



**Annual CTS**

# **TRANSPORTATION RESEARCH CONFERENCE**

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**Curiosity. Discovery. Innovation.**

**DRAFT PROGRAM**

**November 4, 2021**

**[cts.umn.edu](https://cts.umn.edu)**



**CENTER FOR  
TRANSPORTATION STUDIES**

**UNIVERSITY OF MINNESOTA**

# Program at a Glance

Thursday, November 4, 2021

8:00–8:30 a.m.	<b>Conference Opens for Log-on and Technology Checks</b>				
8:30–10:15 a.m.	<b>Welcome</b> <i>Kyle Shelton</i> , Director, Center for Transportation Studies, University of Minnesota  <b>Keynote Presentation and Panel Discussion</b> <b>Speaker</b> <i>Jonathan Foley</i> , Executive Director, Project Drawdown <b>Panelists</b> <i>Jessica Hellmann</i> , Executive Director and Ecolab Chair for Environmental Leadership, Institute on the Environment, University of Minnesota; <i>Ashwat Narayanan</i> , Executive Director, Our Streets Minneapolis				
10:15–10:30 a.m.	<b>Break</b>				
10:30–11:45 a.m.	<b>Concurrent Sessions</b>				
	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
	Assessing Climate Resilience of Transportation Infrastructure	Intersection Safety	COVID-19 Lessons Learned	Health and Equity in Transportation	CAV Technology Evolutions
11:45 a.m.–12:30 p.m.	<b>Lunch Break</b>				
12:30–1:30 p.m.	<b>Afternoon Plenary Session</b> <b>Opening Comments</b> <i>Margaret Anderson Kelliher</i> , Commissioner, MnDOT <i>(invited)</i>  <b>Keynote Presentation</b> <b>Speaker</b> <i>The Honorable Pete Buttigieg</i> , United States Secretary of Transportation <i>(invited)</i>				
1:30–1:45 p.m.	<b>Break</b>				
1:45–3:00 p.m.	<b>Concurrent Sessions</b>				
	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	
	Demonstrating Distance-Based Fees Through a Shared Mobility Model	Electrification: From Transit to Freight	Traveler Experience with an Equity Lens	Public Perception of CAVs	
3:00–3:15 p.m.	<b>Break</b>				
3:15–4:30 p.m.	<b>Concurrent Sessions</b>				
	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	
	Leveraging Infrastructure Improvement Projects to Reconnect Communities	Transit Impacts on Local Communities	Latest Research in Shared Mobility and Shared Services	Human Behavior and Safety	

# Program Schedule

Thursday, November 4, 2021

8:00–8:30 a.m.	<b>Conference Opens for Log-On and Technology Checks</b>
8:30–10:15 a.m.	<b>Welcome</b> <i>Kyle Shelton</i> , Director, Center for Transportation Studies, University of Minnesota
	<b>Keynote Presentation and Panel</b> <b>Speaker</b> <i>Jonathan Foley</i> , Executive Director, Project Drawdown <b>Panelists</b> <i>Jessica Hellmann</i> , Executive Director and Ecolab Chair for Environmental Leadership, Institute on the Environment, University of Minnesota <i>Ashwat Narayanan</i> , Executive Director, Our Streets Minneapolis  The morning keynote will focus on the intersection of transportation, sustainability, and climate change. A panel discussion will follow the keynote presentation.
10:15–10:30 a.m.	<b>Break</b>
10:30–11:45 a.m.	<b>Concurrent Sessions</b>
1	<b>Assessing Climate Resilience of Transportation Infrastructure</b> <b>Assessing Climate Resilience of Transportation Infrastructure</b> <i>Jeffrey Meek</i> , MnDOT; <i>Halil Ceylan</i> , Institute for Transportation, Iowa State University; <i>John Fleming</i> , MnDOT This session will highlight the development of a flood vulnerability assessment, a pilot study of a climate vulnerability assessment, and an investigation of changes in freeze-thaw cycles and trends in Minnesota.
2	<b>Intersection Safety</b> <b>Leveraging Video Data to Predict Driver-Vehicle Interaction Outcomes and Yielding Rates</b> <i>Raphael Stern</i> , Department of Civil, Environmental, and Geo- Engineering, University of Minnesota Co-authors: <i>Tianyi Li</i> , Department of Civil, Environmental, and Geo- Engineering, University of Minnesota; <i>John Cullom</i> , Department of Computer Science, University of Minnesota <b>Performance Evaluation of Modified Cyclic Max Pressure Controlled Intersections in Realistic Corridors</b> <i>Simanta Barman</i> , Department of Civil, Environmental, and Geo- Engineering, University of Minnesota Co-author: <i>Michael W. Levin</i> , Department of Civil, Environmental, and Geo- Engineering, University of Minnesota <b>Crash Analysis with Flashing Yellow Arrow Implementation on Highway 96</b> <i>Taehyoung Kim</i> and <i>Luis C. Flores</i> , Ramsey County
3	<b>COVID-19 Lessons Learned</b> <b>COVID-19 Impacts on Speed and Safety</b> <i>Shauna Hallmark</i> and <i>Neal Hawkins</i> , Institute for Transportation, Iowa State University Co-authors: <i>Skylar Knickerbocker</i> and <i>Theresa Litteral</i> , Institute for Transportation, Iowa State University <b>Telecommuting During COVID-19: How Will It Shape the Future Workplace and Workforce?</b> <i>Xinyi Qian</i> , Tourism Center, University of Minnesota Extension Co-author: <i>Neil Linscheid</i> , University of Minnesota Extension Center for Community Vitality <b>Public Engagement Practices During the COVID-19 Pandemic and Other Disruptive Events</b> <i>Jeanne Aamodt</i> , MnDOT Co-author: <i>Christine Kline</i> , CTC & Associates LLC <b>The Tipping Point: What COVID-19 Travel Reduction Tells Us About Effective Congestion Relief</b> <i>Paul Morris</i> and <i>Gordon Parikh</i> , SRF Consulting Group Co-author: <i>Brad Utecht</i> , MnDOT

