driven Estimation of Vehicle-Based Freight OD Matrices (Shahriar Iqbal Zame, TUM)
14:30-15:00	Charging Facilities Allocation for Battery-Electric Freight Corridors: Plug-in Charging, Battery Swapping, and Electric Road Systems (Wanrong Hu, BOKU)
15:00-15:30	Drinks and snacks break
Part B: External experts' input on the project topic	
15:30-16:00	Long-haul Road Freight Electrification and Automation: Technical Implications from a System Perspective (Fabian Bussieweke and Niclas Klein, TUM)
16:00-16:30	Filling the gap in truck electrification: an investigation of the factors influencing light-duty electric truck adoption in urban logistics contexts. (Dr. Muhamad Rizki, ITENAS)
16:30-17:00	Toward Spatially Equitable Public EV Charging Infrastructure: Urban–Rural Differences in Location Preferences (Dr. Oleksandr Rossolov, Dalhousie University)
17:00-17:30	Pricing Delivery Demand: A Complement to Freight Electrification (Dr. Trilce Encarnación, University of Missouri - St Louis)
17:30-18:00	Open feedback discussion: research needs, implementation barriers, and collaboration opportunities (Chairs: Prof. Dr. Constantinos Antoniou, Prof. Dr. Yusak Susilo)
19:00	Workshop dinner at a Bavarian Restaurant

Expected Participants

The workshop is expected to bring together members of the **SEE-FAR project team** from TUM and BOKU, invited academic experts in freight transport, automation, electrification, logistics systems, and transport policy, as well as selected industry stakeholders from the German freight and vehicle technology sector.



Prof. Dr. Constantinos Antoniou (TUM)



Dr. Yusak Susilo (BOKU)



Dr. Trilce Encarnacion (University of Missouri – St. Louis)



Dr. Oleksandr Rossolov (Dalhousie)



Dr. Muhamad Rizki (ITENAS)

Speakers

Title: Toward Spatially Equitable Public EV Charging Infrastructure: Urban–Rural Differences in Location Preferences

Speaker: Oleksandr Rossolov

Abstract: Public EV charging infrastructure is essential for supporting broader electric vehicle adoption, yet charging needs and location preferences may differ substantially between urban and rural populations. This study examines urban–rural heterogeneity in public EV charging location preferences using Nova Scotia, Canada, as a case study. A hybrid choice modelling framework is applied to integrate travel behaviour, built-environment attributes, and latent sustainability attitudes into the analysis of preferences for workplace, gas-station, grocery/mall, and on-street charging locations. The results reveal distinct behavioural mechanisms across geographies. In urban areas, individuals with stronger pro-sustainability attitudes are more likely to prefer gas-station and grocery/mall charging, while in rural areas similar attitudes are more strongly associated with workplace charging. Elasticity analysis further shows greater responsiveness to workplace and corridor-based charging in rural contexts, whereas urban respondents are more sensitive to residential proximity and mixed-use built environments. The latent sustainability construct also acts as an attitudinal mediator, amplifying built-environment and travel-related effects in urban areas while exerting a more constrained influence in rural settings. These effects vary by household income and household size, generating distinct preference patterns across population groups.



Biography: Dr. Oleksandr Rossolov is a Postdoctoral Research Associate at Dalhousie University and an internationally recognised transportation systems researcher with prior faculty appointments in transportation systems and logistics in Ukraine. His research integrates behavioural modelling, agent-based simulation, telematics, and logistics to address challenges in transport decarbonization, mobility innovation, freight systems, and last-mile delivery. Dr. Rossolov has received several competitive international awards and distinctions, including the Fulbright Visiting Scholar Award, the Marie Skłodowska-Curie Actions for Ukraine Accolade of Excellence, and the Best Work-in-Progress Paper Award at the Information Systems for Crisis Response and Management Conference. He is a member of the TRB AT012 Standing Committee on Freight and Logistics Planning and Modeling and its Working Group on E-Commerce Emerging Trends and Urban Impacts. He has co-led national research projects on transport electrification, AI-driven mobility incentives, and sustainable last-mile delivery in the e-commerce sector.

