

# THE PATH TO PROGRESS

ANNUAL REPORT 2017





# TIMELINE

**1987**

CTS begins operation.

**1990**

The Autoscope™ video imaging system for vehicle detection is patented by the U.



**1991**

The Intelligent Transportation Systems Institute is established as a federal University Transportation Center at CTS.

**1992**

The Minnesota Technology Transfer Program—now Minnesota Local Technical Assistance Program—is established and housed at CTS.

# T2

**1994**

CTS moves from the Civil Engineering Building to new offices in the Transportation and Safety Building.

**2004**

The Access to Destinations Study, a multi-year research and outreach effort, gets under way.

**2000**

The Airport Technical Assistance Program is launched and housed at CTS.



**2006**

The Braun/CTS Chair in Transportation Engineering is endowed.

**2006**

The Transitway Impacts Research Program is created by the Hennepin County–University of Minnesota partnership.

**2012**

CTS and MnDOT develop a summer internship program.

**2015**

The Initiative on the Sharing Economy begins study of shared use and consumption.



## KNOWLEDGE **NEVER STANDS STILL.**

It's a constant process of discovery, guided by the light of earlier thinking. It's exciting, sometimes surprising, and always pointing to a better future.

CTS is a catalyst for knowledge and innovation—and we have been for 30 years. This annual report shares highlights from FY17 and celebrates our first three decades of accomplishment.

Over the years, CTS has driven discovery in all disciplines related to transportation. We nurture relationships with funders and stakeholders to ensure that research meets real-world needs, and form interdisciplinary teams to address critical and emerging issues.

Our education programs cultivate the next generation of the transportation workforce and promote lifelong learning. And our engagement efforts share ideas and maintain dialog with an array of audiences.

Our work is just beginning, and we're confident in what lies ahead. As always, our success will depend on the vision and support of our partners, sponsors, and committee members. My thanks to all of you.

Sincerely,

A handwritten signature in black ink that reads "Laurie G. McGinnis". The signature is written in a cursive, flowing style.

Laurie G. McGinnis, Director



# RESEARCH:

## A PATH TO PROGRESS

### WORK-ZONE WARNINGS COULD SOON BE **DELIVERED TO YOUR SMARTPHONE**

Imagine that you're driving to work when your smartphone announces, "Caution, you are approaching an active work zone." Thanks to a new app being developed by University of Minnesota researchers, this scenario is on its way to becoming reality.

"Most work-zone crashes are caused by drivers not paying attention," says Chen-Fu Liao, senior systems engineer at the U's Minnesota Traffic Observatory. "That's why we are working to design and test an in-vehicle work-zone alert system that announces messages through the driver's smartphone or the vehicle's infotainment system."

As part of the project, sponsored by the Minnesota Department of Transportation (MnDOT), Liao and his team used inexpensive Bluetooth low-energy (BLE) tags to provide in-vehicle warning messages. The BLE tags were programmed to trigger spoken messages in smartphones within range of the tags, which were placed on construction barrels or lampposts ahead of a work zone.

The researchers also developed two applications for the project: a smartphone app to trigger the audio-visual messages in vehicle-mounted smartphones, and a second app that allows work-zone contractors to update messages remotely, in real time.

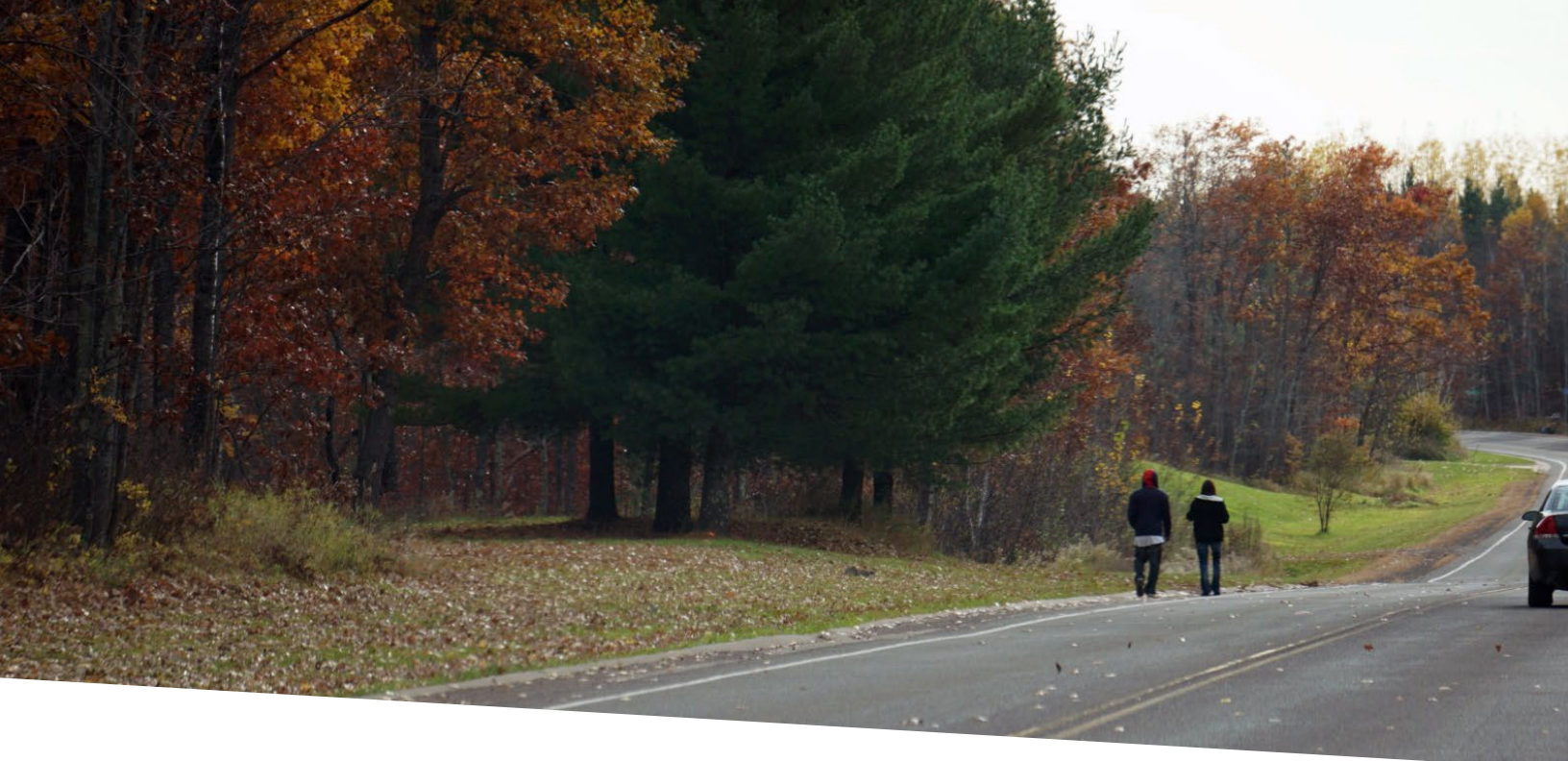
Field tests proved the system works. "We found that while traveling at 70 miles per hour, our app is able to successfully detect a long-range BLE tag placed more than 400 feet away on a traffic barrel on the roadway shoulder," Liao says. "We also confirmed the system works under a variety of conditions, including heavy traffic and inclement weather."

