

# Mingfeng Shang

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## EDUCATION

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**University of Minnesota, Twin cities**

*Exp. May 2024*

Ph.D., Civil Engineering, Transportation Engineering

Advisor: [Raphael E. Stern](#)

**University of Illinois, Urbana-Champaign**

Dec 2018

Master of Science, Civil Engineering, Transportation Engineering

**Southwest Jiaotong University, Chengdu, China**

Jun 2017

Bachelor of Engineering, Civil Engineering

## JOURNAL PUBLICATIONS

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[J6] **M. Shang**, S. Wang, and R. Stern. Extending ramp metering control to mixed autonomy traffic flow with varying degrees of automation. *Transportation Research Part C: Emerging Technologies*, 151:104119, 2023. [Online Access](#).

[J5] S. Wang, **M. Shang**, M. Levin, and R. Stern. A general approach to smoothing nonlinear mixed traffic via control of autonomous vehicles. *Transportation Research Part C: Emerging Technologies*, 146:103967, 2023. [Online Access](#).

[J4] **M. Shang**, B. Rosenblad, and R. Stern. A novel asymmetric car following model for driver-assist enabled vehicle dynamics. *IEEE Transactions on Intelligent Transportation Systems*, 23(9):15696–15706, 2022. [Online Access](#).

[J3] H Jeon, RF Benekohal, B Garshasebi, and **M. Shang**. Comparison of an adaptive signal system to time based coordination plan along a signalized arterial. *Advances in Transportation Studies*, 56, 2022. [Online Access](#).

[J2] **M. Shang** and R. E Stern. Impacts of commercially available adaptive cruise control vehicles on highway stability and throughput. *Transportation Research Part C: emerging technologies*, 122:102897. [Online Access](#).

[J1] M. Levin, **M. Shang**, and R. Stern. Effects of short-term travel on covid-19 spread: A novel seir model and case study in minnesota. *Plos One*, 16(1):e0245919, 2021. [Online Access](#).

## JOURNAL PUBLICATIONS IN REVIEW

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[JR3] S. Wang, **M. Shang**, and R. Stern. Analytical characterization of cyberattacks on adaptive cruise control vehicles. *IEEE Transactions on Intelligent Transportation Systems*, Under Review, 2023

[JR2] **M. Shang**, S. Wang, and R. Stern. Modeling adaptive cruise control vehicle dynamics: A two-condition continuous asymmetric car-following model. *IEEE Transactions on Intelligent Vehicles*, Under Review, 2023

[JR1] T. Li, **M. Shang**, S. Wang, and R. Stern. Understanding and detecting malicious cyberattacks on adaptive cruise control vehicles: A machine learning approach. *IEEE Transactions on Intelligent Vehicles*, Under Review, 2023

## CONFERENCE PROCEEDINGS AND TECHNICAL REPORTS

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- [C12] A. Zare, **M. Shang**, D. Kan, and R. Stern. Modeling car-following behavior of electric adaptive cruise control vehicles using experimental testbed data. In *2023 IEEE 26th International Conference on Intelligent Transportation Systems (ITSC)*. IEEE, 2023.
- [C11] **M. Shang**, S. Wang, and R. Stern. Capacity implications of personalized adaptive cruise control. In *2023 IEEE 26th International Conference on Intelligent Transportation Systems (ITSC)*. IEEE, 2023.
- [C10] T. Li, B. Rosenblad, S. Wang, **M. Shang**, and R. Stern. Exploring energy impacts of cyberattacks on adaptive cruise control vehicles. In *2023 IEEE Intelligent Vehicles Symposium (IV)*, pages 1–6. IEEE, 2023. [Online Access](#).
- [C9] **M. Shang** and R. Stern. Impacts of mixed autonomy traffic flow with adaptive cruise control vehicles on fuel consumption and emissions. In *2023 8th International Conference on Models and Technologies for Intelligent Transportation Systems (MT-ITS)*, pages 1–6. IEEE, 2023. [Online Access](#).
- [C8] **M. Shang**, S. Wang, and R. Stern. Modeling adaptive cruise control vehicles: A continuous asymmetric car-following perspective. In *2022 IEEE 25th International Conference on Intelligent Transportation Systems (ITSC)*, pages 923–928. IEEE, 2022. [Online Access](#).
- [C7] S. Wang, **M. Shang**, M. Levin, and R. Stern. Smoothing nonlinear mixed traffic with autonomous vehicles: Control design. In *2022 IEEE 25th International Conference on Intelligent Transportation Systems (ITSC)*, pages 661–666. IEEE, 2022. [Online Access](#).
- [C6] T. Li, **M. Shang**, S. Wang, and R. Stern. Detecting stealthy cyberattacks on automated vehicles via generative adversarial networks. In *2022 IEEE 25th International Conference on Intelligent Transportation Systems (ITSC)*, pages 3632–3637. IEEE, 2022. [Online Access](#).
- [C5] D. Vrabac, **M. Shang**, B. Butler, J. Pham, R. Stern, and P. Paré. Capturing the effects of transportation on the spread of covid-19 with a multi-networked seir model. In *2021 American Control Conference (ACC)*, pages 3152–3157. IEEE, 2021. [Online Access](#).
- [C4] **M. Shang** and R. Stern. A hybrid fundamental diagram for modeling mixed human and automated traffic flow. In *2021 7th International Conference on Models and Technologies for Intelligent Transportation Systems (MT-ITS)*, pages 1–6. IEEE, 2021. [Online Access](#).
- [C3] **M. Shang** and R. Stern. Calibrating heterogeneous car-following models for human drivers in oscillatory traffic conditions. In *2020 Forum on Integrated and Sustainable Transportation Systems (FISTS)*, pages 101–106. IEEE, 2020. [Online Access](#).
- [C2] **M. Shang**, F. Hauer, and R. Stern. Do cut-ins matter: Assessing the impact of lane changing and string stability on traffic flow. In *2020 IEEE 23rd International Conference on Intelligent Transportation Systems (ITSC)*, pages 1–6. IEEE, 2020. [Online Access](#).
- [C1] R. Benekohal, B. Garshasebi, H. Jeon, and **M. Shang**. Evaluation of adaptive signal control technology-volume 3: Comparison of the 2017 and asct 2017. Technical report, Illinois Center for Transportation/Illinois Department of Transportation, 2019. [Online Access](#).

