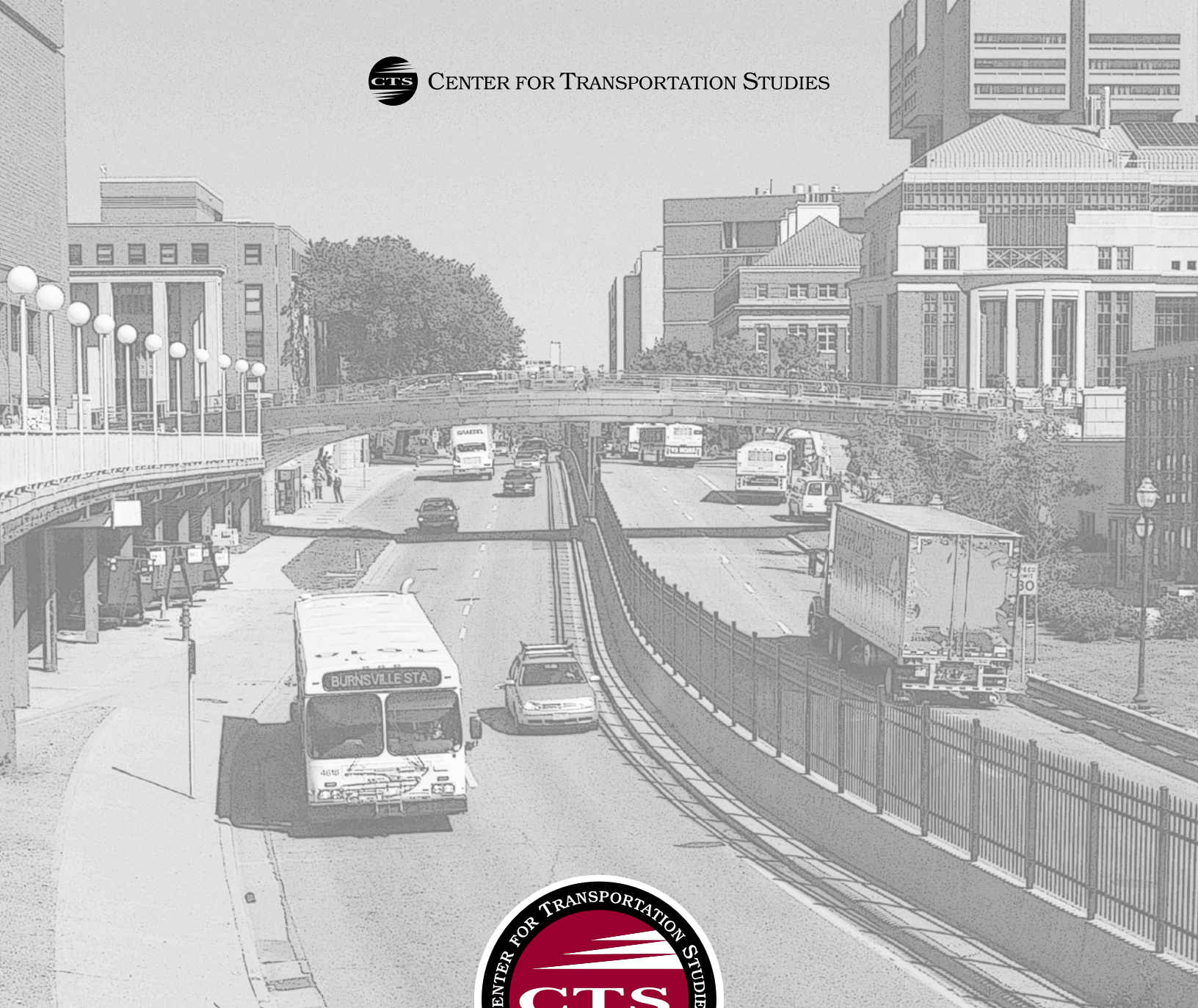




CENTER FOR TRANSPORTATION STUDIES



# 2008 Annual Report



UNIVERSITY OF MINNESOTA

## Center for Transportation Studies

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**Photography:** Jonathan Chapman: front & back covers; inside front cover & title page; pp. 7 (bottom), 8 (bottom), 11 (top), 14. Nancy Johnson: p. 26 (top right). Michelle Riedel: p. 26 (top right). St. Anthony Falls Lab: p. 7 (top). Alaska Department of Transportation: p. 9 (top). Faculty, staff, and students

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# Center for Transportation Studies

## 2008 Annual Report

This publication contains highlights of transportation research, education, and outreach activities conducted by the Center for Transportation Studies and its affiliated programs for the period July 2007 through June 2008 (fiscal year 2008).