Title: Pricing Delivery Demand: A Complement to Freight Electrification

Speaker: Trilce Encarnacion

Abstract: Freight electrification reduces emissions per mile, addressing the environmental intensity of each delivery. Demand-side instruments such as retail delivery fees address a different dimension: the volume of vehicle miles traveled. This talk presents empirical evidence from a study of retail delivery fees, drawing on a behavioral and econometric analysis of consumer response. The findings show how modest fees can shift consumer behavior in ways that reduce delivery trips and associated vehicle miles traveled, with implications for congestion, road wear, and emissions that technology alone does not resolve. The talk also considers how these effects vary across consumer segments and what they imply for the design of equitable, effective delivery policy. The session frames pricing and electrification as complementary tools in the freight decarbonization toolkit, each addressing a distinct part of the challenge.



Biography: Trilce Encarnacion is an Associate Professor of Supply Chain Management and Analytics in the Ed G. Smith College of Business at the University of Missouri–St. Louis. Her research leverages econometric analysis, analytical modeling, and behavioral experimentation to support decision-making in complex and dynamic supply chain environments. She specializes in last-mile distribution, with an emphasis on urban delivery systems, delivery policy, and freight infrastructure governance, alongside ongoing work in emergency logistics and humanitarian operations. Her work is guided by a commitment to advancing sustainability, community resiliency, and equity and access in public service delivery, and her interdisciplinary approach bridges operations research, economics, and public policy. Recent projects have examined demand-side instruments for reducing the externalities of urban freight, the modeling of social costs in time-sensitive service systems, and the role of technology and behavior in sustainable supply chains.

Title: Filling the gap in truck electrification: an investigation of the factors influencing light-duty electric truck adoption in urban logistics contexts.

Speaker: Muhamad Rizki

Abstract: Electrification of small urban road-freight vehicles has received comparatively little research attention, despite the sector's substantial and growing contribution to urban freight activity. This study examines the determinants of light-duty electric truck (LDET) adoption among business owners in Bandung City, Indonesia, using an Integrated Choice and Latent Variable framework that jointly models observable economic attributes alongside latent attitudinal constructs. Data were collected through a stated preference experiment and attitudinal survey administered to 152 truck business owners. Exploratory factor analysis identified four latent constructs: Economic, Operational, and Institutional Benefits; Environmental Benefits; Brand Image and Modernity; and Industry and Social Influence. Results indicate that the factors shaping LDET adoption extend beyond cost-related attributes and encompass multidimensional latent motivations. Environmental motivation is found to be positively and significantly associated with LDET adoption, while the Industry and Social Influence construct appears to shape adoption responses in a more segment-specific manner. Effect decomposition further reveals that firm characteristics shape adoption both directly and through underlying attitudinal mechanisms, reflecting strong sectoral heterogeneity among operators. These findings challenge the sufficiency of total cost of ownership frameworks and underscore the need for differentiated policies that reduce perceived operational uncertainty and leverage non-economic motivations to accelerate freight electrification in urban markets across developing countries.



Biography: Muhamad Rizki is Assistant Professor of Transport Planning at the Institut Teknologi Nasional Indonesia and Senior Net Zero Specialist at the World Resources Institute Indonesia. His research focuses on travel behavior, time-use analysis, decision process, longitudinal methods, and the behavioral dynamics of technology adoption. He has experience working on electrification projects and national transportation decarbonization initiatives, collaborating with both government and private sector stakeholders.

