



28th Annual CTS
TRANSPORTATION
RESEARCH
CONFERENCE



Curiosity. Discovery. Innovation.

FINAL PROGRAM

November 2, 2017

The Commons Hotel
East Bank Campus
Minneapolis, MN

cts.umn.edu



**CENTER FOR
TRANSPORTATION STUDIES**
UNIVERSITY OF MINNESOTA



General Information

Reception

A reception with hors d'oeuvres and a cash bar will take place following the final concurrent sessions, offering attendees further opportunity to socialize with fellow participants and presenters.

Conference Presentations Online

PowerPoint presentations (for which we receive permission from presenters to post) will be available in PDF format approximately one week after the conference at: cts.umn.edu/events/conference/2017

Conference Credit Professional Development Hours (PDHs)

This conference awards up to 6.5 Professional Development Hours (PDHs). A credit form is included in your conference folder and on the conference website.

AICP Maintenance Credits

This conference has been approved for 13.75 AICP maintenance credits. A complete list of sessions approved for credit is included in your conference folder, on the conference website, and in the program schedule.



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To participate in Twitter conversations around this year's Research Conference, please add the hashtag **#ctsresconf** to your tweets. For the latest news and events from the Center for Transportation Studies, follow @UMNCTS on Twitter and like us on Facebook at facebook.com/UMNCTS.



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Enhance your conference experience by downloading the conference app on your iPhone or Android device. With it you can:

- View the conference program
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- Keep track of AICP credits and PDH

Wireless Access

Conference attendees can access free wireless internet by selecting "Commons Convention" from the list of networks and entering password: CTS17.

To get the guide for iOS and Android users: Download 'Guidebook' from the Apple App Store or the Android Marketplace, search for "CTS Conference," or scan the following image using Guidebook's QR code reader:



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Amber Cameron
University of Minnesota

Curtis Craig
University of Minnesota

Frank Douma
University of Minnesota

Jonathan Ehrlich
Metropolitan Council

Al Forsberg
Blue Earth County (retired)

Steve Gentry
Metropolitan Airports Commission

John Hourdos
University of Minnesota

Alireza Khani
University of Minnesota

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Mark Your Calendar

Toward Zero Deaths Conference

October 23–24, 2018

Verizon Wireless Center, Mankato, Minnesota

2018 CTS Research Conference

November 1, 2018

The Commons Hotel, Minneapolis, Minnesota

Welcome to the Conference

The Center for Transportation Studies is pleased to present its 28th Annual Transportation Research Conference and welcomes you to the University of Minnesota campus. The conference convenes researchers and practitioners from Minnesota and the Upper Midwest to highlight new learning, emerging ideas, and the latest innovations in transportation. Concurrent session topics align with the Center's research emphasis areas: Transportation Safety and Traffic Flow, Transportation Infrastructure, Transportation Planning and the Economy, Environment and Energy in Transportation, and Transportation Education and Engagement.



Keynote Presentations



How We Pay for Transportation Infrastructure: What's the Value Proposition?

Thursday, November 2, 2017: 8:30–10:15 a.m.

Joung Lee, Policy Director,
American Association of State
Highway and Transportation Officials (AASHTO)

The public generally supports investing in transportation infrastructure, yet it fiercely opposes increases in user fees or taxes to support this investment. The opaqueness of transportation revenue mechanisms like the gas tax makes it difficult for the traveling public to easily discern how much they pay for infrastructure and what value they derive from it.

In the conference opening session, Joung Lee, policy director at the American Association of State Highway and Transportation Officials, will examine the latest direction in infrastructure funding at the federal level. He will also offer examples of innovation happening in states all around the country and discuss policy and political considerations when they come to transportation revenue and financing tools.

Following Lee's presentation, a panel of Minnesota leaders and experts will share perspectives on transportation infrastructure funding.

Panelists include: *Tracy Hatch*, Deputy Commissioner, MnDOT; *Jeffrey Heilstedt*, Vice-President, Transportation Regional Business Line Leader, Midwest Region, AECOM; *Jim McDonough*, Commissioner, Ramsey County; *Jerry Zhao*, Associate Professor, Humphrey School of Public Affairs, University of Minnesota



Transportation Policy Innovation: LA Metro's Experience
Thursday, November 2, 2017: 11:45 a.m.–1:30 p.m.

