25th Annual Transportation Research Conference

FINAL PROGRAM

May 21-22, 2014
Saint Paul Rivercentre, Saint Paul Minnesota
About the Conference
The University of Minnesota’s Center for Transportation Studies is pleased to present its 25th Annual Transportation Research Conference, May 21-22, 2014. The conference will be held at the Saint Paul RiverCentre, 175 West Kellogg Boulevard, Saint Paul, Minnesota. The conference acts as a forum for researchers and practitioners from Minnesota and the Upper Midwest to share their research findings in a variety of transportation-related areas. Concurrent sessions are focused in four categories that match the Center’s research emphasis areas – Transportation Safety and Traffic Flow, Transportation Infrastructure, Transportation and the Economy, and Transportation Planning and the Environment – with a fifth category covering Education and Outreach Issues.

Who Should Attend
• Policymakers and practitioners from state, local, regional, and national government
• Private industry and nonprofit representatives
• Faculty, staff, and students from colleges and universities

The Center for Transportation Studies
The Center for Transportation Studies was established by the University of Minnesota in 1987 as a multidisciplinary research, education, and outreach center. The mission of the Center is to be a focal point for strengthening knowledge in transportation using multidisciplinary approaches that address transportation problems. The Center develops research, education, and outreach programs that create an interactive environment for University researchers and the transportation community. As a result of these programs, the Center improves transportation decision making and assists transportation officials in anticipating and preparing for significant national, regional, and state issues.
Extreme Weather: Trends, Projections, and Thoughts for Building Resilience

Joe Casola, staff scientist and program director, Center for Climate and Energy Solutions

Over the last decade, a number of significant weather events have resulted in significant costs, many of which stemmed from disruption or damage to transportation networks. In some cases (although not necessarily all), trends in the frequency or intensity of these events can be linked to longer-term changes in the climate. In all cases, the events demonstrate the vulnerabilities that are associated with our transportation infrastructure and services.

Casola will discuss strategies for building resilience and offer real-world examples from transportation managers and planners to illustrate some of the emerging best practices in resilience planning. Taking steps to manage vulnerabilities can be important opportunities for improving the condition of assets and services.

Featured Workshop: Transforming Communities Through Transitways

Thursday, May 22, 2014; 8:30 a.m.-12:00 p.m.

Research indicates transitways are improving mobility, spurring economic growth and development, and supporting equity. How can the lessons learned help build-out the rest of the network most effectively?

Landmark regional investments to create an expanded network of transitways have the potential to significantly change long-term land-use patterns and travel behavior. They also raise important questions for policymakers and elected officials regarding the potential return on investment:

• How are travel choices and mobility changing in the Twin Cities as a result of increased transit service and availability?
• What is the connection between transit accessibility and economic growth?
• How will transit investment influence the housing market, development patterns, and land values?
• Who benefits from increased transit accessibility?

Two featured sessions will showcase transitway research findings, highlight how these findings are being used by practitioners, and engage participants in a dynamic conversation about policy implications and next steps.

Free Wireless Internet Available

For Wi-Fi, select the MSE Hotspot network. A page will pop up to accept the terms of Rivercentre, then click agree.

Professional Development Hours (PDHs)

This conference awards 10.5 Professional Development Hours (PDHs).

AICP Maintenance Credits

25.25 AICP maintenance credits have been approved for the conference. In addition, 3.75 AICP maintenance credits have been applied for the conference. A full list of approved and applied for credits will be available on the CTS website and at the registration table at the conference.

Twitter!

To participate in Twitter conversations around this year’s Research Conference, please add the hashtag #ctsresconf to your tweets.

