27th Annual CTS
TRANSPORTATION RESEARCH CONGRESS

FINAL PROGRAM

November 3, 2016
The Commons Hotel
East Bank Campus
Minneapolis, MN

cts.umn.edu/events/conference

CENTER FOR TRANSPORTATION STUDIES
UNIVERSITY OF MINNESOTA
Welcome to the Conference

The Center for Transportation Studies is pleased to present its 27th 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.

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 following the conference. These presentations will be available at: cts.umn.edu/events/conference/2016.

Conference Credit

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

AICP Maintenance Credits
This conference has been approved for 12.25 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.

Twitter and Facebook

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.

Mobile App

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

• View the conference program
• View conference abstracts
• Engage in Twitter conversations
• Upload conference photos
• Keep track of AICP credits and PDHs

To get the guide for iOS and Android users: Download ‘Guidebook’ from the Apple App Store or the Android Marketplace, search for “CTS Transportation Research Conference” or scan the following image using Guidebook’s QR Code reader:

Wireless Access

Conference attendees can access free wireless Internet by selecting “Commons Convention” from the list of networks and entering password: CTS16.
### Keynote Presentations

#### Creating Sustainable, Livable, Forward-Compatible Cities for Economic Resilience

**Thursday, November 3, 2016: 8:30–10:15 a.m.**

*Gabe Klein*

author, *Start-up City: Inspiring Private and Public Entrepreneurship, Getting Projects Done, and Having Fun*

Cities at different stages of development all grapple with managing the traditional challenges of transportation, infrastructure financing, housing, and environmental sustainability. These complexities are further compounded by rapidly changing modes of operation, new and disruptive technologies, and changing expectations and demands from citizens and business. What innovations are taking place in cities these days, and how can government, business, and nonprofit leaders utilize this wave of change to shape a quality of life that is improved and not compromised? How can they work together—instead of at cross-purposes?

Gabe Klein will discuss the larger macro trends in society and address process innovation and governance. He will also share how city leaders are reorganizing their urban systems to be synergistic rather than at odds with one another and the city's goals. High-return public-private partnerships, active transportation, and enhanced public space projects all play a role in the ideal city of the future.

Following Klein’s presentation, a panel of experts will share perspectives on the implications for the future of transportation systems in Minnesota cities.

Panelists include: Mayor Ardell Brede, City of Rochester; Mayor Chris Coleman, City of Saint Paul; Anu Ramaswami, Humphrey School of Public Affairs, University of Minnesota

Copies of Gabe Klein’s book, *Start-up City: Inspiring Private and Public Entrepreneurship, Getting Projects Done, and Having Fun*, will be on sale in the Meridian Foyer. Mr. Klein will be available for signing after his presentation.

#### How to Promote and Prepare for Automated Driving

**Thursday, November 3, 2016: 11:45 a.m.–1:30 p.m**

*Bryant Walker Smith*

Assistant Professor, School of Law, University of South Carolina

Bryant Walker Smith will outline steps that governments can take to encourage the development, deployment, and use of automated driving systems. Built on a solid understanding of the related technologies, applications, and existing legal infrastructure, these steps include key administrative, legal, and community strategies that focus as much on today’s problems as tomorrow’s solutions.

Following his presentation during the Luncheon General Session, Bryant Walker Smith will be joining the panel in Session 5: Q&A on Connection & Autonomous Vehicle Technology & Policy to continue the conversation around preparing for automated vehicles.