## Health and Equity in Transportation

### The Health and Transportation Nexus: A Conceptual Framework for Collaborative Health and Transportation Planning

*Nissa Tupper, MnDOT*

### Modal Options, Destination Access, and Everyday Well-Being

*Yingling Fan, Humphrey School of Public Affairs, University of Minnesota*

Co-authors: *Greg Lindsey, Humphrey School of Public Affairs, University of Minnesota; Jueyu Wang, Department of City and Regional Planning, University of North Carolina at Chapel Hill*

### Health and Equity in Long-Range Transportation Planning

*Hally Turner, MnDOT*

### What is Equity in Transportation Electrification? Key Questions, Strategies, and an Equity Analysis Framework

*Allison Bell, Bellwether Consulting; Rachel Brummer, Departments of Environmental Studies and Political Science, Luther College*

## CAV Technology Evolutions

### Highway 52 Connected and Automated Vehicle Study

*Jacob Folkeringa, SRF Consulting Group; Cory Johnson, MnDOT*

### Can Automated Vehicles “See” in Minnesota? Ambient Particle Effects on LiDAR Systems

*Lu Zhan, Department of Mechanical Engineering, University of Minnesota*

Co-authors: *Will Northrop and Darrick Zarling, Department of Mechanical Engineering, University of Minnesota*

### Maximum-Stability Dispatch Policy for Shared Autonomous Vehicles Based on Zone-Based Dynamic Queueing Models

*Te Xu, Department of Civil, Environmental, and Geo- Engineering, University of Minnesota*

Co-authors: *Maria Cieniawski and Michael W. Levin, Department of Civil, Environmental, and Geo- Engineering, University of Minnesota*

### Fuel Consumption and Emissions of Mixed Traffic Flow at Different Levels of Autonomy

*Mingfeng Shang, Department of Civil, Environmental, and Geo- Engineering, University of Minnesota*

Co-author: *Raphael Stern, Department of Civil, Environmental, and Geo- Engineering, University of Minnesota*

11:45 a.m.–12:30 p.m.

## Lunch Break

12:30–1:30 p.m.

## Afternoon Plenary Session

### Opening Comments

*Margaret Anderson Kelliher, Commissioner, MnDOT (invited)*

## Keynote Presentation

### Speaker

*The Honorable Pete Buttigieg, United States Secretary of Transportation (invited)*

The afternoon keynote will explore the latest priorities from the USDOT, including highlights from the new surface transportation bill and the importance of research in related areas.

1:30–1:45 p.m.

## Break

1:45–3:00 p.m.

## Concurrent Sessions

## Demonstrating Distance-Based Fees Through a Shared Mobility Model

### Demonstrating Distance-Based Fees Through a Shared Mobility Model

*Kenneth Buckeye, MnDOT; Chris Berrens, MnDOT; Frank Douma, Humphrey School of Public Affairs, University of Minnesota; Mike Warren, WSP; Camila Fonseca-Sarmiento, Humphrey School of Public Affairs, University of Minnesota*

This session will focus on Minnesota’s Distance-Based Fee Demonstration and its major findings and conclusions. Presenters will share MnDOT’s perspective on the project, technical demonstration findings, and a social, economic and policy analysis. A panel discussion will focus on future directions and policy implications for Minnesota around distance-based fees.

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## Electrification: From Transit to Freight

### Prioritizing Bus Routes for Electrification: A GIS-Based Multi-Criteria Analysis Considering Operational, Environmental, and Social Benefits and Costs

*Behman Davazdah Emami*, Department of Civil, Environmental, and Geo- Engineering, University of Minnesota;

*Ying Song*, Department of Geography, Environment and Society, University of Minnesota

Co-author: *Alireza Khani*, Department of Civil, Environmental, and Geo- Engineering, University of Minnesota

### Strategies to Accelerate Transportation Electrification in the Twin Cities

*Tony Fischer*, Metropolitan Council

### Electric Trucks: Are They Ready for Prime Time?

*Dan Murray*, American Transportation Research Institute

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## Traveler Experience with an Equity Lens