Planning Committee

Farideh Amiri, Minnesota Department of Transportation
Kirby Becker, Minnesota Department of Transportation
Lowell Benson
Lynn Bly, Minnesota Department of Transportation
Ken Buckeye, Minnesota Department of Transportation
Dave Christianson, Minnesota Department of Transportation
Biz Colburn
Janet Creaser, University of Minnesota
Frank Douma, University of Minnesota
Sara Dunlap, Minnesota Department of Transportation
Jonathan Ehrlich, Metropolitan Council
Brad Estochen, Minnesota Department of Transportation
Chris Hiniker, SEH, Inc.
Bruce Holdhausen, Minnesota Department of Transportation
Michael Iacono, University of Minnesota
Cory Johnson, Minnesota Department of Transportation
Connie Kozlak, Metropolitan Council
Brad Larsen, Minnesota Department of Transportation
ChenFu Liao, University of Minnesota
Kevin MacDonald
Mark Maloney, City of Shoreview
Jeff Marr, University of Minnesota
Kristi Morter, Hennepin County
Durga Panda
Carol Shield, University of Minnesota
Shirley Shirkow, Minnesota Department of Transportation
Fay Simer, Stantec
Tom Sohrweide, SEH, Inc.
John Tompkins, Minnesota Department of Transportation
Ben Worel, Minnesota Department of Transportation
Members and Friends of the Education and Outreach Council
## PROGRAM AT A GLANCE

### WEDNESDAY, MAY 21, 2014

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<th>Time</th>
<th>Session/Activity</th>
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<td>7:30-8:30 a.m.</td>
<td>Registration and Buffet Breakfast</td>
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| 8:30-10:15 a.m.    | Welcome – Laurie McGinnis, director, Center for Transportation Studies, University of Minnesota  
| Grand Ballrooms A-B| Keynote Presentation: The End of Car Culture? Socio-Demographic Trends and Travel Demand  
|                    | John Njord, Tom Warne and Associates, and former executive director, Utah Department of Transportation  |
| 10:15-10:30 a.m.   | Break                                                                            |
| 10:30-11:45 a.m.   | Session 1: Local Road Safety: Data Collection and Lessons Learned  
|                    | Session 2: Bridge Monitoring and Analysis                                         
|                    | Session 3: Freight's Impact on Roads and the Economy                              
|                    | Session 4: Transportation System Planning in the Twin Cities                      
|                    | Session 5: Developing Future Transportation Leaders                               |
| 11:45 a.m.-1:30 p.m.| Luncheon and Presentation  
| Grand Ballrooms A-B| Opening Comments - Eric Davis, chief of staff, Minnesota Department of Transportation  
|                    | Keynote Presentation: Extreme Weather: Trends, Projections, and Thoughts for Building Resilience  
|                    | Joe Casola, staff scientist and program director, Center for Climate and Energy Solutions  |
| 1:30-1:45 p.m.     | Break                                                                            |
| 1:45-3:00 p.m.     | Session 6: Intersection Safety Strategies                                        
|                    | Session 7: Building the Future on a Solid Foundation                             
|                    | Session 8: Understanding the Relationship Between Transportation and Economic Development  
|                    | Session 9: Bicycle and Pedestrian Travel in Minnesota                             
|                    | Session 10: Local Agencies and Stakeholder Engagement                              |
| 3:00-3:15 p.m.     | Break                                                                            |
| 3:15-4:30 p.m.     | Session 11: Freeway ITS: Get Max Smart, Max Safety, and Max Mobility            
|                    | Session 12: The Path to Better Pavements                                         
|                    | Session 13: Breathe Deep: Emissions and Alternatives to Fuels                     
|                    | Session 14: Twin Cities Transitways                                              
|                    | Session 15: Using Pooled Funds to Benefit Minnesota: Best Practices and Successful Examples  |
| 4:30-5:30 p.m.     | Reception with Hors d'oeuvres and Cash Bar                                       |

### THURSDAY, MAY 22, 2014

<table>
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<th>Time</th>
<th>Session/Activity</th>
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<td>8:00-8:30 a.m.</td>
<td>Continental Breakfast</td>
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| 8:30-10:15 a.m.    | Session 16: Watching out for Pedestrians and Teen Drivers                         
|                    | Session 17: Surface Water Management                                             
|                    | Session 18: Return on Investment for Transportation Projects                      
|                    | Session 19: Predicting and Measuring Transit Use                                  
|                    | Session 20: Technologies and Techniques for Public Engagement                     
|                    | Session 21: Part I: From Research to Practice, Transitway Impacts on the Twin Cities Region  |
| 10:15-10:30 a.m.   | Break                                                                            |
| 10:30 a.m.-12:00 p.m.| Session 22: Toward Zero Deaths Spotlight                                      
|                    | Session 23: Measuring Transportation Performance                                 
|                    | Session 24: Twin Cities Travel Behavior Inventory                                
|                    | Session 25: Part II: Policy Implications of Transforming Communities             |
| 12:00 p.m.         | Adjourn                                                                          |
The End of Car Culture? Socio-Demographic Trends and Travel Demand