Title: Long-haul Road Freight Electrification and Automation: Technical Implications from a System Perspective

Speaker: Niclas Klein and Fabian Bussieweke

Abstract: The logistics sector is experiencing a fundamental transition as electrification and automation reshape freight transport. The successful integration of battery-electric trucks depends not only on vehicle technology but also on the coordinated development of charging infrastructure, operational strategies, and energy system capabilities. These elements are tightly coupled through logistics demand and operational constraints, creating complex system-level interactions that cannot be addressed in isolation. Adopting a systems perspective, this presentation explores the relationships between operational strategies, charging infrastructure, and the energy system. Based on this analysis, it identifies the technical requirements and key challenges for realizing efficient freight transport in both electrified and future electrified– automated logistics systems.

Biography:

Niclas Klein:



Niclas Klein received his bachelor's and master's degrees in mechanical engineering from the Karlsruhe Institute of Technology (KIT) in 2019 and 2022, respectively. He is currently pursuing his PhD at the Institute of Automotive Technology at TUM, where his research focuses on the operation of battery electric trucks, the integration of smart stop planning strategies and reservation of charging stations into daily truck business. He is part of the SPIRIT-E research project, which aims at the integration of bidirectionally

chargeable trucks in the freight forwarding context and the evaluation of the associated economic potentials.

Fabian Bussieweke:



Fabian Bussieweke holds a master's degree in Business Administration and Engineering from RWTH Aachen University in Germany, as well as a master's degree in Production, Logistics and Supply Chain Management from the Technical University of Valencia in Spain. He is currently a PhD student at the Institute of Automotive Technology at the Technical University of Munich in Germany. His research focuses on the synergies of electrification and automation in road freight logistics, particularly the value that increased automation can generate in terms of flexibility for the energy system, as well as the implications for vehicle and infrastructure

design.

Title:

Operational Patterns and Impact Analysis of Long-Haul Road Freight: A Case Study of Bavaria and Austria

Speaker: Denissa Purba

Abstract:

Road freight accounts for approximately 34% of transport-related greenhouse gas emissions in EU, yet existing freight impact assessments rarely capture the heterogeneity and dynamic nature of long-haul operations. Most studies rely on aggregate, outdated, or low-resolution datasets, limiting the ability to characterize observed freight movements and their associated impacts. As a result, current knowledge of long-haul freight operations and their implications for freight decarbonization remains limited. This study develops a data-driven assessment framework to characterize and evaluate long-haul road freight operations using high-resolution 2025 freight vehicle trajectory data covering Austria and Bavaria, Germany. The dataset comprises 2.38 million trajectory records from 37,600 heavy-duty vehicles collected over 12 weeks in 2025. First, exploratory spatiotemporal analyses are conducted to identify freight travel

behavior and operational patterns across multiple spatial, temporal, and functional contexts of long-haul freight corridors. Next, observed operational patterns are integrated with impact assessment functions to quantify the environmental, social, and economic impacts of current long-haul freight operations. The resulting analyses provide an updated assessment of long-haul freight activities and highlight key challenges and opportunities for future freight decarbonization efforts. The findings offer evidence-based insights to support policymakers and practitioners in designing effective and targeted strategies for sustainable long-haul freight transport in Bavaria-Austria region.

Biography:



Denissa Purba is a Postdoctoral Researcher at BOKU University, Vienna, Austria. She holds a Ph.D. and M.Sc. in Civil Engineering from the University of Illinois Urbana-Champaign, US, and a B.Sc. from Institut Teknologi Bandung, Indonesia. Her research centers on the integration of sustainable and resilient system design, with a focus on electrified transportation planning, emergency preparedness, and community resilience to enhance resilience to disasters and climate change. She brings interdisciplinary expertise in network modeling, operations research, travel behavior modeling, and spatial and statistical analysis methods.