Ken Johnson, work-zone, pavement marking, and traffic devices engineer at MnDOT, concurs. "This was a proof of concept that showed that smartphones can receive

Bluetooth signals at highway speeds and deliver messages to drivers."

Future work includes a pilot implementation with multiple participants to further evaluate the system's effectiveness.





## BUILDING PARTNERSHIPS WITH **TRIBAL COMMUNITIES TO IMPROVE SAFETY**

The motor vehicle crash fatality rate is higher for American Indians than for any other ethnic or racial group in the United States. In a project sponsored by the Roadway Safety Institute, Associate Professor Kathryn Quick and Research Associate Guillermo Narváez, both with the Humphrey School of Public Affairs, are collaborating with American Indian communities to better understand the transportation safety risks on tribal lands and develop strategies to mitigate these risks.

As part of this work, Quick and Narváez have had discussions with 12 tribal governments to explore their transportation concerns. That has grown into collaborations with four tribal governments: the Red Lake Band of Chippewa, Leech Lake Band of Ojibwe, Fond du Lac Band of Lake Superior Chippewa, and Mille Lacs Band of Ojibwe.

Findings suggest that tribal transportation safety problems may be similar to rural safety problems, except for a much greater concern for pedestrian safety and the complexities of coordinating between tribal governments and other jurisdictions.

In some communities, the research is already leading to practical safety improvements. Kade Ferris, transportation planner with the Red Lake Tribal Engineering Department, says that the researchers' work has allowed for "an

unprecedented and useful integration of disparate types of data into a more comprehensive, robust picture, leading to the development of a comprehensive tribal transportation safety plan for the Red Lake Nation."

The data have also helped the tribe identify and address specific safety concerns. For example, Ferris says that data collected through this collaboration helped identify pedestrian safety concerns along Minnesota Highway 1, the main east-west highway through the reservation. The tribe then used the data to apply for and receive funding from the state of Minnesota to develop a new walking trail and street lighting to provide a safer walking environment for the reservation's residents.



**Although the number of fatal crashes decreased in the nation as a whole by about 21 percent from 1975–2013, it increased by about 35 percent on American Indian reservation roads.**

# MINNESOTA TRANSPORTATION FUNDING: HOW ARE FEDERAL AND STATE DOLLARS REDISTRIBUTED?

Transportation funding that is directly generated by local taxes and fees stays in local jurisdictions. Federal and state transportation funding, however, is allocated through certain budgetary procedures and may not be used in the original point of collection. How are these transportation funds redistributed in Minnesota? An analysis from U of M researchers offers perspectives.

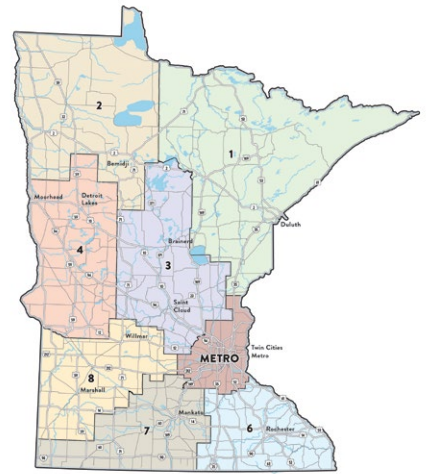
For the study, which looked at the six-year period between 2009 and 2014, the researchers analyzed funding revenues and expenditures at the district level for both roadways and transit. The work was completed as part of the U's Transportation Policy and Economic Competitiveness Program.