John Njord, Tom Warne and Associates, and former executive director, Utah Department of Transportation

In the next 30 to 40 years, the transportation industry will face many challenges caused by new and emerging trends. These trends—in areas ranging from technology to climate change to the economy—will dramatically reshape transportation priorities and needs. To help practitioners face these changes and effectively shape the future, a National Cooperative Highway Research Program study (20-83) is investigating these emerging trends and their implications for the transportation system.

One of these trends—changing socio-demographic factors—is expected to considerably affect travel demand. Although America has long been one of the world’s prime car cultures, that status might be shifting because of new population and demographic trends. The graying and browning of America, slow household growth, and a hyperlinked younger generation are all playing a role in the need for vehicles.

John Njord, former executive director of the Utah Department of Transportation and now with Tom Warne and Associates, will discuss these key socio-demographic trends, their potential impacts on future travel demand, and their implications for state DOTs and MPOs. Following Njord’s presentation, a panel of experts will share their perspectives on these socio-demographic trends and their implications for transportation professionals.

1. Local Road Safety: Data Collection and Lessons Learned

Meeting Room 6

Moderator: Tom Sohrweide, SEH Inc.

Local Agency Traffic Data Collection
Scott Petersen, SRF Consulting Group, Inc.; Darin Mielke, Carver County

Evaluation Results of the Alert-2 Rural Intersection Conflict Warning System
Taek Kwon, Department of Electrical Engineering, University of Minnesota, Duluth

Minnesota’s County Roadway Safety Plans: Lessons Learned
Howard Preston, CH2M HILL, Inc.

2. Bridge Monitoring and Analysis

Meeting Room 5

Moderator: Ben Jilk, Minnesota Department of Transportation

Monitoring of Fracture-Critical Steel Bridges
Tony Tillman, Department of Civil Engineering, University of Minnesota

Anchorage of Shear Reinforcement in Prestressed Concrete Bridge Girders
Brian Mathys, Department of Civil Engineering, University of Minnesota

Development and Integration of Advanced Timber Bridge Inspection Techniques
Brian Brashaw, Natural Resources Research Institute, University of Minnesota, Duluth

3. Freight’s Impact on Roads and the Economy

Meeting Room 4

Moderator: Tim Spencer, Minnesota Department of Transportation

Understanding and Enhancing the Value of Freight Economy in Minnesota
Lee Mannich, Humphrey School of Public Affairs, University of Minnesota

Using Public Data and GIS to Facilitate Freight Facility Location Decisions: A Case Study from Grand Forks-East Grand Forks
William Boulay, Olsson Associates; Lance Bernard, SRF Consulting Group, Inc.

Frac Sand Mining Impacts
Dave Christianson, Minnesota Department of Transportation

4. Transportation System Planning in the Twin Cities

Meeting Room 3

Moderator: Chris Hiniker, SEH, Inc.

The Creation of a Performance-Based Transportation Plan
Mark Filipi, Metropolitan Council

Twin Cities Regional Bicycle System Master Study
Tony Hull, Toole Design Group; Steven Elmer, Metropolitan Council

Highway Transitway Corridor Study
Cole Hiniker, Metropolitan Council; Mona Elabaddy, SRF Consulting Group, Inc.