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# DIRECTOR'S MESSAGE



Robert C. Johns

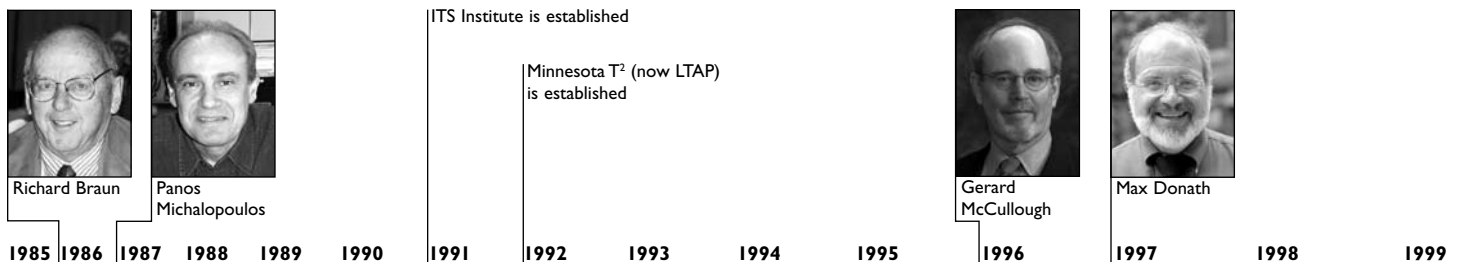
In 1986 two professors planted the seed for a transportation research center at the University of Minnesota. The idea took root, and today the Center for Transportation Studies is a nationally recognized leader in transportation innovation.

CTS opened its doors in 1987 with a single employee—founding director Richard P. Braun, a former commissioner of the Minnesota Department of Transportation—and a one-time state allocation of \$2.7 million. Today CTS coordinates approximately \$20 million annually for research, education, and outreach activities at the University.

Much has happened between then and now. Our research program broadened from pavements, bridges, and traffic into arenas such as policy, finance, land use, and energy. More than 75 faculty from 25 departments are now involved.

CTS brings these diverse fields together to tackle complex transportation issues. For example, a recent study led by the American Institute of Architects looked at how transportation can enhance community design, while an effort

## CTS Timeline



- 1985**
  - Two transportation professors in the Department of Civil and Mineral Engineering—Panos Michalopoulos and Yorgos Stephanedes—work toward the establishment of a transportation research center.
- 1986**
  - The University's Institute of Technology and Department of Civil and Mineral Engineering establish CTS, and Richard Braun is named CTS director.
- 1987**
  - CTS begins operation using oil overcharge funds allocated by the state of Minnesota and funds from Mn/DOT. The Regional Transit Board provides funding to CTS for transit research.
  - CTS joins Mn/DOT and the Federal Highway Administration (FHWA) in helping fund the development of the Autoscope video sensor technology by Professor Panos Michalopoulos.
- 1988**
  - CTS issues the first Request for Proposals to University researchers.
- 1989**
  - CTS formalizes its committee and council structure.
- 1990**
  - CTS holds the First Annual Transportation Research Conference.
- 1991**
  - A state transportation bill is signed that includes operating funds for CTS.
  - The Intelligent Transportation Systems (ITS) Institute is established in CTS by the Intermodal Surface Transportation Efficiency Act (ISTEA) as a federal University Transportation Center. Dennis Foderberg is named director.
  - Professor Panos Michalopoulos commercializes the Autoscope technology, which is incorporated into products sold worldwide and generates significant royalties for the University.
- 1992**
  - The Minnesota T<sup>2</sup> program is established with funding from the FHWA's Local Technical Assistance Program (LTAP) and matching funds from the Minnesota Local Road Research Board.
- 1993**
  - CTS reports to the University's Vice President for Research and Dean of the Graduate School.
- 1994**
  - Richard Braun retires as CTS director.
  - The Center moves from the Civil Engineering Building to new offices in the Transportation and Safety Building.
- 1996**
  - Gerard McCullough is named CTS director.
- 1997**
  - The Transportation and Regional Growth Study is launched.
  - CTS holds a Policymakers' Forum titled "Logistics—Keeping Minnesota Competitive." This forum becomes the basis for the annual freight and logistics symposium.
  - Professor Max Donath is named director of the ITS Institute.
- 1998**
  - The ITS Institute is authorized to receive \$2 million per year in the Transportation Equity Act for the 21st Century (TEA-21).

funded by the state legislature explored ways to reduce greenhouse gas emissions from the transportation sector.