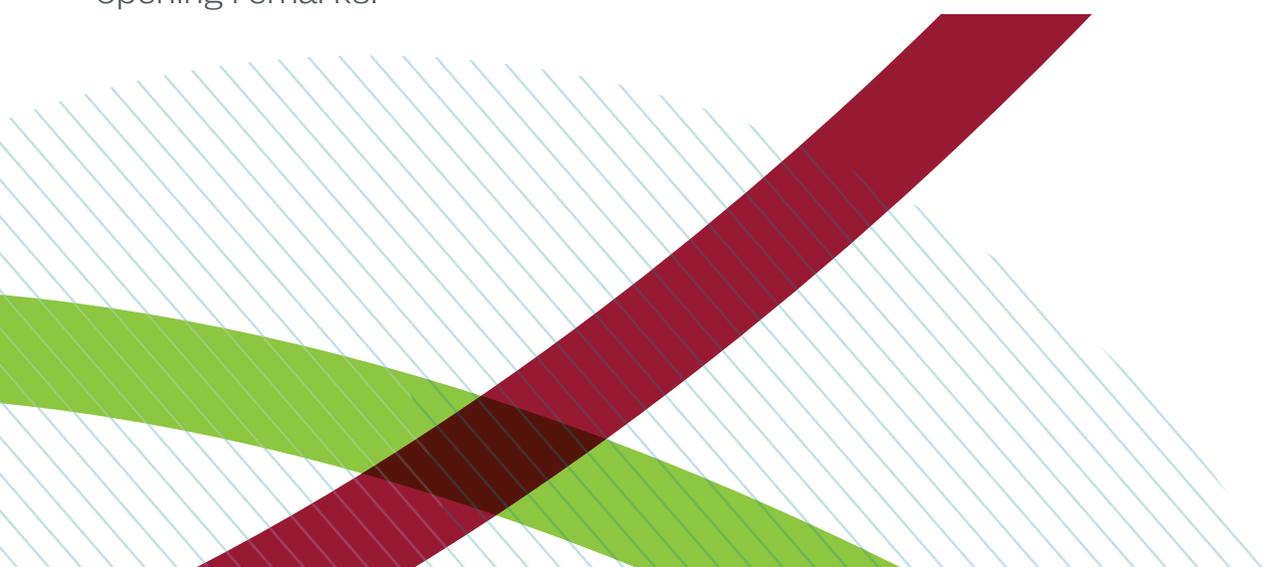
Joshua Schank, Chief Innovation Officer,
Los Angeles County Metropolitan Transportation Authority

In August 2015, the Los Angeles County Metropolitan Transportation Authority (LA Metro) embarked on an ambitious experiment. Could a new department with an extraordinary name bring about dramatic changes in transportation policy and innovation to a large government agency in a short period of time?

LA Metro's chief innovation officer, Joshua Schank, will describe the creation of the Office of Extraordinary Innovation (OEI), designed to manage public-private partnerships (P3) and strategic planning for the agency. For P3s, this included overseeing a new unsolicited proposal process designed to encourage private-sector ideas for delivering LA Metro projects and services. OEI was also charged with developing the Metro Strategic Plan, which would clearly define the mission, vision, and goals for the agency and create a culture of innovation.

Schank's presentation will look back on the successes and failures of the first two years of this experiment in transportation policy innovation at LA Metro and explore the path forward. This will include a discussion of the challenges faced—including fierce resistance to innovative approaches and intense demands on OEI to deliver quickly—as well as the new ideas brought to the agency.

Minnesota Department of Transportation Commissioner Charles Zelle will offer opening remarks.



