



# Annual CTS TRANSPORTATION RESEARCH CONFERENCE

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## FINAL PROGRAM

**November 3, 2022**

Graduate Minneapolis Hotel  
University of Minnesota East Bank Campus  
Minneapolis, MN

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



CENTER FOR  
TRANSPORTATION STUDIES  
UNIVERSITY OF MINNESOTA

# General Information

## Credits

This conference awards up to 7.25 Professional Development Hours (PDHs) and 7.25 American Institute of Certified Planners (AICP) certification maintenance credits.

Credit forms are available at the registration desk or online at [cts.umn.edu/events/conference/2022](https://cts.umn.edu/events/conference/2022).

## Reception

A reception will be held in the Pinnacle Foyer following the final concurrent sessions at 4:30 p.m. Join us for hors d'oeuvres, a cash bar, and the opportunity to socialize with fellow participants and presenters.

## Wi-Fi

Network: Graduate Meetings

Password: graduate

## Social Media

 To participate in social media conversations around this year's CTS Research Conference, please add the hashtag **#ctsresconf** to your tweets.

 For the latest news and events from the Center for Transportation Studies, follow us on Twitter at **@UMNCTS** and on LinkedIn at [linkedin.com/company/ctsumn](https://linkedin.com/company/ctsumn).

## Conference Planning Committee

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### *Erik Rudeen*

Minnesota Department  
of Transportation

### *Raul Velasquez*

Minnesota Department  
of Transportation

### *Joe Gustafson*

Washington County

## Keynote Speakers



### Opening Session: Peter Norton

Peter Norton is an associate professor of history in the Department of Engineering and Society at the University of Virginia. He has also been a visiting faculty member at the Technical University of Eindhoven in the Netherlands and is a member of the University of Virginia's Center for Transportation Studies.

Norton is the author of *Fighting Traffic: The Dawn of the Motor Age in the American City* (MIT Press), and of *Autonorama: The Illusory Promise of High-Tech Driving* (Island Press, 2021). He is a winner of the Abbott Payson Usher Prize of the Society for the History of Technology and a frequent speaker on the subject of sustainable and equitable urban mobility.



### Luncheon Session: Shelley Francis

Dr. Shelley Francis, a former medical school faculty member, is a public health executive, tech entrepreneur, and transportation disruptor. Dr. Francis is the co-founder and managing partner at EVNoire, a tech company focused on electric, connected, shared, and autonomous e-mobility solutions. EVNoire's work focuses on two pillars: e-mobility best practice and e-mobility diversity, equity, and inclusion.

Dr. Francis's vision led to the co-founding of the nation's largest network of diverse electric vehicle drivers and enthusiasts, EVHybridNoire, a 501(c)3 nonprofit with thousands of members and chapters across the United States, Canada, Europe, Asia, Africa, and the Caribbean.

