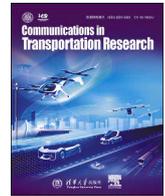Contents lists available at ScienceDirect

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Editorial

Advancing transportation research: interdisciplinary insights from emerging technologies and diverse perspectives

The landscape of transportation research is undergoing a profound and rapid evolution driven by unprecedented technological advancements and a growing global imperative for sustainable, efficient, and equitable mobility. Recognizing the critical need to showcase diverse scholarly contributions at this pivotal juncture, *Communications in Transportation Research* (COMMTR) issued a special call for papers on "Emerging Technologies in Transportation Research for Women in Engineering". This thematic collection, born from a rigorous peer-review process, highlights the innovative work and impactful discoveries from studies where the first or corresponding author is a woman and where female researchers contributed at least 50% of the work. It aims to foster an inclusive environment and catalyze professional growth and leadership within the field.

This special issue presents seven cutting-edge articles that collectively demonstrate the transformative power of interdisciplinary research and data-driven insights in shaping the future of transportation. These contributions span critical areas from advanced perception and control in autonomous systems to the strategic management of future mobility ecosystems and the design of human-centric urban environments.

The forefront of intelligent and autonomous mobility is significantly advanced by contributions to this issue. For example, MetaSSC, a novel meta-learning framework, substantially enhances three-dimensional (3D) semantic scene completion for autonomous driving by integrating deformable convolution, large-Kernel attention, and the Mamba model, addressing deployment costs and long-range dependencies (Qu et al., 2025). The complexities of mixed autonomy traffic are addressed by a hybrid flow and trajectory control (HFTC) strategy that integrates macroscopic ramp metering with microscopic cooperative merging, demonstrating superior adaptability across various traffic conditions (https://doi.org/10.1016/j.commtr.2025.100188). Furthermore, understanding the nuanced social interactions of human drivers is paramount for robust autonomous vehicle testing. A multiagent social interaction model, Social-MAIL, quantifies cooperation and competition intentions through social value orientation and employs a temporal–spatial attention mechanism to simulate realistic driving behaviors accurately (https://doi.org/10.1016/j.commtr.2025.100183). Beyond operational aspects, the economic implications of new technologies are explored, with an analysis of whether autonomous vehicles should receive parking subsidies; this research suggests that such subsidies may undermine urban productivity, advocating instead for public transit incentives (https://doi.org/10.1016/j.commtr.2025.100196).

The evolution of future mobile ecosystems extends beyond traditional ground transportation. The management of unmanned aerial vehicles (UAVs) in urban low-altitude airspace is addressed by a hybrid centralized-decentralized traffic control framework, introducing the innovative concept of "virtual flight containers" to ensure conflict-free and low-delay operations (https://doi.org/10.1016/j.commtr.2025.100195). This forward-looking research provides essential solutions for urban air mobility (UAM).

The pursuit of sustainable and equitable urban environments is also a central theme. A global city-level image analysis delves into the relationship between urban visual clusters and road transport fatalities, revealing how specific streetscape designs and public transit availability profoundly influence road safety outcomes (https://doi.org/10.1016/j.commtr.2025.100193). This highlights the critical role of urban planning in creating safer communities. The broader context of sustainable transportation also calls for a stand against indiscriminate private car use and encourages policies for increased bicycle use, which are often supported by advanced choice models (Ortúzar, 2021).

Underpinning these technological and policy advancements is the vital role of academic leadership and diversity. A comprehensive bibliometric analysis empirically demonstrates the strategic roles of female scholars in steering transportation research agendas. This study reveals a structural transition toward mixed-gender collaborations, which exhibit measurably greater citation influence, and notes that female-led collaborations show a stronger tendency to drive sustained exploration in research fields (https://doi.org/10.1016/j.commtr.2025.100198). This empirical evidence underscores the profound impact of diverse perspectives in fostering innovation and thematic longevity in academic inquiry.

To ensure the high reliability and soundness of new scientific methods and discoveries, COMMTR upholds a strong commitment to replicability and open science. Our policy mandates the disclosure and sharing of data and code, promoting transparency and enabling other researchers to validate and extend published work, thereby enhancing the broader value of scholarly contributions (Gao et al., 2022).

This special issue stands as a testament to the significant contributions of women in engineering to the rapidly transforming field of transportation. Through their leadership and innovative research, these scholars are not only advancing the technical frontiers but also shaping a more inclusive, efficient, and sustainable future for global mobility. We invite the broader research community to engage with these impactful studies and join us in fostering a vibrant, diverse, and forward-thinking academic environment.

List of articles in this special issue:

1 TITLE: Urban visual clusters and road transport fatalities: A global city-level image analysis. AUTHORS: Zhuangyuan Fan; Becky P.Y. Loo*. https://doi.org/10.1016/j.commtr.2025.100193
2 TITLE: MetaSSC: Enhancing 3D semantic scene completion for autonomous driving through meta-learning and long-sequence modeling. AUTHORS: Yansong Qu, Zixuan Xu, Zilin Huang, Zihao Sheng, Sikai Chen*, Tiantian Chen*. https://doi.org/10.1016/j.commtr.2025.100184
3 TITLE: Integrating micro and macro traffic control for mixed autonomy traffic. AUTHORS: Tingting Fan, Jieming Chen, Edward Chung*. https://doi.org/10.1016/j.commtr.2025.100188
4 TITLE: A multiagent social interaction model for autonomous vehicle testing. AUTHORS: Shihan Wang, Ying Ni, Chengsheng Miao, Jian Sun, Jie Sun*. https://doi.org/10.1016/j.commtr.2025.100183
5 TITLE: A hybrid centralized-decentralized traffic control framework for unmanned aerial vehicles in urban low-altitude airspace. AUTHORS: Xiangdong Chen, Shen Li, Meng Li*. https://doi.org/10.1016/j.commtr.2025.100195
6 TITLE: Should autonomous vehicles be subsidized to reduce parking fees? A productivity perspective. AUTHORS: Yao Li, Ziyue Yang, Shuxian Xu, Tao Wang*, Jiancheng Long. https://doi.org/10.1016/j.commtr.2025.100196
7 TITLE: Female Scholars' Strategic Roles in Steering Transportation Research Agendas. AUTHORS: Mingyang Pei, Zisen Lin, Xiao Fu, Xin Pei* https://doi.org/10.1016/j.commtr.2025.100198.

CRediT authorship contribution statement

Mingyang Pei: Supervision, Writing – original draft, Writing – review & editing. **Zhuoyan Wei:** Writing – original draft. **Xin Pei:** Project administration, Supervision. **Yu Zhang:** Supervision. **Xiaokun Cara Wang:** Supervision. **Yang Liu:** Supervision. **Ronghui Liu:** Supervision, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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