Program at a Glance

Thursday, November 2, 2017

7:30–8:30 a.m.	Registration and Buffet Breakfast (Meridian Foyer)			
8:30–10:15 a.m.	Welcome (Meridian Ballroom) <i>Laurie McGinnis</i> , Director, Center for Transportation Studies, University of Minnesota Keynote Presentation—How We Pay for Transportation Infrastructure: What’s the Value Proposition? Speaker <i>Joung Lee</i> , Policy Director, American Association of State Highway and Transportation Officials Panelists <i>Tracy Hatch</i> , Deputy Commissioner, MnDOT <i>Jeffrey Heilstedt</i> , Vice-President, Transportation Regional Business Line Leader, Midwest Region, AECOM <i>Jim McDonough</i> , Commissioner, Ramsey County <i>Jerry Zhao</i> , Associate Professor, Humphrey School of Public Affairs, University of Minnesota			
10:15–10:30 a.m.	Break (Meridian Foyer)			
10:30–11:45 a.m.	Concurrent Sessions			
	1 Issues in Multimodal Travel Behavior and Accessibility Summit Room	2 Engaging the Public and Stakeholders on Transportation Issues Think 5	3 Maximizing the Efficiency of Minnesota’s Freight Network Think 4	4 Opportunities and Innovations from the Sharing Economy Pathways Room
11:45 a.m.–1:30 p.m.	Luncheon and Presentation (Meridian Ballroom) Opening Comments <i>Charles Zelle</i> , Commissioner, MnDOT Keynote Presentation—Transportation Policy Innovation: LA Metro’s Experience Speaker <i>Joshua Schank</i> , Chief Innovation Officer, Los Angeles County Metropolitan Transportation Authority			
1:30–1:45 p.m.	Break (Meridian Foyer)			
1:45–3:00 p.m.	Concurrent Sessions			
	5 Transportation Innovation in Minnesota: Panel Discussion Pathways Room	6 Roadsides and Pollinators Think 4	7 Technologies for Making Work Zones Safer Think 5	8 Bike Shares, Multimodal Parks, and Self-Driving Vehicles: Who Is Being Left Out? Summit Room
3:00–3:15 p.m.	Break (Meridian Foyer)			
3:15–4:30 p.m.	Concurrent Sessions			
	9 Transportation Funding: Planning, Distribution, and Value Pathways Room	10 Design and Maintenance of Transportation Infrastructure in Minnesota Think 4	11 Trends in Transit Ridership Behavior Summit Room	12 Roadway Safety Now and Into the Future Think 5
4:30–5:30 p.m.	Reception with Hors d’Oeuvres and Cash Bar (Meridian Foyer)			

Program Schedule

Thursday, November 2, 2017

7:30–8:30 a.m.	Registration and Buffet Breakfast (Meridian Foyer)
8:30–10:15 a.m.	Welcome (Meridian Ballroom) <i>Laurie McGinnis, Director, Center for Transportation Studies, University of Minnesota</i>
Keynote Presentation—How We Pay for Transportation Infrastructure: What's the Value Proposition?	
<p>Speaker <i>Joung Lee, Policy Director, American Association of State Highway and Transportation Officials (AASHTO)</i></p> <p>Panelists <i>Tracy Hatch, Deputy Commissioner, MnDOT; Jeffrey Heilstedt, Vice-President, Transportation Regional Business Line Leader, Midwest Region, AECOM; Jim McDonough, Commissioner, Ramsey County; Jerry Zhao, Associate Professor, Humphrey School of Public Affairs, University of Minnesota</i></p>	<p>The public generally supports investing in transportation infrastructure, yet it fiercely opposes increases in user fees or taxes to support this investment. The opaqueness of transportation revenue mechanisms like the gas tax makes it difficult for the traveling public to easily discern how much they pay for infrastructure and what value they derive from it.</p> <p>In the conference opening session, Joung Lee, policy director at the American Association of State Highway and Transportation Officials, will examine the latest direction in infrastructure funding at the federal level. He will also offer examples of innovation happening in states all around the country and discuss policy and political considerations when they come to transportation revenue and financing tools.</p> <p>Following Lee's presentation, a panel of Minnesota leaders and experts will share their perspectives on transportation infrastructure funding.</p>
10:15–10:30 a.m.	Break (Meridian Foyer)
10:30–11:45 a.m.	Concurrent Sessions
1	Issues in Multimodal Travel Behavior and Accessibility (Summit Room) <p>Moderator <i>Jim Henricksen, MnDOT</i></p> <p>Time Series Data Clustering of Minnesota Bike Sharing System and Operation Strategy <i>Yufeng Zhang, Department of Civil, Environmental, and Geo-Engineering, University of Minnesota</i></p> <p>Intraurban Accessibility and Employment Density: Evidence from the Twin Cities <i>Michael Iacono, MnDOT</i></p> <p>Evaluating Transit Route Choice in the Twin Cities <i>Jacqueline Nowak, Department of Civil, Environmental, and Geo-Engineering, University of Minnesota</i></p> <p>Full-Day Accessibility Evaluation of Transit Systems Using GPS-Based Location Data <i>Ying Song, Department of Geography, Environment, and Society, University of Minnesota</i></p>
2	Engaging the Public and Stakeholders on Transportation Issues (Think 5) <p>Moderator <i>Steve Gentry, Metropolitan Airports Commission</i></p> <p>Status of and Strategies for Social Media Use in Minnesota's Transportation Planning and Policy <i>Ingrid Schneider and Melissa Peck, Department of Forest Resources, University of Minnesota</i></p> <p>Addressing Citizens' Requests for Traffic Safety Solutions <i>Rena Kuehl, SRF Consulting Group; Mark Ray, City of Crystal</i></p> <p>More than a Bridge: The Challenges in Developing an International Border Crossing Project <i>Dale Grove, Stantec</i></p>