CTS has steadily added new capabilities with components such as the federally funded Intelligent Transportation Systems Institute and the Minnesota Local Technical Assistance Program. We also partner with other organizations in programs such as the Center for Excellence in Rural Safety and the Transportation Engineering Road Research Alliance.

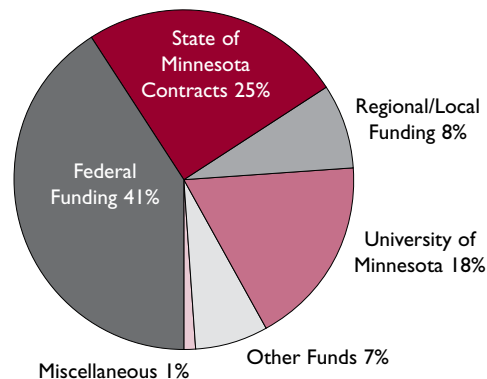
Throughout its history, CTS has served as a resource and neutral facilitator, helping University researchers share their knowledge with professionals and policymakers and inform public debate. This role—public engagement—has grown in scope and importance, evidenced by an array of events, publications and Web sites, and media outreach.

We are proud to have reached the upper echelon of the nation's transportation centers. CTS is a proven performer, thanks to the contributions of the many people and organizations that have supported us. We look forward to what the next 20 years may bring.

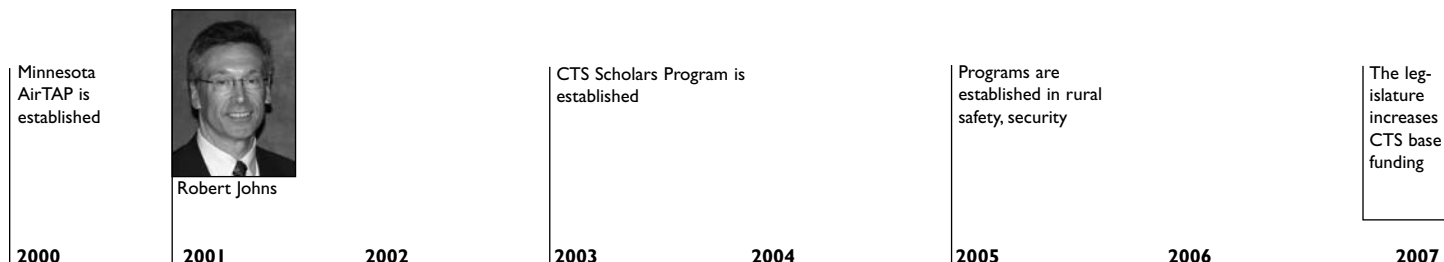


Robert C. Johns, Director  
Center for Transportation Studies

### FY08 BUDGET



CTS total revenues FY08: \$19.9 million



- 2000**
  - CTS, Mn/DOT's Office of Aeronautics, and the Minnesota Council of Airports launch the Airport Technical Assistance Program (AirTAP).
- 2001**
  - A Graduate Certificate in Transportation Studies program is established and begins accepting students.
  - Robert Johns is named CTS director.
- 2002**
  - The first James L. Oberstar Forum on Transportation Policy and Technology is held.
  - CTS reports to the University Executive Vice President and Provost.
- 2003**
  - The Transportation and Regional Growth Study is brought to a close with the publication of a synthesis titled *Market Choices and Fair Prices*.
  - CTS implements the CTS Scholars Program, which involves joint appointments of faculty and researchers.