5. Developing Future Transportation Leaders

Meeting Room 2

Moderator: Ann Johnson, Department of Civil Engineering, University of Minnesota

WTS Transportation You
Lisa Rasmussen, WTS Minnesota and Kimley-Horn & Associates

MnDOT Recruitment Programs: Phoenix, SEEDs, Graduate Engineer Sandy Caron, Minnesota Department of Transportation; Calahena Merrick, Minnesota Department of Transportation

Met Council Interns Panel Discussion
Todd Rowley, Metropolitan Council; Charles Carlson, Metro Transit; Ashley Ver Burg, Kimley-Horn & Associates; Pierce Canser, Metro Transit

6. Intersection Safety Strategies

Meeting Room 6

Moderator: Lowell Benson

Estimating the Crash Reduction and Vehicles Dynamics Effects of Flashing LED Stop Signs
Gary Davis, Department of Civil Engineering, University of Minnesota

Generating Time Space Diagram Using Event-Based Traffic Data
Jianfeng Zheng, Department of Civil Engineering, University of Minnesota

Update on the Chicago Region’s Interoperable Transit Signal Priority Program
Daryl Taavola, URS Corporation
7. Building the Future on a Solid Foundation
Meeting Room 5
Moderator: Ben Worel, Minnesota Department of Transportation
Lessons Learned During Geotechnical Research Deployment: How Organizations Encourage Implementation
Glen Engstrom, Minnesota Department of Transportation
Performance-Based Measurement of Optimum Moisture for Soil Compaction
Bradley Hansen, Department of Bioproducts and Biosystems Engineering, University of Minnesota
Current State of Intelligent Compaction Efforts in Minnesota
Rebecca Embacher, Minnesota Department of Transportation

8. Understanding the Relationship Between Transportation and Economic Development
Meeting Room 4
Moderator: Matt Shands, Minnesota Department of Transportation
Pilot Projects to Validate the Results of T-PICS
Matt Shands, Minnesota Department of Transportation
Manufacturers’ Perspectives on Minnesota’s Transportation System: A Pilot Study in Southwestern Minnesota
Donna Koren, Minnesota Department of Transportation
Mutual Causation in Highway Construction and Economic Development
Michael Iacono, Department of Civil Engineering, University of Minnesota

9. Bicycle and Pedestrian Travel in Minnesota
Meeting Room 3
Moderator: Greg Lindsey, Humphrey School of Public Affairs, University of Minnesota
Monitoring Bicycle and Pedestrian Traffic in Minnesota: A Status Report
Lisa Austin and Jasna Hadzic, Minnesota Department of Transportation
Methods for Measuring Regional Traffic
Trail Traffic: A Case Study of the Three Rivers Park District
Angela Laird, Humphrey School of Public Affairs, University of Minnesota
Day-of-Year Scaling Factors and Design Considerations for Non-motorized Traffic Monitoring Programs
Steve Hankey, Department of Civil Engineering, University of Minnesota

10. Local Agencies and Stakeholder Engagement
Meeting Room 2
Moderator: Emily Saunoi-Sandgren, Humphrey School of Public Affairs, University of Minnesota
Insights from Beltrami County
Bruce Hasbargen, Beltrami County
Insights from Dakota County
Brian Sorenson, Dakota County
Enhancing Local Road Systems Through Public Engagement: New Research Findings
Guillermo Narváez, and Emily Saunoi-Sandgren, Humphrey School of Public Affairs, University of Minnesota

11. Freeway ITS: Get Max Smart, Max Safety, and Max Mobility
Meeting Room 6
Moderator: Ray Starr, Minnesota Department of Transportation
Investigation of the Impact of a Variable Speed Limit System on Safety and Shockwave Generation Along I-94
Stephen Zitzow, Department of Civil Engineering, University of Minnesota
Using Naturalistic Driving Data to Characterize Driver Behavior in Freeway Shockwaves
Gary Davis, Department of Civil Engineering, University of Minnesota
An Examination of Safety and Mobility at Open v. Closed Access High Occupancy Toll Lane Facilities in Minnesota
John Hourdos, Department of Civil Engineering, University of Minnesota

12. The Path to Better Pavements
Meeting Room 5
Moderator: Farideh Amiri, Minnesota Department of Transportation
Evaluation of Optimal Concrete Rehabilitation Interval
Bernard Izevbekhai, Minnesota Department of Transportation
Performance of Recycled Asphalt and High RAP Asphalt Mix
Mihai Marasteau, Department of Civil Engineering, University of Minnesota
Comparative Performance Study of Bonded Wear Course Systems Applied to Bridge Decks in Minnesota
Eshan Dave, Department of Civil Engineering, University of Minnesota Duluth