3

Maximizing the Efficiency of Minnesota's Freight Network (Think 4)

Moderator *Matt Schmit*,
Humphrey School of Public
Affairs, University of Minnesota

Connecting Small and Medium-Sized Farms to Wholesale Markets Through Backhauling from Rural Grocery Stores

Naomi Olive, Regional Sustainable Development Partnerships,
University of Minnesota; *Duke Harrison*, Mason Brothers
Wholesale Grocery

Evolving Supply Chains and Local Commodity Flows: A GIS Road Network Analysis of Minnesota Cereal Grain Movement

Travis Fried, Humphrey School of Public Affairs,
University of Minnesota

Components of an Attractive Minnesota Freight Market

Matt Schmit, Humphrey School of Public Affairs,
University of Minnesota

4

Opportunities and Innovations from the Sharing Economy (Pathways Room)

Moderator *Saif Benjaafar*,
Department of Industrial
and Systems Engineering,
University of Minnesota

Do New Bike Share Stations Increase Member Use: A Quasi-Experimental Study and Spatial-Temporal Models of Bike Share Trips in the Twin Cities

Jueyu Wang, Humphrey School of Public Affairs,
University of Minnesota

Shared Rides for Everyone: Transportation Network Companies (TNCs) at MSP Airport

Atif Saeed, Metropolitan Airports Commission

Considering a User-Based Fee that Funds Infrastructure in the Sharing Economy

Chris Berrens, MnDOT

Keynote Presentation—Transportation Policy Innovation: LA Metro's Experience

Opening Comments *Charles Zelle*,
Commissioner, MnDOT

Speaker *Joshua Schank*,
Chief Innovation Officer,
Los Angeles County
Metropolitan Transportation
Authority

In August 2015, the Los Angeles County Metropolitan Transportation Authority (LA Metro) embarked on an ambitious experiment. Could a new department with an extraordinary name bring about dramatic changes in transportation policy and innovation to a large government agency in a short period of time?

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5

Transportation Innovation in Minnesota: Panel Discussion (Pathways Room)

Moderator *Gina Baas*, Center for Transportation Studies, University of Minnesota

Panelists *Frank Douma*, Humphrey School of Public Affairs, University of Minnesota; *Jenifer Hager*, City of Minneapolis; *John Levin*, Metro Transit; *Brendan Murphy*, Accessibility Observatory, Center for Transportation Studies, University of Minnesota

This session will build on the theme of innovation presented during the luncheon keynote. Panelists will offer their insights on how innovative technologies and policy approaches may impact the transportation network, now and in the future. Audience members will be encouraged to ask questions and offer their own ideas as well.