"When we include both roadways and public transit, our findings indicate that the Metro district contributes about 48

percent of federal and state transportation revenues and receives about 51 percent of federal and state transportation expenditures," says principal investigator Jerry Zhao, associate professor in the Humphrey School of Public Affairs. "However, the expenditure-to-revenue ratio changes when we separate roads and transit. Metro counties receive about 88 percent of transit funding but 36 percent of highway funding."

Other districts show different patterns. "Among eight districts, we expect to see higher and lower ratios of revenues and expenditures," Zhao says. For example, District 2 and District 1 receive more than they contribute, mainly because of much lower population densities in those counties.

"This research is an important way to enhance the discussion about resource collections and redistribution in transportation and to help improve decision making," says Ken Buckeye, program manager in MnDOT's Office of Financial Management.



**1925**  
Minnesota's first gas tax of 2 cents/gallon was enacted.

**1988**

CTS issues its first Request for Proposals to U of M researchers.

**1998**

The Transportation and Regional Growth Study is launched.

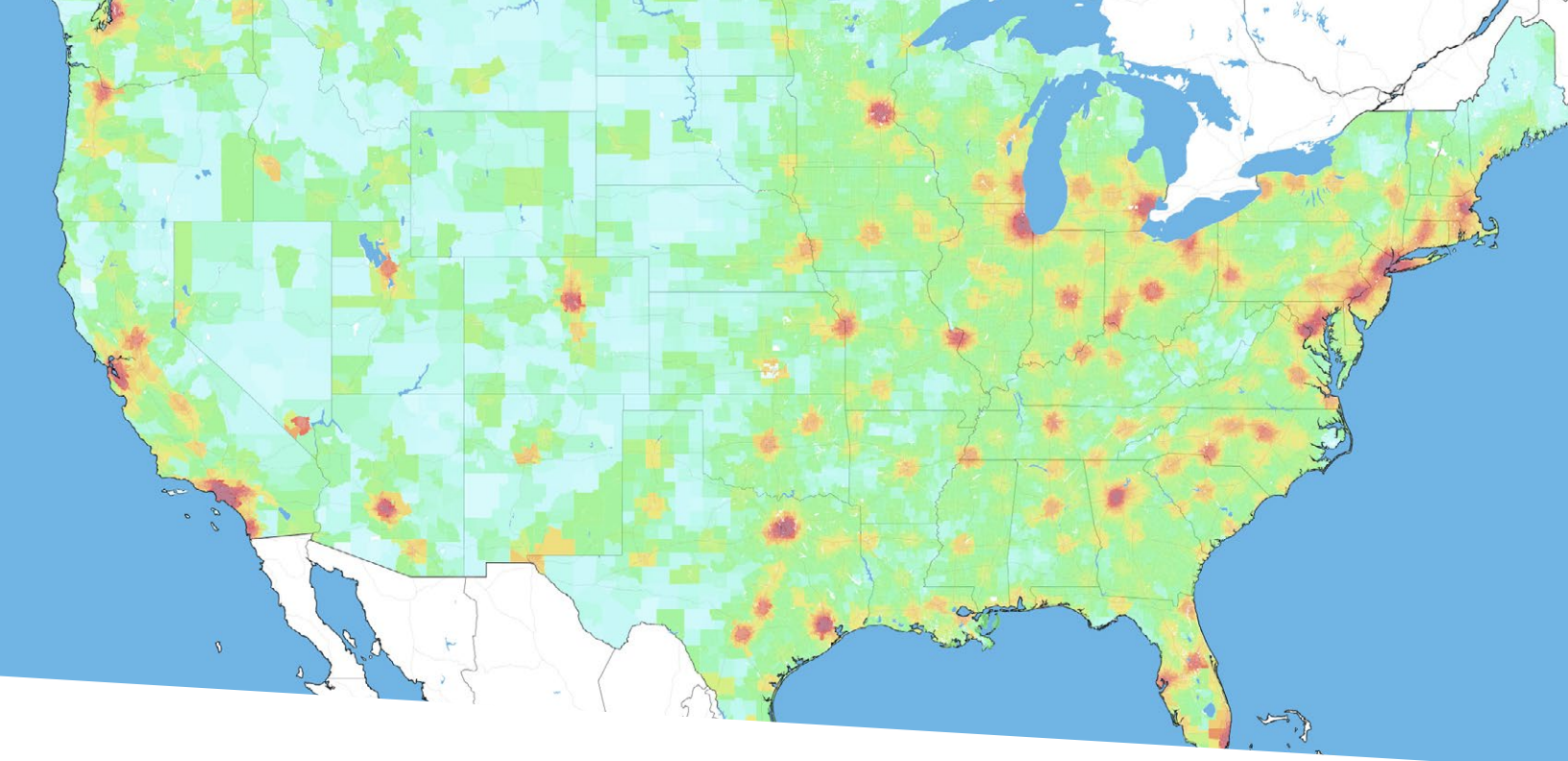
**2001**

ITS Institute researchers win a \$500,000 grant from the Federal Transit Administration to study lane-assist system technology requirements.

**2007**

The Minnesota Legislature funds a study of public policy and technology options for reducing greenhouse gases emitted from the transportation sector.