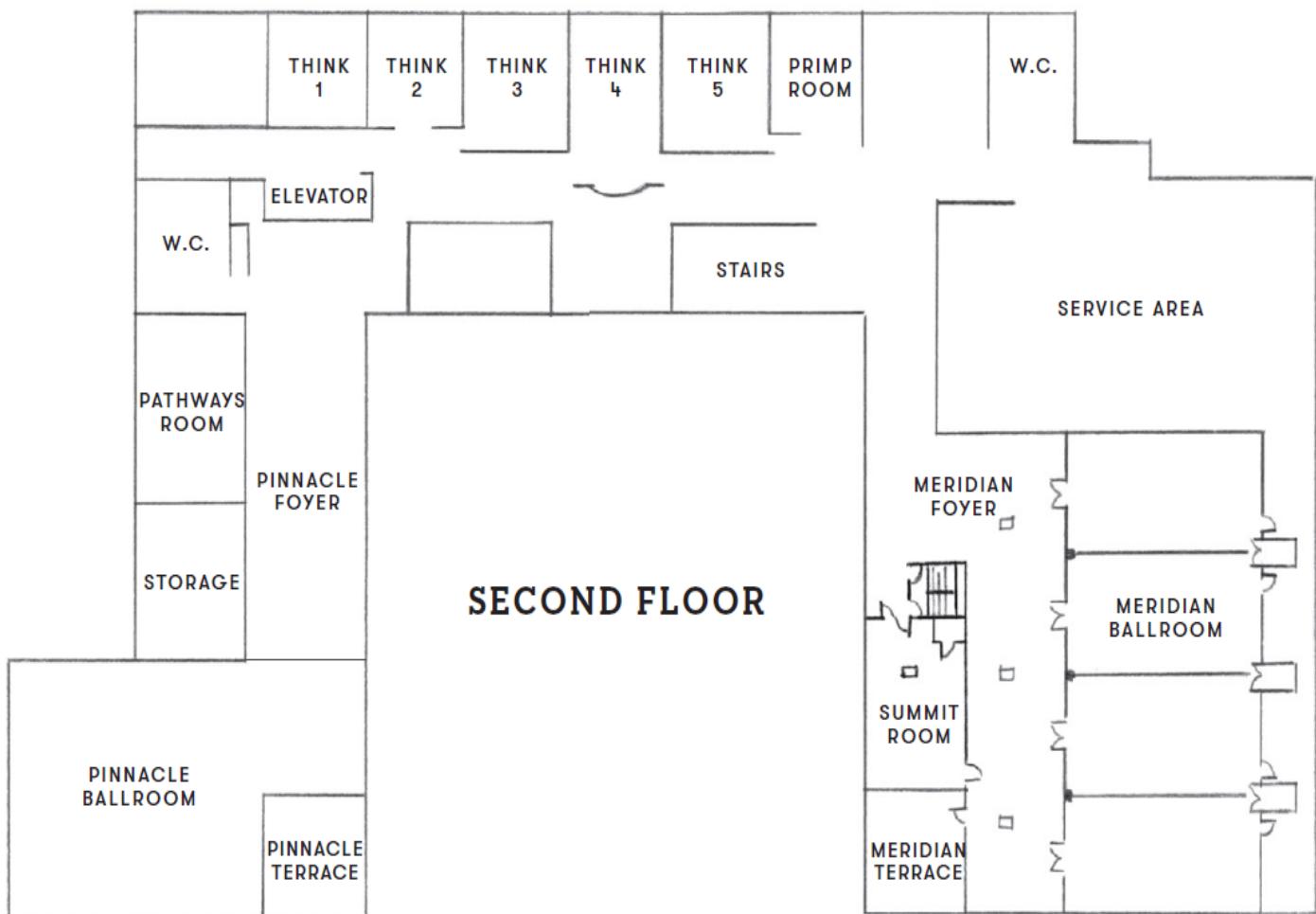
Dr. Francis is frequently sought out for her expertise in e-mobility and the public health impacts of transportation emissions. She has advised leadership at the Department of Transportation, Department of Energy, Environmental Protection Agency, and the White House. Dr. Francis currently serves as a national board director for the Electric Vehicle Association and as a board member for the University of Richmond's Alumni Association.

