TOGETHER, TOWARD THE UNDISCOVERED

IMPACTS REPORT 2018

CENTER FOR
TRANSPORTATION STUDIES
UNIVERSITY OF MINNESOTA

OUR MISSION: CTS IS A CATALYST FOR TRANSPORTATION INNOVATION THROUGH RESEARCH, EDUCATION, AND ENGAGEMENT.

FY18 BY THE NUMBERS

At the University of Minnesota, we're working from every angle to make transportation better. We hope you enjoy this report of CTS highlights from fiscal year 2018. And as always, our deepest thanks to our supporters.

Sincerely,
Laurie G. McGinnis, Director

RESEARCH

5 patents/licenses applied for; 3 granted

106 peer-reviewed publications and conference proceedings

166 active projects

46 research reports published

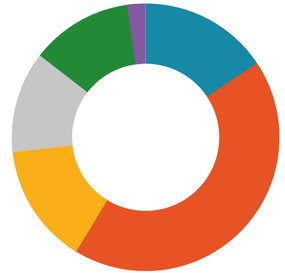
EDUCATION

26 Ph.D. and master's graduates

562 K-12 students in CTS activities

5,605 participants in customized training and technical assistance programs

REVENUES: $15,490,000



- Federal 16%
- State of Minnesota 43%
- Regional/Local 15%
- University of Minnesota 12%
- Other 12%
- Miscellaneous 2%

Read the annual impacts report online
for links to these stories and much more:
cts.umn.edu/2018annualreport

ENGAGEMENT

183 media stories referencing transportation research

3,715 participants at events

24,065 subscribers to publications and social media

SPOTLIGHT: RESEARCH OUTCOMES

Testbed for connected vehicles

Researchers transformed a high-crash stretch of interstate in Minneapolis into a testbed for connected vehicles. The close-to-campus testbed has high-resolution radar sensors covering two-thirds of a mile on I-94. The sensors give nearly continuous coverage of the trajectories of 85,000 vehicles a day, while cameras provide real-time verification of that information. The data-collection infrastructure is supported by a comprehensive data warehousing and dissemination software architecture. *Lead researcher: John Hourdos, Minnesota Traffic Observatory. Sponsors: USDOT's Roadway Safety Institute, MnDOT.*

Bus operator scheduling tool

As part of a multiyear partnership, researchers developed a tool that aims to help Metro Transit schedule and manage its bus operator workforce. The tool recommends how many reserve operators are needed for the next day's service; the goal is to balance the number of reserves with the number of regular operators who are asked to work overtime. *Lead researchers: Qie He and Diwakar Gupta, Department of Industrial and Systems Engineering. Sponsors: U of M Office of the Vice President for Research, Metro Transit.*

Creating Knowledge and Finding Answers

Fresh perspectives and bold solutions are needed to make transportation better—to move people and goods safely, efficiently, and sustainably.

What CTS does:

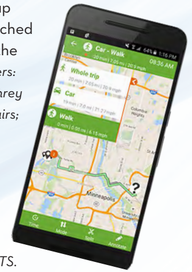
- **Manage a broad research program funded by diverse sources.**
- **Engage multidisciplinary teams to tackle pressing issues.**
- **Develop and disseminate new knowledge.**

App for high-risk rural curves

A new system uses a smartphone app to warn drivers of high-risk curves. The system uses in-vehicle technology to display dynamic curve-speed warnings to the driver based on the driver's real-time behavior and position relative to the curve. *Lead researchers: Brian Davis, Department of Mechanical Engineering; Nichole Morris, HumanFIRST Lab. Sponsors: Minnesota Local Road Research Board, MnDOT.*

Smartphone app for collecting trip data

Daynamica™, a smartphone app designed to log activities and trips, was patented. The app makes it easier and less costly to collect travel behavior information and provides richer, more accurate data than traditional methods. A start-up company was launched to commercialize the app. *Lead researchers: Yingling Fan, Humphrey School of Public Affairs; Julian Wolfson, School of Public Health; Gediminas Adomavicius, Carlson School of Management. Sponsors: USDOT, CTS.*



Job accessibility data and analysis

The University's Accessibility Observatory published reports illustrating the accessibility to jobs by transit and by auto in U.S. cities. The DOTs in Florida, Maryland, and the District of Columbia are using Observatory data for their planning. *Lead researcher: Andrew Owen, Accessibility Observatory. Sponsor: National Accessibility Evaluation Pooled-Fund Study.*

Pavement design package

A series of research projects under way since the early 2000s culminated in a pavement design package that allows for the improved use of geogrid. This work—which will enable cities, counties, and the state to build more financially effective roadways—was honored with the 2018 CTS Research Partnership Award. *Lead researchers: Kimberly Hill, Lev Khazanovich, Danielle Tan, Department of Civil, Environmental, and Geo- Engineering; Satish Gupta, Andry Ranaivoson, Amanjot Singh, Department of Soil, Water, Climate. Sponsors: MnDOT, Minnesota Local Road Research Board, private sector.*