## STUDIES ESTIMATE ACCESSIBILITY TO JOBS BY AUTO, TRANSIT IN U.S. CITIES

The University's Accessibility Observatory published reports illustrating accessibility to jobs by auto and by transit in U.S. cities.

For the auto analysis, the research team estimated job accessibility for each of the 11 million U.S. census blocks and analyzed the data in the 50 largest (by population) metropolitan areas. The team also calculated the 10 metropolitan areas where workers experience, on average, the greatest reduction in job access due to congestion.

"For example, the Minneapolis–St. Paul metro area ranked 12th in terms of job accessibility but 23rd in the reduction in job access due to congestion," says Andrew Owen, director of the Observatory. "This suggests that job accessibility is influenced less by congestion here than in other cities."

The transit analysis estimated the accessibility to jobs in 49 of the 50 largest (by population) metropolitan areas in the United States using transit schedules from January

2015. The transit report also presents detailed accessibility values for each metropolitan area and block-level maps that illustrate the spatial patterns of accessibility within each area, as well as a U.S. census tract-level map that shows accessibility patterns at a national scale.

"Taken together, these reports provide a comprehensive view of the relative accessibility impact of auto and transit systems across different cities," Owen says.

The research was sponsored by the National Accessibility Evaluation Pooled-Fund Study, a multi-year effort led by MnDOT and supported by partners including the Federal Highway Administration and 10 state DOTs.



The **Accessibility Observatory** builds on the methods, tools, and expertise developed in two previous U of M multi-year studies: the **Transportation and Regional Growth Study** and the **Access to Destinations Study**.

### 2008–12

Faculty collect and analyze data from smart bridge technology installed on the new I-35W St. Anthony Falls Bridge.

### 2013

The Accessibility Observatory is formed and begins analysis of accessibility to jobs across the entire U.S.

### 2013

The Transportation Policy and Economic Competitiveness Program is established by the Minnesota Legislature.

### 2015

The Global Transit Innovations Program is formed to find solutions and educate the next generation of transit leaders.

# FULL-DEPTH RECLAMATION IS A **COST-EFFECTIVE OPTION FOR DURABLE ROADS**

Full-depth reclamation (FDR) of asphalt pavement is often used on rural roadways to reduce costs for materials and hauling. Research from the U of M indicates that FDR is also a good option for rehabilitating urban and suburban roadways and most likely outperforms traditional mill-and-overlay in cost and durability.

“Our goal was to provide evidence of FDR’s cost-effectiveness, guidelines for FDR project selection, and, ultimately, performance-based specifications,” says Mihai Marasteanu, a professor with the Department of Civil, Environmental, and Geo- Engineering and the study’s principal investigator.

With FDR, road builders use trains of recycling equipment to pulverize, lift, grind, remix, and repave asphalt in a single pass. This recycling puts less demand on petroleum resources and new aggregate. Despite its benefits, FDR has yet to be adopted widely by city and county public works departments. In part, this is due to the challenge of using trains of equipment on urban and suburban roads that feature curbs, manholes, and driveways. Mill-and-overlay also has lower initial costs.

Marasteanu and co-investigator Jia-Liang Le sought to provide procedures for analyzing life-cycle costs of FDR compared with conventional rehabilitation methods. The project was sponsored by the Minnesota Local Road Research Board and MnDOT.

“When we compared the simulated life-cycle costs of FDR with known results for mill-and-overlay mixtures, we found that FDR is more cost-effective over a 35-year period than traditional methods,” Marasteanu says. “Mill-and-overlay must be redone every 18 years, causing more inconvenience and costs for road users than the longer-lasting FDR.”

Mark Maloney, Shoreview’s public works director, says the research helps translate full-depth reclamation projects in Shoreview into hard cost-benefit, return-on-investment numbers. “It validates what we’ve been doing and gives cities what they need to justify the cost of using FDR in urban settings.”



**Designing pavements that can stand up to Minnesota’s harsh climate is a continuing priority for U of M researchers.**







## RESEARCH HELPS GAUGE SAFETY OF **HEAVY VEHICLES ON OLDER CONCRETE BRIDGES**

Bridges built using prestressed concrete girders are among the most common in Minnesota and throughout the U.S. because of their good performance, lower initial material costs, and relatively low ongoing maintenance costs. However, the federal requirements for these bridges have changed considerably over the years. As a result, bridges built to older specifications may score poorly when subjected to new bridge rating standards even though they are actually in good condition.

In a MnDOT-sponsored study, U of M researchers evaluated whether the current guidelines may be overly conservative for these older concrete bridges that are in good condition.

“One area in which this discrepancy between ratings and reality can cause problems is determining safe legal load limits for bridges, which are used to decide whether larger trucks may cross the bridge with an overload permit,” says Catherine French, CSE Distinguished Professor in the Department of Civil, Environmental, and Geo- Engineering and the study’s principal investigator. Others on the research team included CSE Distinguished Professor Carol Shield (co-investigator) and UMD assistant professor Benjamin Dymond.

Results showed that the shear forces—which transfer loads to the supports—for some bridges are not as high as those

predicted by distribution factors in the current specifications, at least partially explaining why some MnDOT bridges with low shear ratings show no signs of distress, French says. The researchers provided recommendations for more refined methods of evaluating prestressed concrete girder bridges that rate low for shear and developed a screening tool to identify which bridges should be further analyzed.