# Program at a Glance

Thursday, November 3, 2022

7:30–8:30 a.m.	<b>Registration and Buffet Breakfast</b> (Meridian Foyer)
8:30–10:15 a.m.	<b>Welcome</b> (Meridian Ballroom) <i>Kyle Shelton</i> , Director, Center for Transportation Studies, University of Minnesota <b>Keynote Presentation and Panel Discussion: The Transport Transformation Can't Wait for Technofuturistic Utopia</b> <b>Speaker</b> <i>Peter Norton</i> , Associate Professor of History, Department of Engineering and Society, University of Virginia <b>Panelists</b> <i>Ginny Crowson</i> , Connected and Automated Vehicles Director, MnDOT; <i>Thomas Fisher</i> , Director, Minnesota Design Center, University of Minnesota; <i>Marc Valencia</i> , Vice President of Public Engagement and Communications, NewPublica
10:15–10:30 a.m.	<b>Break</b> (Meridian Foyer)
10:30–11:45 a.m.	<b>Concurrent Sessions</b> 1 Winter Weather Technologies <i>Think 5</i> 2 Cutting-Edge Planning Strategies for a Modern World <i>Think 4</i> 3 Environmental Resilience in Transportation <i>Summit Room</i> 4 Tools for Increasing Engagement and Information Sharing <i>Pinnacle Ballroom</i>
11:45 a.m.–1:30 p.m.	<b>Luncheon and Presentation: Equity and Electrification</b> (Meridian Ballroom) <b>Opening Comments</b> <i>Jean Wallace</i> , Deputy Commissioner and Chief Engineer (Interim), MnDOT <b>Speaker</b> <i>Shelley Francis</i> , Co-Founder and Managing Partner, EVNoire and EVHybridNoire
1:30–1:45 p.m.	<b>Break</b> (Meridian Foyer)
1:45–3:00 p.m.	<b>Concurrent Sessions</b> 5 Understanding Driver Behavior <i>Summit Room</i> 6 Transportation Infrastructure <i>Think 5</i> 7 Intersections of Transportation and the Economy <i>Think 4</i> 8 Understanding Travel During and After COVID-19 <i>Pinnacle Ballroom</i>
3:00–3:15 p.m.	<b>Break</b> (Meridian Foyer)
3:15–4:30 p.m.	<b>Concurrent Sessions</b> 9 Advancing and Measuring Equity <i>Think 4</i> 10 Transportation and Wildlife <i>Think 5</i> 11 Technology and Traffic Flow <i>Summit Room</i> 12 Data Dive Into Bike, Scooter, and Pedestrian Travel <i>Pinnacle Ballroom</i>
4:30–5:30 p.m.	<b>Reception with Hors d'Oeuvres and Cash Bar</b> (Pinnacle Foyer)

# Graduate Minneapolis Hotel Floorplan



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## Concurrent Session Evaluations

Help us improve the conference by giving us your feedback!

Please scan the QR code and fill out an evaluation for each of the concurrent sessions you attend.

# Program Schedule

Thursday, November 3, 2022

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**7:30-8:30 a.m.** **Registration and Buffet Breakfast** (Meridian Foyer)

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**8:30-10:15 a.m.** **Welcome** (Meridian Ballroom)  
*Kyle Shelton, Director, Center for Transportation Studies, University of Minnesota*

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## **Keynote Presentation and Panel Discussion: The Transport Transformation Can't Wait for Technofuturistic Utopia**

### **Speaker**

*Peter Norton, Associate Professor of History, Department of Engineering and Society, University of Virginia*

### **Panelists**

*Ginny Crowson, Connected and Automated Vehicles Director, MnDOT*

*Thomas Fisher, Director, Minnesota Design Center, University of Minnesota*

*Marc Valencia, Vice President of Public Engagement and Communications, NewPublica*

"Pay no attention to the man behind the curtain," the Wizard of Oz told the adventurers. The Wizard feared they would discover his deception. This, according to Peter Norton, is our dilemma. We have all the technology we need for the transport transformation, but tech companies, automakers, and others want to convince us that we need unlimited futuristic tech. For 90 years, they have been selling us impossible futures, always on the promise that amazing technology will finally deliver a city in which everyone can drive anywhere at any time without delay. When the promises fail, they invoke the next generation of amazing technology to restore their lost credibility. But amazing technology does not make car dependency work. The promoters' goal has never been transport sufficiency; they sell transport consumerism.

In this presentation, Norton will pull back the curtain, expose the high-tech distraction, and demonstrate that we already have everything we need for the affordable, healthful, inclusive, and sustainable transport future we seek.

Following the presentation, Minnesota experts on connected and automated vehicles will discuss Norton's ideas and explore how academic researchers, agencies, and industry partners can work together to build effective, safe, and innovative transportation technologies.

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**10:15-10:30 a.m.** **Break** (Meridian Foyer)

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**10:30-11:45 a.m.** **Concurrent Sessions**

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### **Winter Weather Technologies** (Think 5)

**Moderator:** *Beth Engum, Bolton & Menk*

#### **The Need for Low-Salt Design**

Presenter: *Connie Fortin, Bolton & Menk*

#### **Integrating Technologies in Winter Maintenance Activities to Support End-to-End Process Improvements**

Presenter: *Ben Zietlow, Quetica Consulting*

#### **Improving Winter Road Weather Alerts on Highway Dynamic Message Signs**

Presenter: *Brian Kary, MnDOT*

Additional authors: *Skylar Knickerbocker, Institute for Transportation, Iowa State University; Garrett Schreiner, MnDOT*