Title:

Charging Facilities Allocation for Battery-Electric Freight Corridors: Plug-in Charging, Battery Swapping, and Electric Road Systems

Speaker: Wanrong Hu

Abstract:

Battery-electric trucks can support road freight decarbonization, but their deployment depends on whether charging systems can preserve operational feasibility and cost efficiency. This study examines the allocation of three charging systems, plug-in charging, battery swapping, and electric road systems (ERS), across heterogeneous long-haul battery-electric truck corridors. We develop a corridor-level carrier-provider equilibrium model in which carriers choose between stop-based charging options while an infrastructure provider sets capacity, battery inventory, service prices, and ERS deployment subject to grid, land, service-quality, and budget constraints. The model represents queueing, battery inventory, carrier generalized cost, provider operating surplus, and hours-of-service regulation, and is applied to a Bavaria-Austria freight corridor system. Under the 2026 baseline, plug-in charging serves 78.1% of electric freight trips and battery swapping serves 21.9%, with swapping remaining valuable on longer, higher-utilization, or fast-turnaround corridors. Scenario results show that charging-system performance is conditional: faster swapping, altered driver-break constraints, higher demand density, and fee regulation can change the relative attractiveness of plug-in and swap services, while ERS expands only when corridor-level public support or concession governance clears the deployment threshold. The findings suggest that freight electrification policy should move beyond single-technology ranking toward corridor-specific charging portfolios that jointly consider carrier reliability, provider viability, and institutional coordination.

Biography:



Wanrong Hu is a PhD student at BOKU University working in quantitative transportation research, with a focus on road freight electrification and emerging automated freight systems. Her research examines how infrastructure, operations, and demand interact in freight systems, using mechanism-driven quantitative models and selectively integrating data-driven methods for calibration, prediction, and scenario analysis. She is particularly interested in decision-support approaches that help carriers, infrastructure providers, and policymakers design charging and

operational strategies for sustainable, reliable, and equitable freight transport.

Title:

Fusing Commercial-Fleet GPS with Roadside Counts for Truck OD Estimation in Bavaria and Austria: A Regularized Inversion with Built-In Reliability Diagnostics

Speaker: Shahriar Iqbal Zame

Abstract:

Freight demand estimation must reconcile two imperfect signals: spatially rich but penetration-biased GPS probes, and sparse but trusted roadside counts. We develop a truck OD-estimation pipeline that treats commercial-fleet GPS stop sequences as OD priors and calibrates them against permanent count stations through a regularized observation-matrix inversion. Building on MCDODE-style observation tensors solved as a non-negative Tikhonov ridge (BVLS), we assemble a probe-density-weighted assignment structure and estimate per-corridor and per-OD truck demand at NUTS-3 resolution and hourly within-day granularity. We produce matrices for Bavaria (calibrated on German BAST federal-road counters) and for Austria, validated against fully held-out ASFINAG motorway counts. The two regions diverge sharply. Bavaria reproduces independent counts to within ~1% aggregate bias on the calibration network; Austria over-predicts by ~2.5×, reaching order-of-magnitude errors on the Vienna ring. Rather than tune the discrepancy away, we trace its mechanism: where few instrumented links constrain an OD pair, the ridge collapses the estimate onto the GPS prior (prior-adherence ratio ≈ 1.2 in Austria vs ≈ 30 in Bavaria), and that prior is itself inflated by repeated intra-zonal delivery stops (3.8 vs 1.0 trips per vehicle). A reversible delivery-round collapse cuts the intra-zonal prior share from 74% to 43% while leaving line-haul flows exactly invariant, and leave-station-out spatial cross-validation quantifies a +16–24 pp extrapolation penalty that delimits where the matrix is trustworthy. The contribution is a probe-plus-count estimation method coupled to diagnostics that label its own identifiability and spatial reliability.

Biography:



Shahriar is a research associate and Ph.D. candidate under the supervision of Prof. Constantinos Antoniou, contributing to the DFG-funded SEE-FAR project, which is jointly led by Prof. Antoniou and Prof. Yusak Susilo. His research focuses on agent-based simulations, optimization, and choice modelling to explore innovative electrification and automation strategies for road freight. He completed his master's degree in Transportation Systems at the Technical University of Munich (TUM). For his master's thesis, he received the Johannes B. Ortnier-Stiftung Award, awarded to outstanding early-career scientists at TUM.