Healthy roadside turfgrass

Keeping Minnesota's roadsides green is about more than just aesthetics—healthy turfgrass can improve water quality, reduce erosion and road noise, and provide animal habitat. However, harsh conditions such as heat, drought, and salt use can make it difficult for roadside turfgrass to thrive. Researchers developed best management practices for installing and establishing a salt-tolerant turfgrass mixture they developed in previous research. *Lead researcher: Eric Watkins, Department of Horticulture. Sponsor: Minnesota Local Road Research Board.*

More-efficient engines

The Thomas E. Murphy Engine Research Laboratory received $1.4 million to research ways to boost the energy efficiency of cloud-connected delivery vehicles. As part of the project, researchers are partnering with UPS and an electric vehicle manufacturing company to improve the energy efficiency of medium-duty delivery vehicles. *Lead researcher: Will Northrop, Department of Mechanical Engineering. Sponsor: U.S. Department of Energy.*

The best pothole patch for cold climates

Choosing the best or most cost-effective pothole repair method is complicated. Researchers evaluated the effectiveness of different methods in a cold climate based on durability, road safety, ride quality, and driver satisfaction. They then developed decision trees and guidelines for road crews. *Lead researcher: Manik Barman, Department of Civil Engineering, University of Minnesota Duluth. Sponsor: MnDOT.*

SPOTLIGHT: EDUCATION ACTIVITIES

Camps and exhibits

Middle schoolers participated in CTS's National Summer Transportation Institute, a two-week program featuring classroom activities, lab sessions, and field trips around the Twin Cities. The summer camp attracts a diverse range of students to education and career opportunities in transportation.

Other activities to spark students' interest included Tech Fest, an annual event held at The Works Museum in Bloomington, geared toward kids ages four and up, and TransportationYou, a mentoring program of the Minnesota Chapter of the Women's Transportation Seminar (WTS) that encourages girls ages 13–18 to pursue transportation careers.

Education Awards

Matthew J. Huber Award (students in engineering, science, and technology fields)
- Woongsun Jeon: Doctoral candidate, mechanical engineering; advisor: Rajesh Rajamani
- Jacqueline Nowak: Master's degree, urban and regional planning, and master's, civil engineering; advisor: Alireza Khani

John S. Adams Award (honoring students in policy and planning fields)
- Xinyi Wu: Doctoral candidate, urban planning; advisor: Jason Cao
- Travis Fried: Master of GIS; advisor: Susanna McMaster

Roadway Safety Institute Outstanding Student of the Year
- Frank Alarcon: Master's degree, urban and regional planning; advisor: Frank Douma

Developing the Transportation Workforce

A skilled and diverse workforce is needed to plan and manage transportation systems—today's and tomorrow's.

What CTS does:

Attract K-12 students to transportation careers.

Enhance University transportation education.

Transfer research results and best practices to practitioners.

Braun Transportation Scholarship

In 2017 the children of Richard P. Braun established a scholarship to honor his memory and legacy. The Richard P. Braun Transportation Scholarship is now awarded annually to a University of Minnesota undergraduate student who is pursuing a degree in a transportation-related field of study. The first recipient of the scholarship is Ella Rasp, an urban studies major, advised by Paula Pentel. Braun was CTS's founding director.

International student exchanges

The Global Transit Innovations (GTI) program coordinated a study-abroad course in spring semester 2018. The course—PA: Planning for China's Urban Billion—was offered by the Humphrey School of Public Affairs; 11 students visited four Chinese cities. In turn, 16 students from Chinese universities spent six weeks in Minnesota learning about American transportation and culture as part of a GTI summer training program. In addition, 15 professionals from the Shenzhen Urban Transportation Planning Center came to Minnesota in fall 2017 for a four-week course. *Sponsors: GTI, CTS, China Center's Mingda Institute.*

Summer interns on the job

University students put their skills to work on real-world transportation projects in internships at MnDOT and Ramsey County. Thirteen civil engineering undergrads participated in various MnDOT offices, and four students worked in several Ramsey County departments. The new partnership with the county built on the longstanding success of the MnDOT program, which completed its eighth year. *Sponsors: MnDOT, Ramsey County.*

Accessible-design training for practitioners

The Minnesota Local Technical Assistance Program (LTAP), housed within CTS, held a series of customized training courses about accessible design. The training, offered in locations across Minnesota, gave attendees an understanding of how to provide accessibility in the public right-of-way from scoping through final design. Minnesota LTAP also posted video recordings of the workshop sessions. *Sponsors: Minnesota Local Road Research Board, MnDOT, Minnesota LTAP.*

Hands-on training for airport staff

Airport managers, maintenance staff, and others from around Minnesota gathered for Fall Fly-Around events at the Morris, Eveleth, and Fairmont airports. The training allowed attendees to learn about airport operations topics in a more casual, hands-on environment from MnDOT Aeronautics representatives. The Airport Technical Assistance Program, housed within CTS, offered the training.