- 2004**
  - The Center hosts the first Access to Destinations conference, using University funds gained through a University-wide competition.
- 2005**
  - The ITS Institute is reauthorized in the federal SAFETEA-LU transportation act at a level of \$16 million over five years.
  - A new interdisciplinary research and outreach study, Access to Destinations, gets under way.
  - A CTS role is defined for the new Transportation Engineering and Road Research Alliance (TERRA).
  - CTS expands its partnership with Hennepin County on the Community Transportation (CT) program.
- 2006**
  - CTS establishes the Security in Transportation Technology Research and Applications (SECTTRA) Program in partnership with the Department of Computer Science to position the University to attract federal funds for transportation security research.
  - CTS takes on a supporting role for the Humphrey Institute's Center for Excellence in Rural Safety (CERS). The center was funded in SAFETEA-LU.

- The Richard P. Braun CTS Chair in Transportation is fully funded with proceeds from Autoscope royalties and the completion of a fundraising effort.
- 2007**
  - The ITS Institute works with the Department of Civil Engineering to develop new traffic laboratory facilities, moving the previous ITS lab to the Civil Engineering Building.
  - CTS receives an appropriation from the Minnesota Legislature to assess public policy and technology options for reducing greenhouse gases emitted from the transportation sector in Minnesota.
  - Research is completed under the Moving Communities Forward interdisciplinary study, funded by the American Institute of Architects.
- 2008 (through June 30)**
  - State transportation legislation is signed that increases operating funds for CTS.
  - An online Rural Highway Safety Clearinghouse is launched by CERS.
  - The legislature appropriates funds to CTS for a study of "value capture" methods for transportation finance.

RESEARCH



**20** years...

**600** research reports

[www.cts.umn.edu/Research](http://www.cts.umn.edu/Research)

## Interdisciplinary studies

### ► Reducing greenhouse gas emissions

CTS received an appropriation in 2007 from the Minnesota Legislature to assess public policy and technology options for reducing greenhouse gas (GHG) emissions from the transportation sector in Minnesota. To address the interdisciplinary issues raised by this study, CTS assembled and led a research team drawn from multiple fields including mechanical engineering, public policy, and civil engineering. Principal investigators were Professor David Kittelson from the Department of Mechanical Engineering, Assistant Professor Julian Marshall from the Department of Civil Engineering, and Assistant Professor Elizabeth Wilson from the Hubert H. Humphrey Institute of Public Affairs.

The team found that the transportation sector can meet its share of the state's goals for reducing GHG emissions in 2015 and can possibly exceed them in 2025—but action must start now. According to the final report, meeting the goals will require a combination of strategies targeted to reduce fuel consumption, vehicle-miles traveled, and fuel carbon content.



*Cutting fuel consumption is necessary to meet the state's emission goals, according to the Greenhouse Gas study.*

### ► Mapping accessibility

CTS published three research reports in the Access to Destinations study. Access to Destinations is an interdisciplinary research and outreach effort coordinated by CTS with support from sponsors including the Minnesota Department of Transportation, Hennepin County, the Metropolitan Council, and the McKnight Foundation. A synthesis of the study research will be published in 2009.

The Second International Access to Destinations Conference was held in August 2007 (see page 25).



*The Access to Destinations study examines access to jobs and other locations.*

### ► Improving community design and livability

Final reports were published for the Moving Communities Forward study. The pioneering study analyzed more than 30 different transportation projects from every corner of the country, exploring how they affect their communities' economic progress, environmental health, public safety, level of citizen participation, and overall aesthetics and livability. The American Institute of Architects (AIA) selected CTS in 2006 to conduct the study. Funding was derived from a grant to the AIA from the Federal Highway Administration, authorized by Congress in the 2005 federal surface transportation bill.

*Pictured left: The Moving Communities Forward study documented how transportation projects can make communities more prosperous and livable.*

## FY08 research project sampler

### ► Analyzing traffic patterns

The collapse of the I-35W bridge over the Mississippi River on August 1, 2007, sparked a number of research studies. In the weeks immediately following the collapse, David Levinson, the Braun/CTS Chair in Transportation Engineering, and three other researchers—civil engineering assistant professors Henry Liu and Nikolas Geroliminis and human factors researcher Kathleen Harder—received funding from the National Science

Foundation's Small Grants for Exploratory Research program to study how metropolitan travel patterns respond to the sudden loss of a major transportation link. They found that traffic adapted well to the bridge collapse. Most drivers did not see a change in travel time after they chose alternative routes for their trips, but some saw an increase and a smaller number experienced a reduction in their travel time.