## PRESENTATIONS

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- 1.
2. *Capacity implications of personalized adaptive cruise control*  
2023 IEEE 26th International Conference on Intelligent Transportation Systems (ITSC), Bilbao, Spain, Sep. 24, 2023 - Sep. 28, 2023.
3. *Impacts of mixed autonomy traffic flow with adaptive cruise control vehicles on fuel consumption and emissions*

2023 8th International Conference on Models and Technologies for Intelligent Transportation Systems (MT-ITS), Nice, France, Jun. 13, 2023 - Jun. 16, 2023.

4. *Modeling adaptive cruise control vehicle dynamics: A two-condition continuous asymmetric car-following model*  
Transportation Research Board 102nd Annual Meeting, Washington DC, Jan. 08, 2023.
5. *Flash talk: modeling and control of mixed autonomy traffic flow*  
The 2022 INFORMS Annual Meeting, Indianapolis, IN, Oct. 16 - Oct. 19, 2022.
6. *A modified traffic fundamental diagram for the mixed autonomy highway traffic flow*  
Mid-Continent Transportation Research Symposium, Ames, IA, Sep. 14 - Sep. 15, 2022.
7. *Modeling and control of mixed autonomy traffic flow*  
UCLA Mathematical Challenges and Opportunities for Autonomous Vehicles Reunion Conference, Los Angeles, CA, Jun. 5 - Jun. 10, 2022.
8. *A novel asymmetric car following model for driver-assist enabled vehicle dynamics*  
ASCE International Conference on Transportation & Development, Seattle, WA, Jun 2, 2022.
9. *Fuel consumption and emissions of mixed autonomy traffic flow*  
Center for Transportation Studies Transportation Research Conference, Minneapolis, MN, Nov 4, 2021.
10. Evaluation of US air transportation network reliability during the COVID-19 pandemic  
*Transportation Research Board 100th Annual Meeting, Washington DC, Jan 25, 2021.*

## AWARDS AND HONORS

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- [2023-24 Doctoral Dissertation Fellowship](#), University of Minnesota, 2023
  - Awarded to the most accomplished Ph.D. candidates across the university
- [Matthew J. Huber Award](#), Center for Transportation Studies, University of Minnesota, 2023
  - For excellence in Transportation Research and Education, one doctoral winner per year
- [Hsiao Shaw-Lundquist Fellowship](#), China Center, University of Minnesota, 2022
- Outstanding Graduate Student (with highest honors), Southwest Jiaotong University, 2017

## TEACHING EXPERIENCE

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Department of Civil, Environmental, and Geo- Engineering, University of Minnesota

- *Teaching Assistant*                      CEGE 4211/5211: Traffic Engineering                      Spring 2020  
*Responsibilities:* Graded assignments and held weekly office hours.  
*Enrollment:* 15
- *Teaching Assistant*                      CEGE 4211/5211: Traffic Engineering                      Fall 2021  
*Responsibilities:* Graded assignments and held weekly office hours.  
*Enrollment:* 27
- *Lab Instructor*                              CEGE 3201: Transportation Engineering                      Spring 2023  
*Responsibilities:* Ran weekly 1-hour discussion section, held weekly office hours.  
*Enrollment:* 22

## STUDENTS MENTORED

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1. Benjamin Rosenblad, Undergraduate student in Civil Engineering, University of Minnesota, *Research on a novel asymmetric car following model for driver-assist enabled vehicle dynamics, May 2021 - Aug. 2021 & exploring the risks and opportunities for ramp metering control in mixed autonomy traffic: a case study in Minnesota, Jan. 2023 - Aug. 2023*
2. Hannah Delker, Undergraduate student in Civil Engineering, University of Minnesota, *Research on Extending ramp metering control to mixed autonomy traffic flow with varying degrees of automation, Sep. 2021 - Dec. 2021*
3. Kenny Tran, Undergraduate student in Computer science, University of Minnesota, *Research on microscopic lane changing modeling and simulation, Jan. 2020 - Aug. 2020*
4. Joseph Pham, Undergraduate student in Civil Engineering, University of Minnesota, *Research on evaluation of US air transportation network reliability during the COVID-19 pandemic, Jan. 2020 - Aug. 2020*

## REFeree SERVICES

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- **Journals refereed:** IEEE Transactions on Intelligent Vehicles, Transportmetrica A: Transport Science, Transportation Research Part C: Emerging Technologies, Transportation Research Record, Scientific Reports, Advances in Bridge Engineering
- **Conferences refereed:** IEEE Conference on Decision and Control, IEEE International Conference on Intelligent Transportation Systems, Transportation Research Board Annual Meeting

## PROFESSIONAL MEMBERSHIP

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- *American Society of Civil Engineers (ASCE)*, Student Member
- *Institute of Electrical and Electronics Engineers (IEEE)*, Student Member