SPOTLIGHT: ENGAGEMENT HIGHLIGHTS

Strategic visioning workshop for automated vehicles in Minnesota

CTS hosted the two-day Strategic Visioning Workshop for Automated Vehicles in Minnesota in June. The event convened about 100 representatives from across the public, private, academic, and nonprofit sectors to define and advance an agenda related to AVs in the state. Participants collaboratively developed an action plan that focuses on deployment. *Sponsors: CTS, McKnight Foundation, MnDOT, Hennepin County, Metropolitan Council.*

Freight & logistics symposium

Participants at the annual Freight and Logistics Symposium explored freight's integral role in the on-demand revolution. New trends and emerging technologies are driving consumer expectations for shortened, lower-cost, more flexible delivery options. Carriers and logistics service providers are facing pressure to increase their own pace of change, adapt to new distribution and delivery models, and provide higher service levels.

Engaging Debate and Informing Decisions

To make an impact, knowledge needs to be widely shared with decision makers, practitioners, the media, and the public.

What CTS does:

- **Translate research results to broaden understanding.**
- **Provide trusted information to stakeholders.**
- **Convene diverse groups and forums to stimulate discussion.**

Research impacts videos

CTS launched a series of videos about the impacts of research. The first two videos touch on the impacts of a multiyear initiative on bicycle and pedestrian counting and a study of the perceived waiting times at transit shelters.

Blowing Snow Control Tools website

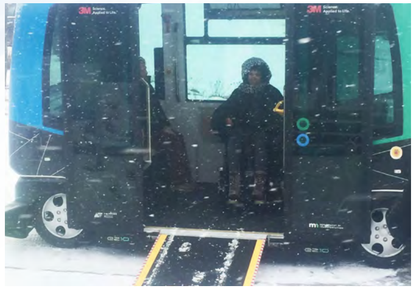
New webinars were added to the Blowing Snow Control Tools website. The site is the home for tools and resources that can help agencies keep roads clear of blowing and drifting snow and ice. It includes a snow-fence design module and a cost-benefit tool to estimate the return on investment of various practices. The site is developed and maintained by CTS. *Sponsor: MnDOT.*

Annual research conference

CTS's 2017 research conference featured two plenary presentations: Joung Lee, policy director at the American Association of State Highway and Transportation Officials, examined the latest directions in infrastructure funding at the federal and state levels; L.A. Metro's Chief Innovation Officer Joshua Schank described the creation of the Office of Extraordinary Innovation, designed to invite new ideas for doing business and manage strategic planning for the agency. The event also included a range of concurrent sessions.

Automated vehicles: equity task force

Researchers in the U's Transportation Policy and Economic Competitiveness Program formed a task force on automated and self-driving vehicles. Their goal was to identify how various deployment strategies could improve mobility and access for transportation-dependent Minnesotans: seniors, people with disabilities, and others who are not able to drive themselves. Stakeholder meetings were held across the state.



Annual meeting of research centers

CTS hosted the annual summer meeting of the Council of University Transportation Centers. More than 130 attendees from university centers and institutes focused on transportation research, education, and outreach gathered in Minneapolis for the event. In the event keynote, Carissa Slotterback, associate dean of the Humphrey School of Public Affairs, discussed the importance of collaborative engagement in transportation research.

Leaders who made an impact:

2018 Distinguished Service Awards

Richard P. Braun Distinguished Service Award (outstanding leadership in research and innovation): Greg Lindsey, professor, Humphrey School of Public Affairs, University of Minnesota

Ray L. Lappegaard Distinguished Service Award (outstanding leadership, mentorship, and support for the profession): Amy Vennewitz, deputy director, Metropolitan Transportation Services, Metropolitan Council

William K. Smith Distinguished Service Award (leadership, mentorship, and education of future leaders in private-sector freight transportation): George Schember, vice president, Cargill Transportation & Logistics

Distinguished Public Leadership Award (public leaders who have influenced innovative transportation policy directions): Jim McDonough, chair, Ramsey County Board of Commissioners

EXECUTIVE COMMITTEE

Chair: Jay Cowles
Co-Chair, Itasca Project Transportation Committee

Ardell Brede
Mayor of Rochester, Minnesota

Gina Buccellato
Technical Director, Transportation Safety Division, 3M

Chris Cramer
Associate Dean for Academic Affairs, College of Science & Engineering, University of Minnesota

Steve Cramer
President and CEO, Minneapolis Downtown Council

Scott Dibble
Senator, State of Minnesota

Bill Dossett
Executive Director, Nice Ride Minnesota

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Peter Frosch
Vice President, Strategic Partnerships, GREATER MSP

Andrew Furco
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County Commissioner, Ramsey County

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Partner, Director of Civic Studio, Duval Companies

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Vice President, Cargill Transportation & Logistics

Vicki Schwartz
Vice President, Logistics and Transportation, Schwan's Company

Carissa Slotterback
Associate Dean, Humphrey School of Public Affairs, University of Minnesota

Troy Volk
President, Volk Transfer Inc.

Charles Zelle
Commissioner, Minnesota Department of Transportation

civil engineering, mechanical engineering, computer science, public affairs, planning, design, horticulture, plant biology, urban studies, human factors, geography, applied economics, public health, aerospace engineering, industrial and systems engineering, management, bioproducts, biosystems engineering

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