13. Breathe Deep: Emissions and Alternatives to Fuels
Meeting Room 4
Moderator: Steve Hankey, University of Minnesota
Air Pollution from Traffic in the Minneapolis-St. Paul Metropolitan Area and its Relationship to Socio-Economic Demography
Gregory Pratt, Minnesota Pollution Control Agency
Evaluation of the Next Generation Hybrid Transit Bus
William Northrop, Department of Mechanical Engineering, University of Minnesota

14. Twin Cities Transitways
Meeting Room 3
Moderator: Sam O’Connell, Metro Transit
The Impact of Hiawatha LRT, Neighborhood Design, and Self-Selection on Auto Use
Jason Cao, University of Minnesota
Southwest Light Rail Transit
Craig Lomathe, Ryan Kronzer, Kathryn Hansen, Metro Transit

15. Using Pooled Funds to Benefit Minnesota: Best Practices and Successful Examples
Meeting Room 2
Moderator: Linda Taylor, Minnesota Department of Transportation
Clear Roads Winter Highway Operations
Tom Peters, Minnesota Department of Transportation
Evaluation of Low-Cost Safety Improvements Pooled Fund
Brad Estochen, Minnesota Department of Transportation
Transportation Library Connectivity and Development Pooled Fund
Sheila Hatchell, Minnesota Department of Transportation
Study of the Impacts of Implements of Husbandry on Bridges and Bulb-T Research Study
Dave Conkle, Minnesota Department of Transportation
Asset Management Pooled Fund
Mark Nelson, Minnesota Department of Transportation

3:00-3:15 – Break
3:15-4:30 – Concurrent Sessions

4:30-5:30 – Reception – Hors d’oeuvres and Cash Bar
Thursday, May 22, 2014

8:00-8:30 a.m. – Continental Breakfast
36x105

8:30-10:15 – Concurrent Sessions

16. Watching out for Pedestrians and Teen Drivers
Meeting Room 6
Moderator: Janet Creaser, Department of Mechanical Engineering, University of Minnesota
Conclusions of Scramble of Pedestrians in a Roundabout
Majed Al-Ghandour, North Carolina Department of Transportation
Application of Highway Capacity Manual Methodology into Unsignalized Pedestrian Crossing Evaluation
Bryan Nemeth, Bolton & Menk, Inc.

Preliminary Results of the Teen Driver Support System Field Operational Test
Janet Creaser, Department of Mechanical Engineering, University of Minnesota

Safer Teen Cars: Effects of In-vehicle Feedback on Teen Drivers’ Risky Behaviors
Chris Edwards, Department of Mechanical Engineering, University of Minnesota

17. Surface Water Management
Meeting Room 5
Moderator: Mark Maloney, City of Shoreview
Runoff from Impervious Area in Urban Watersheds
Ali Ebrahimian, St. Anthony Falls Laboratory, University of Minnesota
Estimation of Performance of a Swale with a Simple Computational Model
Farzana Ahmed, St. Anthony Falls Laboratory, University of Minnesota
Climate-Change-Related Extreme Precipitation Events: Assessing Trunk Highway Vulnerability and Planning for Adaptation
Sara Dunlap, Minnesota Department of Transportation
Laboratory-Based Testing of Culvert Designs for Aquatic Organism Passage
Jessica Kazarek, St. Anthony Falls Laboratory, University of Minnesota

18. Return on Investment for Transportation Projects
Meeting Room 4
Moderator: Kenneth Buckeye, Minnesota Department of Transportation
The Itasca Project
Julia Silvis, McKinsey and Company

Return on Investment for State Highway Projects
Roger Millar, Smart Growth America

Chamber of Commerce Perspectives on Return on Investment
Will Schroer, Minneapolis Chamber of Commerce

19. Predicting and Measuring Transit Use
Meeting Room 3
Moderator: Fay Simer, Stantec
Neighborhood Prerequisites for Transit Readiness and the Transit Market Index
Todd Graham, Metropolitan Council