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## Cutting-Edge Planning Strategies for a Modern World (Think 4)

**Moderator:** Mary Karlsson, Isthmus Engineering

### Understanding Post-COVID Safety Concerns Toward the Use of Shared Mobility in Greater Minnesota

Presenter: *Xinyi Qian*, Tourism Center, University of Minnesota Extension

Additional authors: *Neil Linscheid*, University of Minnesota Extension; *Galen Ryan* and *Yingling Fan*, Humphrey School of Public Affairs, University of Minnesota

### Maximizing Transportation Assets by Building Community Connection Through Innovative Development of Rights of Way and Airspace

Presenter: *Frank Douma*, Humphrey School of Public Affairs, University of Minnesota

Additional authors: *Maya Sheikh*, Humphrey School of Public Affairs and School of Public Health, University of Minnesota; *Hannah Rank*, *Lisa Austin*, and *Cyrus Knutson*, MnDOT

### Comprehensive Equity and Performance Metrics for Bus Priority Projects

Presenter: *Joseph Reid*, Metro Transit

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## Environmental Resilience in Transportation (Summit Room)

**Moderator:** Katie Kowalczyk, City of Minneapolis

### Using Noise Barriers and Snow Fencing to Capture Solar Energy

Presenter: *Mijia Yang*, Department of Civil, Construction and Environmental Engineering, North Dakota State University

Additional authors: *Yao Yu*, Department of Civil, Construction and Environmental Engineering, North Dakota State University; *Dan Gullickson*, MnDOT

### Adapting Stormwater Infrastructure in the Face of Climate Change

Presenter: *Noah Gallagher*, Department of Civil, Environmental, and Geo- Engineering, University of Minnesota

Additional authors: *John Gulliver*, *Andrew Erickson*, and *William Herb*, St. Anthony Falls Laboratory, University of Minnesota; *Bruce Wilson*, Department of Bioproducts and Biosystems Engineering, University of Minnesota; *Peter Weiss*, College of Engineering, Valparaiso University

### Impact of Snow Depth on Fuel Economy of Snow Maintenance Vehicles

Presenter: *Dinesh Reddy Challa*, Data Science Program, University of Minnesota

Additional authors: *Matthew Eagon*, *Peter Wringa*, and *William Northrop*, Department of Mechanical Engineering, University of Minnesota

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## Tools for Increasing Engagement and Information Sharing (Pinnacle Ballroom)

**Moderator:** John Rodeberg, SEH

### Rethinking Continuing Education for Public Works and Maintenance Staff

Presenter: *Ann Johnson*, PE Services

### Up Your Social Media Game with Tips from Minnesota Transportation Agencies

Presenter: *Tom Holmes*, Zan Associates

### Tools to Expand the Transportation Workforce in Local Agencies

Presenter: *Stephanie Malinoff*, Center for Transportation Studies, University of Minnesota

### Communicating Freight Data Through Interactive Maps and Dashboard Tools

Presenter: *Chris Ryan*, HDR

Additional author: *Michael Corbett*, MnDOT

11:45 a.m.-1:30 p.m.

## Luncheon and Presentation: Equity and Electrification (Meridian Ballroom)

### Opening Comments

Jean Wallace, Deputy Commissioner and Chief Engineer (Interim), MnDOT

### Speaker

Shelley Francis, Co-Founder and Managing Partner, EVNoire and EVHybridNoire

This year is one of the most transformational moments in history for the electrification sector. With the convergence of the Infrastructure Investment and Jobs Act, the Inflation Reduction Act, infrastructure deployment, workforce and economic development opportunities, and rebate and incentive programs, we have to ask ourselves: What will electrification look like in five years? As we speed toward electrifying all transportation sectors, how can we leverage electrification best practices and diversity, equity, and inclusion considerations to ensure that our approach is accessible to all consumers?

In this presentation, Shelley Francis will examine the historical context of transportation policy and explore how it impacts current transportation, movement, and public health. She will also share electrification best practices from research and case studies using data-driven mobility frameworks.

1:30-1:45 p.m.

## Break (Meridian Foyer)

1:45-3:00 p.m.