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## Program At-a-Glance

**Thursday, November 3, 2016**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:30–8:30 a.m.</td>
<td><strong>Registration and Buffet Breakfast</strong></td>
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<tr>
<td></td>
<td>Meridian Foyer</td>
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<tr>
<td>8:30–10:15 a.m.</td>
<td><strong>Welcome</strong> – Meridian Ballroom</td>
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<td><em>Laurie McGinnis</em>, Director, Center for Transportation Studies</td>
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<tr>
<td></td>
<td><strong>Keynote Presentation</strong></td>
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</tbody>
</table>
|               | **Creating Sustainable, Livable, Forward-Compatible Cities for Economic Resilience**  
|               | *Gabe Klein*, author, *Start-up City: Inspiring Private and Public Entrepreneurship, Getting Projects Done, and Having Fun*  
|               | Mr. Klein will be available for book-signing after his presentation. |
| 10:15–10:30 a.m.| **Break** – Meridian Foyer                                         |
| 10:30–11:45 a.m.| **Session 1** [Roadway Safety](#)                                     |
|               | Summit Room                                                          |
| 10:30–11:45 a.m.| **Session 2** [Transit: It's Not Just About Moving People](#)         |
|               | Pinnacle Ballroom                                                    |
| 10:30–11:45 a.m.| **Session 3** [Growing the Transportation Workforce in Minnesota](#) |
|               | Meridian Ballroom, Section 4                                         |
| 10:30–11:45 a.m.| **Session 4** [Curtailing Congestion](#)                            |
|               | Pathways Room                                                        |
| 11:45 a.m.–1:30 p.m.| **Luncheon and Presentation** – Meridian Ballroom                   |
|               | **How to Promote and Prepare for Automated Driving**                |
|               | *Bryant Walker Smith*, Assistant Professor, School of Law, University of South Carolina |
| 1:30–1:45 p.m.| **Break** – Meridian Foyer                                         |
| 1:45–3:00 p.m.| **Session 5** [Q&A on Connection & Autonomous Vehicle Technology & Policy](#) |
|               | Pinnacle Ballroom                                                    |
| 1:45–3:00 p.m.| **Session 6** [Looking at the Bigger Picture: Multimodal Visualization and Mapping](#) |
|               | Summit Room                                                          |
| 1:45–3:00 p.m.| **Session 7** [Advancing Sustainable Transportation and Community-Engaged Learning](#) |
|               | Meridian Ballroom, Section 4                                         |
| 1:45–3:00 p.m.| **Session 8** [Pioneering Pavements and Maintenance: The Future of Minnesota’s Roads](#) |
|               | Pathways Room                                                        |
| 3:00–3:15 p.m.| **Break** – Meridian Foyer                                         |
| 3:15–4:30 p.m.| **Session 9** [Technology and Safety](#)                            |
|               | Summit Room                                                          |
| 3:15–4:30 p.m.| **Session 10** [Economic Impacts of Different Modes](#)              |
|               | Meridian Ballroom, Section 4                                         |
| 3:15–4:30 p.m.| **Session 11** [A Model Discussion: Linking Creative Environmental Justice and Title VI Analysis to Equity and Community Engagement](#) |
|               | Pinnacle Ballroom                                                    |
| 3:15–4:30 p.m.| **Session 12** [Roadside Maintenance and the Environment](#)        |
|               | Pathways Room                                                        |
| 4:30–5:30 p.m.| **Reception with Hors d’Oeuvres and Cash Bar**                      |
|               | Meridian Foyer                                                       |
pursposes? This session will discuss the work together—instead of at cross—
and not compromised? How can they shape a quality of life that is improved
leaders utilize this wave of change to taking place in cities these days, and how
expectations and demands from citizens and disruptive technologies, and changing
complexities are further compounded by rapidly changing modes of operation, new
and environmental sustainability. These complexities are further compounded by
infrastructure financing, housing, and environmental sustainability. These
Cities at different stages of development all grapple with managing the traditional
challenges of transportation, infrastructure financing, housing, and environmental sustainability. These
process innovation and governance. How city leaders are reorganizing their urban
systems to be synergistic rather than at odds with one another will also be
explored. High-return public-private partnerships, active transportation, and
enhanced public space projects all play a role in the ideal city of the future.
Following Mr. Klein’s presentation, a panel of experts will share their
perspectives on the implications for the future of the Minnesota cities transportation systems.
Panelists include: Mayor Ardell Brede,
City of Rochester; Mayor Chris Coleman,
City of Saint Paul; Anu Ramaswami,
Humphrey School of Public Affairs,
University of Minnesota
Copies of Gabe Klein’s book, Start-up City: Inspiring Private and Public Entrepreneurship, Getting Projects Done, and Having Fun, will be on sale in the Meridian Foyer. Mr. Klein will be available for signing after his presentation.

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

10:30–11:45 a.m.
Concurrent Sessions

Session 1: Roadway Safety
(Summit Room)
Moderator: Tom Sohnweide, SEH, Inc.
Performance-Based Superelevation Transition Design
James Rosenow, Minnesota Department of Transportation

Session 2: Transit: It’s Not Just About Moving People
(Pinnacle Ballroom)
Approved for AICP credit
Moderator: Lyssa Leitner, Washington County
Improving Transit Safety and Efficiency Using Open-Source Analytics and Visualization Tools
Joel Huting, Metro Transit
Network Modeling: Ridership on the Twin Cities Transit Network Before and After METRO Green Line Implementation
Jacqueline Nowak, College of Science and Engineering, University of Minnesota
When and How Much Did the Green Line LRT Increase Residential Property Values in St. Paul, Minnesota?
Shengnan Lou, Humphrey School of Public Affairs, University of Minnesota