*A new bridge system can shave several weeks of construction time.*

### ► Building bridges more quickly

Civil engineering researchers confirmed the durability and performance over time of a system for constructing bridges more quickly and with less impact on the environment. The project, sponsored by the Minnesota Department of Transportation, focused on systems that eliminate the need to place and remove formwork, thus accelerating on-site construction and improving safety. For the research, the University team—led by Professors Catherine French and Carol Shield—instrumented and monitored two Minnesota bridges. They also constructed and tested a two-span test bridge in the Structures Laboratory at the University of Minnesota. (The project received the 2008 CTS Research Partnership Award; see page 29.)

### ► Studying the effects of alcohol

Researchers in the HumanFIRST Program and the Intelligent Vehicle (IV) Lab collaborated to study the effects of alcohol on motorcyclists, taking advantage of the programs' access to unique research facilities and expertise in monitoring driver performance. The IV Lab researchers, led by director Craig Shankwitz, instrumented a motorcycle that could be operated safely by a study subject while under the influence of alcohol. HumanFIRST researchers, including research fellows Janet Creaser and Michael (Mick) Rakauskas, conducted test sessions during which study participants either drank alcohol or were given a placebo. The analysis revealed that some impairment was evident in motorcycle riders at the .05 blood-alcohol level, below the .08 level used by law enforcement for drunk driving arrests. The research was funded by the National Highway Traffic Safety Administration. The HumanFIRST Program and the IV Lab are components of the Intelligent Transportation Systems (ITS) Institute, directed by Professor Max Donath.



*Impairment was evident in motorcyclists before they reached the .08 blood-alcohol level—the legal limit.*



**► Keeping road pollutants out of lakes and rivers**

A research team developed a new procedure to assess the performance of underground storm water treatment devices. Funded by the Minnesota Local Road Research Board and the Twin Cities Metropolitan Council, researchers at the St. Anthony Falls Laboratory (SAFL) determined the sediment removal efficiency of several devices. SAFL director Omid Mohseni and co-investigator John Gulliver, professor of civil engineering, developed the new procedure during the research. The procedure was incorporated into the Minnesota Stormwater Best Management Practices (BMP) Performance Assessment Protocol through funding from the Minnesota Pollution Control Agency. In addition, the American Society for Testing and Materials (ASTM) International developed a new standard for testing hydrodynamic separators based on the research.



*Researchers tested storm water treatment devices to gauge how well they remove sediment.*

**► Comparing urban and rural driving attitudes**

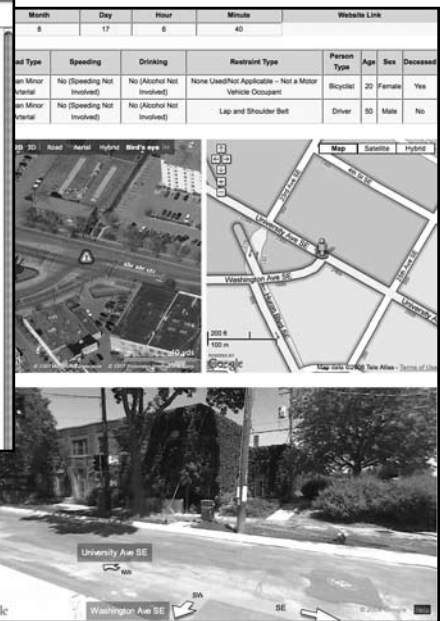
HumanFIRST research sponsored by the Minnesota Local Road Research Board explored the differences in driving behavior and attitudes between urban and rural drivers. Research fellow Michael (Mick) Rakauskas and former director Nic Ward found that more rural drivers believe their risky driving behaviors—not wearing seat belts and driving after drinking—are not that dangerous compared to their urban counterparts. Moreover, rural drivers perceive lower value in government-sponsored traffic safety interventions than their urban counterparts.



## Deployment and implementation

### ► Bringing home the facts of traffic fatalities

Researchers in the Center for Excellence in Rural Safety (CERS) mapped out every traffic-related fatality in the nation for 2006 with details on each death. Users can type in an address at SafeRoadMaps.org to see a map or satellite image of all of the road fatalities that have occurred in the area. Plus, users have the ability to narrow down their search to see the age of the driver, whether speeding or drinking was a factor, and if the driver was wearing a seat belt. The new tool, says CERS research director Tom Horan, also illustrates which life-saving public policies, such as strong seat belt laws, are in the chosen area. CERS, established by the 2005 federal transportation act, is a joint program between the State and Local Policy Program at the Hubert H. Humphrey Institute of Public Affairs and CTS.