## Concurrent Sessions

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### Understanding Driver Behavior (Summit Room)

**Moderator:** Joe Gustafson, Washington County

#### Modeling Driver Yielding Behavior at Unsignalized Intersections

Presenter: *Raphael Stern*, Department of Civil, Environmental, and Geo- Engineering, University of Minnesota  
Additional author: *Tianyi Li*, Department of Civil, Environmental, and Geo- Engineering, University of Minnesota

#### Understanding the Nature of Police Pursuits Using a Mixed-Methods Approach

Presenter: *Sam Jacobs*, HumanFIRST Laboratory, Department of Mechanical Engineering, University of Minnesota  
Additional authors: *Nichole Morris* and *Curtis Craig*, HumanFIRST Laboratory, Department of Mechanical Engineering, University of Minnesota; *Andrew Ryan*, School of Public Health, University of Minnesota

#### Can Place of Last Drink (POLD) Reduce Alcohol-Related Traffic Crashes?

Presenter: *Traci Toomey*, School of Public Health, University of Minnesota

Additional authors: *Daniel Schriemer*, *Kathleen Lenk*, *Richard MacLennan*, *Toben Nelson*, and *Eileen Delehanty*, School of Public Health, University of Minnesota; *Linda Bosma*, Bosma Consulting; *Kari Glappan*, Minnesota Department of Health

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### Transportation Infrastructure (Think 5)

**Moderator:** Kristy Morter, Hennepin County

#### Highlights of National Road Research Alliance Geotechnical Research

Presenter: *Raul Velasquez*, MnDOT

Additional authors: *Bora Cetin*, Michigan State University; *Majid Ghayoomi*, University of New Hampshire; *Soheil Nazarian*, University of Texas at El Paso

#### Deployment of Drone Fleet and Manual for MnDOT Bridge Inspections

Presenter: *Jennifer Wells*, MnDOT

Additional author: *Barritt Lovelace*, Collins Engineers

#### Toward the Development of Pavement-Specific Structural Synthetic Fibers

Presenter: *Pranav Sharma*, Department of Civil Engineering, University of Minnesota Duluth

Additional author: *Manik Barman*, Department of Civil Engineering, University of Minnesota Duluth

#### Load-Rating Assessment of Three Slab-Span Bridges

Presenter: *Kendall Hill*, Department of Civil Engineering, University of Minnesota Duluth



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## Intersections of Transportation and the Economy (Think 4)

**Moderator:** Paul Morris, SRF Consulting Group

### Assessing the Economic Effects of Context-Sensitive Main Street Highways in Small Cities

Presenter: Robin Phinney, Humphrey School of Public Affairs, University of Minnesota

Additional authors: Camila Fonseca-Sarmiento and Raihana Zeerak, Humphrey School of Public Affairs, University of Minnesota; Jerry Zhao, Zhejiang University

### The Impacts of Deferred Maintenance in Minnesota

Presenter: Camila Fonseca-Sarmiento, Humphrey School of Public Affairs, University of Minnesota

Additional authors: Raihana Zeerak and Haiyue Jiang, Humphrey School of Public Affairs, University of Minnesota; Jerry Zhao, Zhejiang University

### Setting Up for Success: A New Strategy for Enhancing Highway Preservation Investments

Presenter: Michael Corbett, MnDOT

Additional author: Paul Morris, SRF Consulting Group

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## Understanding Travel During and After COVID-19 (Pinnacle Ballroom)

**Moderator:** Lisa Austin, MnDOT

### Telecommuting During and After COVID-19: Comparing Employers' and Workers' Experiences

Presenter: Xinyi Qian, Tourism Center, University of Minnesota Extension

Additional authors: Neil Linscheid, Center for Community Vitality, University of Minnesota Extension; Duane Hill, MnDOT

### Transit in the COVID-19 Era: Early Results from the 2021–2022 Twin Cities On-Board Survey

Presenter: Ashley Asmus, Metropolitan Council

Additional authors: Eric Lind, Metro Transit; Fred G'sell, ETC Institute; Jonathan Ehrlich, Metropolitan Council

### Scheduling Efficiency and Operator Satisfaction in a COVID-19 World

Presenter: Mark Patzloff, Metropolitan Council

Additional author: Flavie Gagnon-Pontbriand, GIRO, Inc.