Travel Behavior Inventory: Activity-Based Model Development
Jonathan Ehrlich, Metropolitan Council

The Gaps in Satisfaction with Transit Services Among BRT, Metro, and Bus Riders: Evidence from Guangzhou
Chen Zhang, Humphrey School of Public Affairs, University of Minnesota

20. Technologies and Techniques for Public Engagement
Meeting Room 2
Moderator: Jill Hentges, Metro Transit
Service Improvement Plan
Jill Hentges, Metro Transit

Developing Consent to Get Projects Implemented
Angie Bersaw, Bolton & Menk, Inc.

Introducing FHWA’s New Visual Impact Assessment Process
Craig Churchward, Avenue Design Partners

CIL Feedback Tool
Arlene Mathison, Center for Transportation Studies, University of Minnesota

21. Featured Workshop
Part I: From Research to Practice, Transitway Impacts on the Twin Cities Region
Meeting Room 7
Moderator: Dawn Spanhake, Center for Transportation Studies, University of Minnesota

TIRP Program Impacts: A Commissioner’s Perspective
Peter McLaughlin, Hennepin County, Counties Transit Improvement Board

Regional Transit—Regional Accessibility
Yingling Fan and Andrew Guthrie, Humphrey School of Public Affairs, University of Minnesota; Adam Harrington, Metro Transit

Light Rail Transit as a Magnet for Economic Development: Evidence from Twin Cities
Jason Cao, Humphrey School of Public Affairs, University of Minnesota; Donna Drummond, City of Saint Paul

22. Toward Zero Deaths Spotlight
Meeting Room 6
Moderator: Brad Estochen, Minnesota Department of Transportation
Enhance Intersection Safety by Reducing Red-Light-Running Violations
Ben Hao, URS Corporation

Evaluation of the Effects of Signage and Striping on Safety at a Multilane Roundabout
John Hourdos, Department of Civil Engineering, University of Minnesota

E Pluribus Unum (One from Many) Single Imputation Methods for a Public Use Data Set
Yiwen Zhang, Minnesota Department of Health

Point of Impact Program
Gordy Pehrson, Minnesota Department of Public Safety

23. Measuring Transportation Performance
Meeting Room 4
Moderator: Deanna Belden, Minnesota Department of Transportation
A Comprehensive System for Real-time Monitoring and Broadcasting of Truck Parking Availability
Ted Morris, Department of Computer Science and Engineering, University of Minnesota

Using National Performance Management Research Data Set to Generate Statewide Performance Measures
Chen-Fu Liao, Department of Civil Engineering, University of Minnesota

Implementing SHRP-2 Travel Time Reliability Measures in Minnesota
Todd Polham, SRF Consulting Group, Inc.

Developing GPS-based Arterial Performance Measures
Paul Czech, Minnesota Department of Transportation; Shawn Turner, Texas Transportation Institute
24. Twin Cities Travel Behavior Inventory
Meeting Room 3
Moderator: Connie Kozlak, Metropolitan Council

Travel Behavior Inventory: Survey Results
Jonathan Ehrlich, Metropolitan Council

Accessibility and Travel Behavior
Martin Brosnan, Department of Civil Engineering, University of Minnesota

Bicycle Travel in the Twin Cities
Jessica Schoner, Department of Civil Engineering, University of Minnesota

25. Featured Workshop Part II: Policy Implications of Transforming Communities
Meeting Room 7
Moderator: Mariia Zimmerman, MZ Strategies, LLC

TIRP Research: Key Findings and Policy Implications
Mariia Zimmerman, MZ Strategies, LLC

Policy Implications for Future Transitway Investments – A Conversation
Participants have the opportunity to engage in a dynamically flowing conversation about policy implications related to the continued build-out of the regional transit network in the Twin Cities.

12:00 noon – Adjourn

Mark Your Calendars
Toward Zero Deaths Conference
November 13-14, 2014
Duluth Entertainment Convention Center
Duluth, MN

26th Annual Transportation Research Conference
May 20-21, 2015
Saint Paul RiverCentre
Saint Paul, Minnesota