### ► Smoothing traffic flow

A system was implemented on 11 signals along busy France Avenue in Edina and Bloomington, Minnesota, that may one day allow traffic signals on arterial streets to adjust automatically based on traffic conditions. The system, called SMART-Signals (short for “Systematic Monitoring of Arterial Road Traffic Signals”), was developed by a team led by assistant civil engineering professor Henry Liu. The effort was funded by the ITS Institute and the Minnesota Local Road Research Board, with significant in-kind support from Hennepin County.



► **Designing technology to aid drivers**

Driver-assistive technologies—including head-up displays, vibrating seats, and steering control developed by director Craig Shankwitz and research staff in the Intelligent Vehicles Laboratory—were installed in snowplows and buses. For example, three vehicles (and a fourth planned) have been deployed in Alaska, where high snowfall rates and dry, blowing snow routinely cause whiteout conditions and zero visibility. Two snowplows in St. Louis County, Minn., are also instrumented with the technologies.



*Technologies help drivers stay on the road in low-visibility conditions.*



► **Monitoring public spaces**

The Department of Homeland Security and the Transportation Security

Administration deployed a mass transit surveillance and early warning system developed by Professor Nikolaos Papanikolopoulos and program director Vassilios Morellas of the Department of Computer Science and Engineering. The system, in the Amtrak Station in Philadelphia, Penn., uses computer vision techniques to monitor activities. Papanikolopoulos is the director of SECTTRA (Security in Transportation Technology Research and Applications), a joint effort of the Department of Computer Science and Engineering and CTS.



*A surveillance system uses computer vision techniques to warn of suspicious activities.*

► **Rating bridges**

The Mn/DOT Bridge Office implemented a procedure and an associated computer program for ranking steel bridges with fatigue- or fracture-critical details. The procedure was developed during a research project led by Professor Art Schultz in the Department of Civil Engineering.

Research funds—and sources—have grown over time, a sign of the increased interest in addressing transportation challenges through research. In FY08, 45 diverse sources provided nearly \$13.5 million for transportation research.

## Major awards/grants received in FY08

### ► Understanding the causes and costs of the collapse

The National Science Foundation (NSF) awarded a two-year, \$300,000 grant to University of Minnesota researchers to study travel behavior changes after the collapse of the I-35W bridge in August 2007 and its reopening in September 2008. The research team consists of principal investigator Henry Liu, assistant professor in the Department of Civil Engineering (CE), and co-investigators David Levinson, Braun/CTS Chair in Transportation Engineering, and Kathleen Harder, research associate with the Center for Human Factors Systems Research and Design. The project is a continuation of their previous NSF Small Grants for Exploratory Research project (see page 6). CE assistant professor Nikolas Geroliminis is also involved with this new project, which will analyze how an extensive traffic system responds to a sudden, major network disruption.

The Minnesota Department of Transportation is also funding a project related to the bridge collapse. Using data