Session 3: Growing the Transportation Workforce in Minnesota
(Meridian Ballroom, Section 4)
Approved for AICP credit
Moderator: Stephanie Malinoff, Center for Transportation Studies, University of Minnesota
According to a recent federal report, transportation-related employers will need to hire and train a total of 4.6 million new workers—1.2 times the current transportation workforce—due to expected growth, retirements, and turnover in the transportation industry from 2012 to 2022. Is Minnesota ready to answer this need? This session will highlight workforce development initiatives underway in Minnesota at both the state and local levels. Panelists will briefly describe programs currently underway to help meet this workforce demand, and time will be allocated for audience discussion with the panelists following their presentations.
Panelists: Liz Grzechowiak, Concessions & Business Development, Metropolitan Airports Commission; Gary Courtney, Office of Equal Opportunity, Metropolitan Council; Desiree Doud and Jessica Etukudo, Minnesota Department of Transportation; Don Theisen, Public Works, Washington County

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Session 4: Curtailing Congestion  
(Pathways Room)  
Moderator: Nick Thompson, WSP | Parsons Brinkerhoff  
Massive GPS Travel Pattern Data for Urban Congestion Relief in the Twin Cities  
Paul Morris, SRF Consulting Group, Inc.  
Clogged Arteries: Empirical Analysis of Highway Congestion  
Vivek Sakhrani, Canadian Pacific Consulting Services  
A Framework for Evaluating Dynamic Methods of Multimodal Arterial Traffic Control  
Ted Morris, Computer Science and Engineering, University of Minnesota

11:45 a.m.–1:30 p.m.  
Luncheon and Presentation  
(Meridian Ballroom)  
Keynote Presentation  
How to Promote and Prepare for Automated Driving  
Bryant Walker Smith, Assistant Professor, School of Law, University of South Carolina  
Approved for AICP credit  
This presentation will outline steps that governments can take to encourage the development, deployment, and use of automated driving systems. Built on a solid understanding of the related technologies, applications, and existing legal infrastructure, these steps include key administrative, legal, and community strategies that focus as much on today’s problems as tomorrow’s solutions.

1:30–1:45 p.m.  
Break  
(Meridian Foyer)  
1:45–3:00 p.m.  
 Concurrent Sessions  

Session 5: Q&A on Connection & Autonomous Vehicle Technology & Policy  
(Pinnacle Ballroom)  
Approved for AICP credit  
Moderator: Philip Schaffner, Minnesota Department of Transportation  
This session will be an exploration on the technical and broader policy perspectives of connected vehicles and autonomous vehicles.  
Panelists: Bryant Walker Smith, University of South Carolina; Imran Hayee, Electrical Engineering, University of Minnesota; Ken Buckeye, Minnesota Department of Transportation; Frank Douma, Humphrey School of Public Affairs, University of Minnesota

Session 6: Looking at the Bigger Picture: Multimodal Visualization and Mapping  
(Summit Room)  
Approved for AICP credit  
Moderator: Jacob Achtemeier, HumanFIRST Laboratory, University of Minnesota  
Industry Clusters, Supply Chains, and the Freight Economy  
Lee Munnich, Humphrey School of Public Affairs, University of Minnesota  
Mapping Bicycle and Pedestrian Crashes of St. Paul (and Greater Minnesota)

Rebecca Barney, District Council Collaborative/Minnesota Department of Transportation/University of Minnesota/U-Spatial

Session 7: Advancing Sustainable Transportation and Community-Engaged Learning through the Resilient Communities Project  
(Meridian Ballroom, Section 4)  
Approved for AICP credit  
Moderator: Mike Greco, Center for Urban and Regional Affairs, University of Minnesota  
The Resilient Communities Project (RCP) is a highly successful, cross-disciplinary program at the University of Minnesota that supports one-year partnerships between the university and local government agencies in Minnesota, facilitating faculty-supervised course-based projects that address community-identified environmental, social, economic, and transportation issues and needs. This session will feature a panel discussing their firsthand experience working with RCP. Panelists will describe the program model; discuss strategies, challenges, and lessons learned for incorporating RCP projects in the classroom; and explore the community benefits and impacts of RCP partnerships.  
Panelists: John Gulliver, Department of Civil, Environmental and Geo-Engineering, University of Minnesota; Sarah Sulzar, Graduate of Department of Civil, Environmental and Geo-Engineering, University of Minnesota; Tyler Olsen, Graduate of Department of Civil, Environmental and Geo-Engineering, University of Minnesota; Mark Maloney, Department of Architecture, University of Minnesota; Lawrence Zanko, Natural Resources Research Institute, University of Minnesota Duluth