3:00–3:15 p.m.

### Break (Meridian Foyer)

3:15–4:30 p.m.

### Concurrent Sessions

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## Advancing and Measuring Equity (Think 4)

**Moderator:** Danielle Walchuk, MnDOT

### Equity-First Performance Measures

Presenter: Zachary Elgart, Texas A&M Transportation Institute

Additional authors: Ipek Sener, Todd Hansen, James Cardenas, Lisa Minjares-Kyle, and Ben Ettelman, Texas A&M Transportation Institute

### Telecommuting, Travel Behavior, and Equity

Presenter: Kribashini Narayana Moorthy, Transportation Policy and Economic Competitiveness Program, University of Minnesota

Additional authors: Frank Douma, Adeel Lari, and Maya Sheikh, Humphrey School of Public Affairs, University of Minnesota

### Advancing Equity in Accessibility and Travel Experiences: The Role of Gender and Identity

Presenter: Ying Song, Department of Geography, Environment, and Society, University of Minnesota

Additional authors: Yaxuan Zhang, Department of Geography, Environment, and Society, University of Minnesota; Yingling Fan and Ania McDonnell, Humphrey School of Public Affairs, University of Minnesota; Hally Turner, MnDOT

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## Transportation and Wildlife (Think 5)

**Moderator:** Nicole Bartelt, MnDOT

### Use of Ultrasonic Technology to Deter Bat Bridge Use During Bridge Repair

Presenter: Basak Betkas, Civil Engineering, Minnesota State University, Mankato

Additional authors: Julie Blanchong, Department of Natural Resource Ecology and Management, Iowa State University; Katelyn Freeseman and Ahmed Albughdadi, Institute for Transportation, Iowa State University

### Identifying Deer-Vehicle Collision Concentrations in Minnesota

Presenter: Arian Zare, Department of Civil, Environmental, and Geo- Engineering, University of Minnesota

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

### Roadside Revegetation with Native Plants: Establishment of Plants and Support of Pollinators

Presenter: Emilie Snell-Rood, Department of Ecology, Evolution, and Behavior, University of Minnesota

Additional authors: Tim Mitchell and Ashley Darst, Department of Ecology, Evolution and Behavior, University of Minnesota; Dan Cariveau and Elaine Evans, Department of Entomology, University of Minnesota; Michael Verhoeven, Graduate Program in Conservation Sciences, University of Minnesota

### Designing for Fish Passage at Road-Stream Crossings in Minnesota: Maintaining Connectivity and Building Resiliency

Presenter: Jessica Kozarek, St. Anthony Falls Laboratory, University of Minnesota

Additional authors: William Herb, Matt Hernick, and Chris Lenhart, St. Anthony Falls Laboratory, University of Minnesota

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## Technology and Traffic Flow (Summit Room)

**Moderator:** Tony Fischer, Metropolitan Council

### A Modified Traffic Fundamental Diagram for the Mixed Autonomy Highway Traffic Flow

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

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

### Evaluation and Refinement of the Minnesota Queue Warning System

Presenter: John Hourdos, Department of Civil, Environmental, and Geo- Engineering, University of Minnesota

### Development of a Mobile Smartphone App for Work-Zone Intrusion Reporting

Presenter: Brian Davis, Department of Mechanical Engineering, University of Minnesota

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

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## Data Dive Into Bike, Scooter, and Pedestrian Travel (Pinnacle Ballroom)

**Moderator:** Hannah Pritchard, MnDOT

### Quality Assurance Methods for Hourly Level Bicycle and Pedestrian Automated Counter Data

Presenters: Sebastian Coll and Gustave Stewart, Humphrey School of Public Affairs, University of Minnesota

### Minneapolis Shared Bike and Scooter Data

Presenter: Danielle Elkins, City of Minneapolis

Additional authors: Tim Condon, Rick Paulsen, and Russ Brooks, City of Minneapolis

### Access Evaluation for Bike Planning in Cook County, Illinois

Presenter: Andrew Owen, Center for Transportation Studies, University of Minnesota

Additional authors: Peter Dirks, Cook County, Illinois; Shirley Shiqin Liu, Center for Transportation Studies, University of Minnesota