### The Subjective Well-Being Benefits of Having a Daily Routine

*Yaxuan Zhang*, Department of Geography, Environment, and Society, University of Minnesota

Co-authors: *Yingling Fan*, Humphrey School of Public Affairs, University of Minnesota; *Ying Song*, Department of Geography, Environment, and Society, University of Minnesota

### The Segregation of Our Everyday Life: Investigating Space-Time Interactions Across Gender, Race, and Income Groups

*Cecilia Isaac* and *Rongxuan Zhu*, Department of Geography, Environment, and Society, University of Minnesota

Co-author: *Ying Song*, Department of Geography, Environment, and Society, University of Minnesota

### Integrating Findings from Community Engagement into Project Planning and Development Process: MnDOT Metro Livability Initiative

*Gloria Jeff*, MnDOT

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## Public Perception of CAVs

### Examining the Motivations for the Willingness to Own Autonomous Vehicles in the Twin Cities

*Tao Tao*, Humphrey School of Public Affairs, University of Minnesota

Co-author: *Jason Cao*, Humphrey School of Public Affairs, University of Minnesota

### Let's Talk About CAV: Understanding Minnesotans' Knowledge and Attitudes Related to Connected and Automated Vehicle Technology

*Katie Caskey*, HDR; *Tara Olds*, MnDOT

Co-author: *Marc Valencia*, New Publica

3:00–3:15 p.m.

## Break

3:15–4:30 p.m.

## Concurrent Sessions

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## Leveraging Infrastructure Improvement Projects to Reconnect Communities

### Leveraging Infrastructure Improvement Projects to Reconnect Communities

*Keith Baker*, ReConnect Rondo

The Rondo Land Bridge to revitalize an African American cultural enterprise district offers an opportunity to build an inclusive and equity-based local economy that not only restores what was lost, but also creates a continuous cycle of net-positive economic, social, and environmental benefits for the neighborhood and beyond. The restorative development approach championed by ReConnect Rondo leverages the principles of the circular economy, regenerative urbanism, and smart city technologies to create district wealth and wellbeing, while intentionally creating career paths and living-wage jobs for residents who have been denied access to economic opportunity in the past.

## Transit Impacts on Local Communities

### Accessibility Impacts of Bus Service Allocation Study

*Andrew Owen*, Center for Transportation Studies, University of Minnesota

Co-author: *Kristin Carlson*, Center for Transportation Studies, University of Minnesota

### Community Station Creation: How Rochester and Its Residents Are Designing Its First BRT

*Alicia Valenti* and *Jarrett Hubbard*, SRF Consulting Group

### Did the A-line Arterial Bus Rapid Transit Affect Housing Values in Ramsey County, MN?

*Jason Cao*, Humphrey School of Public Affairs, University of Minnesota

Co-author: *Jack Benson*, Department of Civil, Environmental, and Geo- Engineering, University of Minnesota

## Latest Research in Shared Mobility and Shared Services

### More Access and Less Traffic: Transportation Demand Management Recommendations for Minnesota Municipalities and Employers

*Raihana Zeerak* and *Camila Fonseca-Sarmiento*, Humphrey School of Public Affairs, University of Minnesota

Additional authors: *Jerry Zhao*, School of Public Affairs, Zhejiang Univeristy

### E-scooter Safety Concerns and Crash Mechanisms

*Madeleine Roen*, Department of Mechanical Engineering, University of Minnesota

Co-authors: *Curtis Craig* and *Nichole Morris*, HumanFIRST Laboratory, Department of Mechanical Engineering, University of Minnesota

### Mobile Parcel Locker Location Under Uncertain Demand

*Yiling Zhang*, Department of Industrial and Systems Engineering, University of Minnesota

Co-author: *Liwei Zeng*, Institute for Mathematics and its Applications, University of Minnesota

## Human Behavior and Safety

### Driving Safety and Assessment of Sleepiness

*Curtis Craig*, HumanFIRST Laboratory, Department of Mechanical Engineering, University of Minnesota

Co-authors: *Nichole Morris*, HumanFIRST Laboratory, Department of Mechanical Engineering, University of Minnesota; *Conrad Iber*, University of Minnesota Medical School

### Limited and Relative Intentions to Change Speeding Behaviors: A Mixed Methods Comparison of Minor, Moderate, and Extreme Speeders

*Colleen Peterson*, School of Public Health, University of Minnesota

Co-authors: *Joseph E. Gaugler*, *Toben F. Nelson*, and *Mark A. Pereira*, School of Public Health, University of Minnesota

### Development of a Smartphone App to Warn the Driver of Unintentional Lane Departure Using GPS Technology

*Imran Hayee*, Department of Electrical Engineering, University of Minnesota Duluth

### Evaluating Persuasive Messaging Techniques on Attitude Change Toward Restricted Crossing U-Turn Intersections

*Katelyn Schwieters* and *Nichole Morris*, HumanFIRST Laboratory, Department of Mechanical Engineering, University of Minnesota

Co-author: *Curtis Craig*, HumanFIRST Laboratory, Department of Mechanical Engineering, University of Minnesota