

# Harnessing AI to Revolutionize Transportation Network Modeling

## BIOGRAPHY



Dr. Yafeng Yin is Donald Cleveland Collegiate Professor of Engineering, and Professor and Donald Malloure Department Chair of Civil and Environmental Engineering, and Professor of Industrial and Operations Engineering at University of Michigan, Ann Arbor. His research aims to analyze and enhance multimodal transportation systems towards efficiency, resilience and environmental sustainability. Currently he focuses on developing innovative mobility solutions and services by leveraging vehicle connectivity and automation. Dr. Yin has published over 150 refereed papers in leading academic journals. He was the Editor-in-Chief of Transportation Research Part C: Emerging Technologies between 2014 and 2020 and currently serves as Area Editor of Transportation Science and Associate Editor of Transportation Research Part B: Methodological, another two flagship journals in the transportation domain. Dr. Yin received his Ph.D. from the University of Tokyo, Japan in 2002, his master's and bachelor's degrees from Tsinghua University, Beijing, China in 1996 and 1994 respectively.

## ABSTRACT

Transportation network modeling determines how travel demand from various origins to destinations is distributed across a network. This approach is widely used to assess network performance, evaluate improvement plans or policies, and prescribe optimal strategies. In this talk, we will explore how artificial intelligence can transform the paradigms of transportation network modeling. Our focus will be on advocating for a multi-scale modeling approach and examining two AI-driven applications that reshape this field: (1) an end-to-end learning approach that leverages extensive empirical traffic data to construct integrated network equilibrium models for light-duty policy analysis and prescription, and (2) the application of large language models to enable generative agents that enhance activity-based microsimulation, providing comprehensive, in-depth analysis of plans and policies.