“The results of this project will help us re-evaluate aging bridges in our inventory, to distinguish those that really do have shear problems from those that don’t, and to make decisions about whether they need to be replaced or rehabilitated for extra capacity,” says Yihong Gao, bridge designer with MnDOT’s Office of Bridges and Structures.



**U of M research related to prestressed concrete girders has informed MnDOT bridge standards and practices over several decades.**

# BICYCLE INDUSTRY HAS **BIG ECONOMIC IMPACT IN MINNESOTA**

The bicycling industry in Minnesota—including manufacturing, wholesaling, retail sales, and nonprofits and advocacy groups—produced an estimated total of \$780 million of economic activity in 2014. This includes 5,519 jobs and \$209 million in annual labor income (wages, salaries, and benefits) paid to Minnesota workers.

These findings are one component of a multifaceted report from U of M researchers. Their research, funded by MnDOT, provides a comprehensive understanding of the economic impact and health effects of bicycling in Minnesota.

“This kind of bicycling study is definitely new for Minnesota but also new nationally,” says Sara Dunlap, principal planner in MnDOT’s Office of Transit. “This is the first time a state has attempted to assess, in a single study, the multiple impacts that bicycling activities have on the state’s economy and health.”

Xinyi Qian, an Assistant Extension Professor in the U’s Tourism Center, was the project’s principal investigator. For the bicycling industry portion of the work,

the co-investigators were Neil Linscheid, Extension educator, and Brigid Tuck, senior economic impact analyst, both with U of M Extension.

“Information about the bicycling industry is scattered, so we filled the information gaps by creating a list of bicycle-related businesses in Minnesota, interviewing bicycle-related business leaders, surveying bicycle-related businesses, and gathering additional information from relevant sources,” Linscheid says. “Numerous industries and a diverse supply chain are involved.” The research team then used this information to enhance an economic model that shows the economic contribution of the bicycling industry in Minnesota.

“Minnesota has a strong bicycle-related manufacturing industry that drives the bicycle-related economy,” Tuck says. “Specialty bicycle retail stores, especially independent ones, are a critical component of the bicycle retail industry in Minnesota.” Additionally, she says, when asked about local suppliers, bicycling businesses often provided names of other Minnesota companies, many of which are also bicycle-related businesses.



The bicycle industry in Minnesota produced an estimated **\$780 million** of economic activity in **2014**.





## METHOD PINPOINTS 'HOT SPOTS' FOR BUS EMISSIONS

U of M researchers have developed a way to identify the exact location of “hot spots” for air pollutants created by transit buses—work that could be used to create new strategies for addressing emission hot spots in the future.

The research team, led by Professor David Kittelson of the Department of Mechanical Engineering (ME), collected data using two different instrumented buses, one with a standard diesel engine and automatic transmission and another with a hybrid engine and selectively enabled start-stop technology (both model year 2013). Nitrogen oxide (NOx) emissions and GPS data were recorded for each bus during spring, summer, and fall on three different routes representing a wide range of driving conditions.

The study discovered that buses driving their routes often emit NOx emissions at much higher levels than during certification testing, particularly on routes with frequent stops. On selected routes, bus stops resulted in 3.3 times the route-averaged NOx emissions.

In addition, researchers were able to pinpoint the conditions under which increased NOx emissions were most likely to occur. “Bus stops, cold starts, inclines, and accelerations had the most noticeable impact on elevated NOx emissions for the tested routes,” says Andrew Kotz, a graduate student on the research team.

“Identifying spatiotemporal hot spots can give researchers and vehicle manufacturers a better understanding on where to focus their emissions-reduction efforts and provide regulators with data for improved standards,” adds Will Northrop, ME assistant professor and project co-investigator. The project was funded by the U of M’s Initiative for Renewable Energy and the Environment and CTS.

### FY17 RESEARCH PROGRAM AT A GLANCE:

- 8** patents/licenses applied for; 1 granted
- 29** research reports published
- 44** funding sources
- 100** peer-reviewed publications
- 119** faculty and research staff
- 153** active projects
- 217** research presentations given



The first federal legislation pertaining to air pollution was the **Clean Air Act of 1963**; amendments were passed in **1990**.



# EDUCATION:

## A LIFELONG JOURNEY

### SPARKING THE INTEREST OF THE **FUTURE TRANSPORTATION WORKFORCE**

CTS holds a number of events each year to reach out to youth and spark their interest in pursuing transportation-related degrees and careers.

The Roadway Safety Institute (RSI) participated in the White Earth Indian Reservation Summer Academy of Math and Science for the third consecutive year. The two-week day camp teaches students in grades 4 to 8 about math, science, and engineering using Indian culture and interactive lessons. It is offered in partnership by the White Earth Nation and the University of Minnesota Extension.

CTS hosted a session for eighth- and ninth-grade girls as part of the Eureka! Program, a partnership between the U's College of Science and Engineering and YWCA Minneapolis. The program helps girls interested in STEM explore career possibilities and prepare for next steps in their post-

secondary education. In the CTS session, the girls learned about traffic management and tested their traffic control skills with CTS's online game Gridlock Buster.

