

Session Topic Summary

- *Many production vehicles now include advanced driver-assistance technologies; understanding their impacts on traffic is essential for their future regulation and development.*
- *Recent field studies have contradicted earlier model-based predictions by demonstrating negative impacts on traffic flow and capacity, highlighting a significant discrepancy in the literature.*
- *This session will discuss these discrepancies and suggest solutions using new technologies and models, such as large models or generative AI, alongside offering policy recommendations.*

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- *Jiaqi Ma, University of California, Los Angeles*

Driving safely with regulation: traffic flow and road regulation

- *Saeid Soleimaniamiri, Leidos*

Connected and automated vehicle cooperation with infrastructure

- *Xiaopeng Li, University of Wisconsin-Madison*

Thoughts on Applications of Foundation Models in Transportation

- *Kevin Stutenberg, Argonne National Laboratory*

Experimentation for Insight and Validation of Large Models for C/AV Impacts

- *Tom Shi, University of Wisconsin-Milwaukee*

Calibrating Human Driving Behavior for Naturalistic Driving Environment Simulation

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Key Findings and Lessons Learned

- *Traditional modeling methods have predominantly focused on microscopic behaviors, often overlooking the broader macroscopic effects on traffic, leading to inaccurate predictions at larger scales (Tom).*
- *Field experiments and simulations should be integrated; small-scale field experiments can enhance simulations, which in turn help understand broader traffic flow impacts (Saeid).*
- *Integrating hardware within simulations can improve the handling of uncertainties and errors. (Kevin)*
- *Employing large models can effectively manage uncertainties and errors, thereby supporting various aspects of automated vehicle (AV) impact analysis, including safety, regulation understanding, energy, control, etc. (Jiaqi, Xiaopeng, Kevin)*

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Outcomes & Research Needs Statements

- *Investigate advanced behavior modeling techniques to simultaneously enhance the accuracy of both microscopic and macroscopic traffic simulations.*
- *Develop systematic automated vehicle impact evaluation metrics to effectively guide the deployment of the technology.*
- *Advance the development of large-scale models capable of effectively managing the complexities associated with automated vehicle technologies, diverse driving environments, and varying weather conditions.*