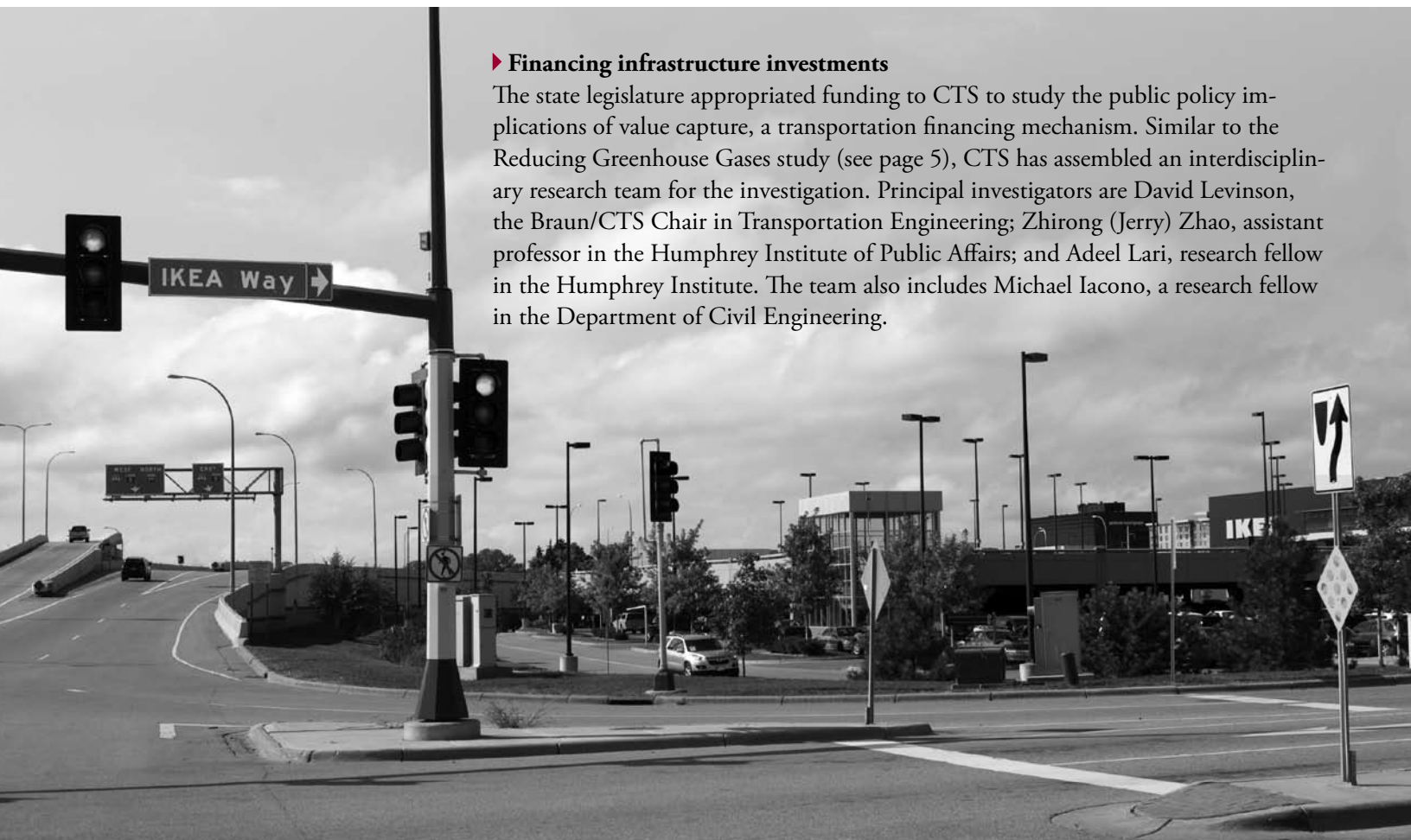
*The new I-35W bridge over the Mississippi in Minneapolis*

collected from in-vehicle GPS units, David Levinson and other researchers are developing models of travel behavior before and after the bridge reopening. Using these models and observations of travel pattern changes, the researchers will attempt to estimate road-user costs associated with the collapse.

In addition, NSF funded a study of the structural factors that may have contributed to the collapse. The team includes civil engineering faculty Taichiro Okazaki, Roberto Ballarini, Art Schultz, and Ted Galambos.

### ► Financing infrastructure investments

The state legislature appropriated funding to CTS to study the public policy implications of value capture, a transportation financing mechanism. Similar to the Reducing Greenhouse Gases study (see page 5), CTS has assembled an interdisciplinary research team for the investigation. Principal investigators are David Levinson, the Braun/CTS Chair in Transportation Engineering; Zhirong (Jerry) Zhao, assistant professor in the Humphrey Institute of Public Affairs; and Adeel Lari, research fellow in the Humphrey Institute. The team also includes Michael Iacono, a research fellow in the Department of Civil Engineering.



### ► Reducing congestion

The Intelligent Transportation Systems (ITS) Institute received \$5.3 million to help Minnesota Valley Transit Authority (MVTA) buses better navigate shoulder lanes using lane-guidance technology and improve traffic flow on Cedar Avenue (Trunk Highway 77) and I-35W. The money is part of a \$133.3 million award to the state through the USDOT's Urban Partnership Agreement program. Two units of the ITS Institute—the Intelligent Vehicles Lab, led by Craig Shankwitz, and the HumanFIRST Program, led by Mike Manser—are collaborating in the work. The IV Lab will deploy lane-guidance technology, which it had developed and tested in earlier research, on 10 MVTA buses. The HumanFIRST Program will help the MVTA procure and prepare a driver training simulator and develop the training protocol.