Session 8: Pioneering Pavements and Maintenance: The Future of Minnesota’s Roads  
(Pathways Room)  
Moderator: Mark Maloney, City of Shoreview  
Winter Maintenance Assessment Tool (WMAT)  
Connie Fortin, Fortin Consulting, Inc.  
Nondestructive Evaluation of Bituminous Compaction Uniformity: GPR Technologies to Enhance Quality Control on Asphalt Pavements  
Lev Khazanovich, Department of Civil, Environmental, and Geo-Engineering, University of Minnesota  
An Overview of Recent Taconite-Based Repair and Pavement Preservation Applications: Innovative Pavement Repair and Patching Project and Alaska Glenn Highway Sand Seal Project  
Lawrence Zanko, Natural Resources Research Institute, University of Minnesota Duluth

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3:15–4:30 p.m.
Concurrent Sessions

Session 9: Technology and Safety
(Summit Room)
Moderator: Dan Rowe, Minnesota Department of Transportation

Truck Rollover Warning Systems Evaluation
Tom Sohrweide, SEH Inc.

Collision Avoidance System on an Instrumented Bicycle
Woongsun Jeon and Rajesh Rajamani, Department of Mechanical Engineering, University of Minnesota

Rural Intersection Collision Warning System (RICWS) Evaluation and Design Investigation
Disi Tian, HumanFIRST Laboratory, University of Minnesota

Session 10: Economic Impacts of Different Modes
(Meridian Ballroom, Section 4)
Approved for AICP credit
Moderator: Jonathan Ehrlich, Metropolitan Council

Manufacturers’ Perspectives on Minnesota’s Transportation System: Summary Results from South, Central, and Northwest Minnesota
Donna Koren, Minnesota Department of Transportation

Estimating the Economic Impact of the Health Benefits Associated with Bicycle Commuting
Xinyi Qian, Tourism Center, University of Minnesota

Session 11: A Modal Discussion: Linking Creative Environmental Justice and Title VI Analysis to Equity and Community Engagement Through the Minnesota Freight Plan
(Pinnacle Ballroom)
Approved for AICP credit
Moderator: Wanda Kirkpatrick, Metropolitan Council

Title VI of the Civil Rights Act and Executive Order 12898 define the populations that federal actions cannot have a disproportionately high adverse effect on or discriminate against. But how can we more creatively analyze Title VI and Environmental Justice concepts in order to create a more equitable state and region? This session will feature a presentation on how the Minnesota Freight Plan considered Environmental Justice and will then host a multimodal panel discussion.

Panelists: Chris Ryan, SRF Consulting Group, Inc.; John Tompkins, Minnesota Department of Transportation; Cyndi Harper, Metro Transit; Jansa Hadzic, Minnesota Department of Transportation; Anita Urvina, Richardson, Richter, and Associates, Inc.

Session 12: Roadside Maintenance and the Environment
(Pathways Room)
Moderator: Andy Golfis, System G Inc.

Treatment of Runoff with Roadside Drainage Ditches
Maria Garcia-Serrana, St. Anthony Falls Laboratory, University of Minnesota

Iron-Enhanced Ditch Checks in Roadside Drainage Ditches Can Mitigate Runoff
Poonima Natarajan, St. Anthony Falls Laboratory, University of Minnesota

Developing Sustainable Turfgrass Mixtures for Roadside in Minnesota
Eric Watkins, Department of Horticultural Science, University of Minnesota

4:30–5:30 p.m.
Reception Hors d’Oeuvres and Cash Bar
(Meridian Foyer)

Planning Committee

Amber Cameron, University of Minnesota
Frank Douma, University of Minnesota
Jonathan Ehrlich, Metropolitan Council
Cathy French, University of Minnesota
Steve Gentry, Metropolitan Airports Commission
Andy Golfis, System G Inc.
Lyssa Leitner, Washington County
Mark Maloney, City of Shoreview
Nichole Morris, University of Minnesota
Tom Sohrweide, SEH, Inc.

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Toward Zero Deaths Conference
November 16–17, 2016
Duluth Convention Center, Duluth, Minnesota

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