In addition, 31 middle schoolers participated in CTS's third National Summer Transportation Institute (NSTI), a two-week program featuring classroom activities, lab sessions, and field trips around the Twin Cities. NSTI is part of a national program designed to attract a diverse range of students to education and career opportunities in transportation. It was sponsored by CTS with funding from the Federal Highway Administration administered by MnDOT.







## GLOBAL TRANSIT INNOVATIONS EXPANDS STUDENT EXCHANGE

The Global Transit Innovations (GTI) Program coordinated a study-abroad course in spring semester 2017 that included visits to five cities in the Yangtze and Pearl River Delta regions in China. The course—PA 5880: High-Density Urban and Regional Development in China—was offered by the Humphrey School of Public Affairs. Led by GTI director Yingling Fan, U of M coordinators took 16 students to Shanghai, Suzhou, Nanjing, Shenzhen, and Hong Kong for the intensive two-week course in May.

CTS hosted 32 students from three Chinese universities—Southeast University, Nanjing Tech University, and Northwest University—for the second offering of the GTI Summer Training Program. Focusing on transportation and urban planning, the six-week program included academic courses, professional seminars, and site visits. It was developed by CTS, GTI, and the U of M China Center’s Mingda Institute. GTI is an affiliated program of CTS.

## AWARDS HONOR ACHIEVEMENT

**Matthew J. Huber Award** (honoring students in engineering, science, and technology fields)

- **Mengying Cui:** Doctoral candidate, civil engineering; advisor: David Levinson
- **Jingru Gao:** Master’s degree, transportation engineering; advisor: Gary Davis



**John S. Adams Award** (honoring students in policy and planning fields)

- **Jueyu Wang:** Doctoral candidate, public affairs (concentration in urban planning); advisor: Greg Lindsey



**Roadway Safety Institute Outstanding Student of the Year**

- **William Barbour,** master’s candidate, civil engineering (concentration in sustainable and resilient infrastructure systems), University of Illinois at Urbana-Champaign, an RSI partner; advisor: Daniel Work



## STUDENTS APPLY KNOWLEDGE TO **REAL-WORLD PROJECTS**

Pedestrian safety and access to healthful foods were some of the issues tackled by U of M students during the 2016–2017 academic year as part of the U’s Resilient Communities Project (RCP). In its fifth year, RCP—a program of the Center for Urban and Regional Affairs—partnered with the City of Brooklyn Park to advance an array of the city’s strategic priorities. RCP connects communities in Minnesota with U of M faculty and students through collaborative, course-based projects. More than 250 students in dozens of courses worked on projects with Brooklyn Park staff, community members, and other organizations.

In another effort, 39 students in the U’s Master of Urban and Regional Planning degree program explored ways to integrate a Minneapolis neighborhood—the North Loop—into the sharing economy. In the fall semester class (Public Affairs 5211: Urban Land Use Planning), student teams created 13 proposals on topics such as parking reallocation, bike sharing, and walkability. They showcased their work in more than 100 posters at an exhibit in December. Fernando Burga, an assistant professor in the Humphrey School of Public Affairs, was the course instructor.

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## EXHIBIT TEACHES KIDS ABOUT **REFLECTIVITY AND SAFETY**

The Roadway Safety Institute (RSI) celebrated the grand opening of its safety-themed museum exhibit at The Works Museum in Bloomington on December 9. The exhibit, a permanent installation at the museum, helps teach kids and their parents how to “be safe and be seen” while walking or biking in the dark.

The exhibit includes a dark room where kids can try on reflective clothing to see how visible they would be to

drivers at night, a microscope area for examining reflective materials up close, and a video produced by 3M about the importance of wearing reflective gear for safety.

The exhibit was created for RSI in partnership with The Works Museum, HumanFIRST Laboratory director Nichole Morris, KidZibits, and CTS.







## PRACTITIONERS GET HANDS-ON **MOTOR-GRADER TRAINING**

The Minnesota Local Technical Assistance Program (LTAP), housed within CTS, provided a two-day training course for motor-grader operators at four sites in Greater Minnesota.

Minnesota LTAP partnered with Nebraska LTAP to offer the in-demand course. “We’re continually looking for new ways to better meet the training needs of local agencies,” says Mindy Carlson, Minnesota LTAP program manager. “This workshop is a great example of partnering with other LTAPs to share expertise and resources to the benefit of our local agencies, their staff, and the public they serve.”

The training consists of one day in a classroom setting, then another day in a field setting on a local gravel road, with each workshop participant given a hands-on opportunity in a motor grader. More than 125 operators received training this summer.

“We try to cover all basics that a maintenance operator has to face,” says course instructor Brian Jackson of Nebraska LTAP. A short video about the training is available on Minnesota LTAP’s website.

### FY17 EDUCATION AT A GLANCE:

**22**

Ph.D. and master’s graduates

**130**

CTS student affiliates

**822**

K-12 students participating in CTS outreach activities

**8,374**

participants in customized training and technical assistance programs

**1988**

CTS presents the first Matthew Huber Award.

**1996**

The first Transportation Career Expo is held.

**2009**

The Gridlock Buster traffic-control game is developed to teach middle and high school students about traffic control.

**2015**

CTS begins offering a summer camp to interest K-12 students in a career in transportation.

# ENGAGEMENT:

## A STEADY DIALOG

### EVENTS BRING PERSPECTIVES TO MINNESOTA

#### Annual Transportation Research Conference

In the opening session of the 2016 research conference, Gabe Klein, author of *Start-up City: Inspiring Private and Public Entrepreneurship, Getting Projects Done, and Having Fun*, discussed the innovations taking place in our cities and examined how government, business, and nonprofit leaders can work together to use this wave of change and shape a better quality of life for the future.