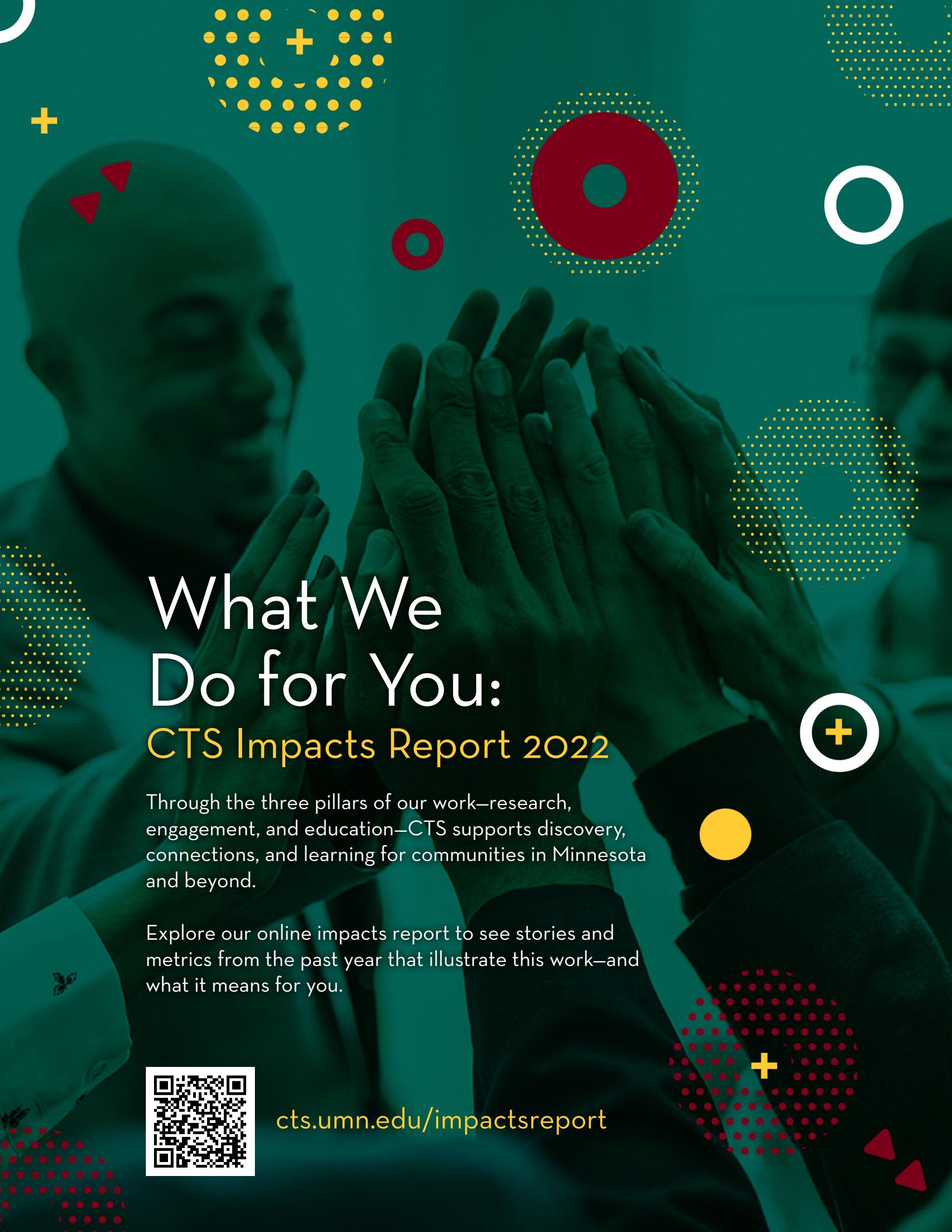
4:30–5:30 p.m.

## Reception with Hors d'Oeuvres and Cash Bar (Pinnacle Foyer)

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# What We Do for You: CTS Impacts Report 2022

Through the three pillars of our work—research, engagement, and education—CTS supports discovery, connections, and learning for communities in Minnesota and beyond.

Explore our online impacts report to see stories and metrics from the past year that illustrate this work—and what it means for you.



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



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