6

Roadsides and Pollinators (Think 4)

Moderator *Tim Sexton*, MnDOT

Importance and Concerns of Roadsides for Pollinators

Daniel Cariveau, Department of Entomology, University of Minnesota

MnDOT's Roadside Management Practices

Tina Markeson, MnDOT

7

Technologies for Making Work Zones Safer (Think 5)

Moderator *Nichole Morris*, HumanFIRST Laboratory, University of Minnesota

Development of a Work Zone Intrusion Reporting System

Curtis Craig, HumanFIRST Laboratory, University of Minnesota

Mitigating Risk in Work Zones: Informing Drivers Using In-Vehicle Technology

Jacob Achtemeier, HumanFIRST Laboratory, University of Minnesota

Using Bluetooth Low-Energy Technology to Trigger In-Vehicle Messages at Work Zones

Chen-Fu Liao, Department of Civil, Environmental, and Geo-Engineering, University of Minnesota

8

Bike Shares, Multimodal Parks, and Self-Driving Vehicles: Who Is Being Left Out? (Summit Room)

Moderator *Virajita Singh*, Equity and Diversity/College of Design, University of Minnesota

Equity Analysis of Access to Bike Share: A Case Study in Twin Cities, MN

Jueyu Wang, Humphrey School of Public Affairs, University of Minnesota

Equity Implications of Multimodal Park Access in the Twin Cities

Jacqueline Nowak and Kristin Carlson, Department of Civil, Environmental, and Geo-Engineering, University of Minnesota

Equity Considerations in the Deployment and Design of Self-Driving Vehicles

Adeel Lari, Humphrey School of Public Affairs, University of Minnesota

9

Transportation Funding: Planning, Distribution, and Value (Pathways Room)

Moderator *Mark Nelson,*
MnDOT

ABC Ramps Transportation Operations Study

Lisa Austin, MnDOT; Kevin Karner, Humphrey School of Public Affairs, University of Minnesota

Minnesota Transportation Funding Redistribution

Jerry Zhao, Humphrey School of Public Affairs, University of Minnesota

Estimating the Economic Value of Bicycling in Minnesota

Xinyi Qian, Tourism Center, University of Minnesota

Enhancing Return on Investment for MnPASS

Paul Morris, SRF Consulting Group; Brad Larson, MnDOT

10

Design and Maintenance of Transportation Infrastructure in Minnesota (Think 4)

Moderator *Al Forsberg,*
Blue Earth County (retired)

Design of Structure Service Life

Kevin MacDonald, Beton Consulting Engineers

Base Stabilization Additives for Pavement Design

Rena Kuehl, SRF Consulting Group; Dan Wegman, Braun Intertec

Planning for Better Bikeway Maintenance

Jordan Kocak, Hennepin County; Shaun Lopez Murphy, Toole Design Group

11

Trends in Transit Ridership Behavior (Summit Room)

Moderator *Jonathan Ehrlich,*
Metropolitan Council

Findings from the 2016 Transit Onboard Survey

Jonathan Ehrlich, Metropolitan Council

Analyzing U-Pass Ridership Trends

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

The Impact of Weather and Socioeconomic Factors on Transit Ridership

Christopher Cheong and Pramesh Kumar, Department of Civil, Environmental, and Geo-Engineering, University of Minnesota

Using the Three-Factor Theory to Examine the Transit Preferences of Riders from Different Income Levels

Xinyi Wu, Humphrey School of Public Affairs, University of Minnesota

12

Roadway Safety Now and Into the Future (Think 5)

Moderator *Tom Sohrweide,*
SEH Inc.

Examining the Relationship Between Speed Enforcement Laws and Traffic Safety

Frank Alarcon, Humphrey School of Public Affairs, University of Minnesota

The Effectiveness of an Intelligent Rural Intersection Conflict Warning System in Promoting Drivers' Gap Acceptance and Safety at Rural Thru-Stop Controlled Intersections

Disi Tian, HumanFIRST Laboratory, University of Minnesota

Safety Study of the I-35W Improvements Done Under Minnesota's Urban Partnership Agreement (UPA) Project

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

What Makes Autonomous Vehicles Testable? Unified Framework for Nonphysical Safety Testing

Edward Schwalb, MSC Software

The
COMMONS
HOTEL

MEZZANINE LEVEL ROOMS



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