In the luncheon presentation, Bryant Walker Smith outlined steps that governments can take to encourage the development, deployment, and use of automated driving systems. Smith is an assistant professor in the School of Law at the University of South Carolina and an internationally recognized expert on self-driving vehicle laws.

Following the luncheon presentation, Smith joined a panel of experts in a question-and-answer session that explored technical issues and broader policy perspectives of connected and autonomous vehicles.

#### Spring Luncheon: Moving to Access

Brookings Institution fellow Adie Tomer explored how the Institution's Moving to Access initiative is looking at innovative policies, tools, and techniques that can help ensure that all people—regardless of income or demography—get where they need to go.

#### 2016 Freight and Logistics Symposium

How does the ability to move freight affect the economic health of a state, region, and even a city? How are the supply chains of businesses impacted by freight flow? And what challenges and opportunities does Minnesota face when it comes to leveraging and strengthening its freight modes? The 2016 Freight and Logistics Symposium offered a thoughtful examination of those questions and explored other topics related to improved mobility in Minnesota, including congestion, regulation, labor shortages, and the value of all freight modes to the state's economy.



1990

CTS holds the First Annual Transportation Research Conference.

2008

CTS begins publishing the *Journal of Transport and Land Use*.

2009

CTS joins Twitter.



## VIDEOS TRACE PROGRESS: **PAVEMENT, TRAFFIC, ACCESSIBILITY**

CTS created three videos about the many contributions U of M researchers have made—and are still making—in pavement design, traffic operations, and accessibility metrics. The videos are one of the ways CTS marked 30 years of transportation innovation. The goal was to show how research progresses over time—from curiosity to discovery to innovation. The videos also show how U of M research meets the practical needs of Minnesotans in the Twin Cities metro and throughout the state and nation.

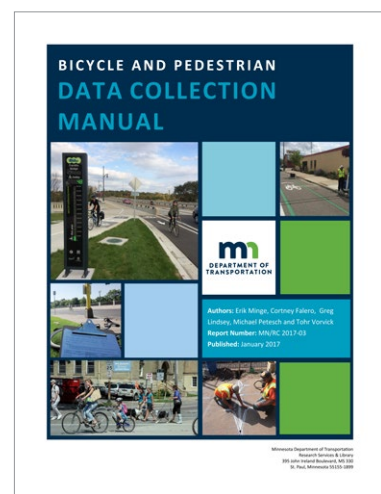


## NEW MANUAL HELPS AGENCIES **COUNT BIKE, PEDESTRIAN TRAFFIC**

As part of an ongoing effort to institutionalize bicycle and pedestrian counting, MnDOT published a new manual designed to help city, county, state, and other transportation practitioners in their counting efforts.

The *Bicycle and Pedestrian Data Collection Manual*, developed by U of M researchers and SRF Consulting Group, provides guidance and methods for collecting bicycle and pedestrian traffic data in Minnesota. The manual is an introductory guide to nonmotorized traffic monitoring designed to help local jurisdictions, nonprofit organizations, and consultants design their own programs.

The manual was completed as part of the third in a series of MnDOT-funded projects related to the Minnesota Bicycle and Pedestrian Counting Initiative, a collaborative effort launched by MnDOT in 2011 to encourage nonmotorized traffic monitoring across the state. U of M researchers, led by professor Greg Lindsey at the Humphrey School of Public Affairs, have been key partners in the initiative since its inception.



### FY17 ENGAGEMENT AT A GLANCE:

**163** media stories referencing U of M transportation research and outreach

**4,633** participants at CTS-sponsored and CTS-hosted engagement events

**23,692** subscribers of CTS-produced publications and social media

**225,220** visits to CTS websites



# LEADERSHIP:

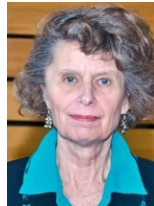
## A BOLD VISION

### DISTINGUISHED SERVICE AWARDS

CTS presented the following awards at its Annual Meeting and Awards Ceremony on February 15 in Minneapolis:

**Richard P. Braun Distinguished Service Award** (outstanding leadership in research and innovation):

- **Mary Vogel**, co-director, Center for Changing Landscapes, U of M



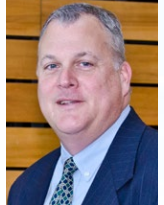
**Ray L. Lappegaard Distinguished Service Award** (outstanding leadership, mentorship, and support for the profession):

- **Alan Forsberg**, retired county engineer, Blue Earth County



**William K. Smith Distinguished Service Award** (leadership, mentorship, and education of future leaders in private-sector freight transportation):

- **Vanta Coda II**, executive director, Duluth Seaway Port Authority



**Distinguished Public Leadership Award** (public leaders who have influenced innovative transportation policy directions):

- **Michael Beard**, chair, Scott County Board, and member, Minnesota House of Representatives, 2002–2014



### RESEARCH PARTNERSHIP AWARD

This award recognizes three interconnected and progressive projects studying the applications of living snow fences in Minnesota:

- Web-Based Preventative Blowing and Drifting Snow Control Calculator Decision Tool
- Economic and Environmental Costs and Benefits of Living Snow Fences
- Assessing the Use of Shrub-Willows for Living Snow Fences in Minnesota

**Project Partners:**

- **University of Minnesota:** Gary Wyatt, Diomy Zamora, Dean Current, Gregg Johnson, Don Kilberg, Joe Knight, Arlene Mathison, Eric Ogdahl, Dinesh Paudel, Sierra

Schroder, David Smith, Steve Taff

- **MnDOT:** Farideh Amiri, Michael Elle, Brad Estochen, Wendy Garr, Dan Gullickson, Rocky Haider, Bruce Holdhusen, Joe Huneke, Cassandra Isackson, Jakin Koll, Gordy Regenscheid, James Rosenow, Dan Warzala, John Wilson, Tom Zimmerman
- **USDA:** Gregory Anderson, Ginger Kopp
- **Minnesota DNR:** Carmelita Nelson



## IN MEMORIAM: **RICHARD P. BRAUN**



Richard P. Braun, the founding director of CTS and a champion of transportation innovation, died April 11 at the age of 91. Braun served as commissioner of the Minnesota Department of Transportation from 1979–86. He also held a variety of high-level positions with state and national organizations.

connection between the professionals working at MnDOT and the faculty conducting transportation research at the University. This partnership and collaboration launched Minnesota’s reputation as an incubator for transportation innovation, a designation that remains true today. We will always remember Dick for his vision and are grateful that he remained engaged with the center for the rest of his life.”

Braun’s children have established a transportation scholarship to honor his memory and legacy.

“Thirty years ago, the University of Minnesota established the center to bridge a gap Dick identified while serving as MnDOT commissioner,” says CTS director Laurie McGinnis. “He recognized that it was critical to strengthen the

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## SAIF BENJAAFAR NAMED **CTS SENIOR SCHOLAR**



CTS launched a new element of the CTS Scholars Program: the CTS Senior Scholar.

Saif Benjaafar, Distinguished McKnight University Professor in the Department of Industrial and Systems Engineering, was named the first CTS Senior Scholar and will serve a two-year term. The selection was made

through a competitive process with guidance from the CTS Executive Committee.

Benjaafar leads the Initiative on the Sharing Economy, an effort established by CTS in partnership with Benjaafar and other faculty members across the University and administered by CTS.

CTS Scholars are leading researchers and educators at the University of Minnesota, drawn from diverse fields. They work closely with CTS to identify new research opportunities and develop new initiatives for transportation education.

**1989**

Six CTS Councils are established to define issues and recommend directions.

**1994**

The CTS Task Force on Logistics, Transportation, and Distribution is created.

**2003**

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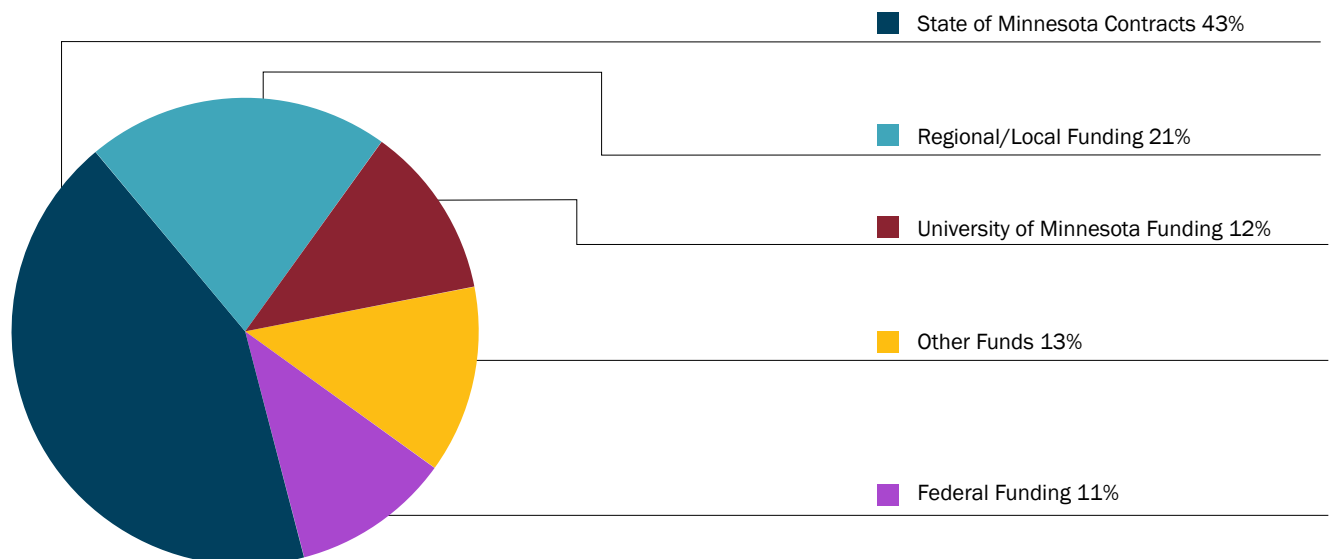
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Not pictured: Kristin Carlson, Mengying Cui, Brendan Murphy



CTS is a catalyst for transportation innovation through research, education, and engagement. It works with faculty and research staff to attract and carry out sponsored research projects; conducts programs to promote multidisciplinary education in transportation and attract future generations to the field; and engages with the community through events and communications.

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