Another UPA research element is a study of telecommuting by Adeel Lari, research fellow with the Humphrey Institute of Public Affairs.



*Lane-guidance technology is being deployed on 10 metro buses.*

### ► Collecting and archiving traffic data

CE assistant professor Henry Liu received \$111,000 to extend his work on “SMART-Signal” technologies and algorithms for oversaturated signalized intersections. This research is drawing national attention for its promising new approach to collect and archive real-time traffic data on arterials (see page 8). The research is part of a \$600,000 grant from the National Cooperative Highway Research Program to consultant Kimley-Horn.



### ► Planning for disaster evacuation

Shashi Shekhar, a McKnight Distinguished University Professor of Computer Science, and Henry Liu, a civil engineering assistant professor, received a \$450,000 grant from the National Science Foundation to investigate an interdisciplinary approach for “Spatio-Temporal Network Databases for Transportation Science.” The grant is to further research into scalable computational methods for determining routes, schedules, and traffic management plans for evacuating metropolitan areas. Shekhar's research team previously completed a system to coordinate local emergency evacuation plans in multiple communities.

### ► Designing better pavements

The University's Pavement Research Institute (PRI) partnered with Mn/DOT, Applied Research Associates, and the University of California, Davis to attract \$4 million from the second Strategic Highway Research Program (SHRP 2) to conduct a research study on composite pavement systems in Minnesota. Team members are PRI director Mike Darter, CE associate professors Lev Khazanovich and Mihai Marasteanu, and PRI associate director Derek Tompkins.

## Research reports published in FY08

► These reports are available in PDF format at [www.cts.umn.edu/Publications/ResearchReports](http://www.cts.umn.edu/Publications/ResearchReports).

### Transportation and the Economy research

*Local Road Funding History in Minnesota*  
Barry Ryan, Thomas Stinson  
Mn/DOT 2007-26

*Transportation as Catalyst for Community Economic Development*  
John S. Adams, Barbara J. VanDrasek  
CTS 07-07

### Transportation Safety and Traffic Flow research

*Access to Destinations: Travel Time Estimation on Arterials*  
Gary A. Davis, Hui Xiong  
Mn/DOT 2007-35

*Access to Destinations: Twin Cities Metro-wide Traffic Micro-simulation Feasibility Investigation*  
John Hourdos, Panos Michalopoulos  
Mn/DOT 2008-15

*Benefit-Cost Analysis for Intersection Decision Support*  
Mike Corbett, David M. Levinson, Xi Zou  
Mn/DOT 2007-32

*Cross Median Crashes: Identification and Countermeasures*  
Gary A. Davis  
Mn/DOT 2008-17

*Developing Driving Support Systems to Mitigate Behavioral Risk Patterns Among Teen Drivers*  
Shawn Brovold, Nic Ward, Max Donath, Stephen Simon  
CTS 07-05

*Driving Performance During 511 Information Retrieval: Cell Phone 2*  
Mick Rakauskas, Nic Ward  
Mn/DOT 2007-48

*Employment of the Traffic Management Lab for the Evaluation and Improvement of Stratified Metering Algorithm—Phase IV*  
Henry Liu, Xinkai Wu, Panos Michalopoulos, John Hourdos  
Mn/DOT 2007-51

*Evaluation of Minnesota's Operation NightCAP Program*  
Janet Creaser, William Affleje, Flavia Nardi  
Mn/DOT 2007-29

*Freeway Network Traffic Detection and Monitoring Incidents*  
A. Joshi, Stefan Atev, D. Fehr, A. Drenner, Robert Bodor, Osama Masoud, Nikolaos P. Papanikolopoulos  
Mn/DOT 2007-40

*Freight Performance Measure Systems (FPMS) System Evaluation and Data Analysis*  
Chen-Fu Liao  
CTS 08-01

*Integration of Infrared Imaging for a Head Up Display Lane Keeping and Collision Avoidance System*  
Pi-Ming Cheng, Craig Shankwitz  
CTS 08-09

*Intersection Decision Support Surveillance System: Design, Performance and Initial Driver Behavior Quantization*  
Lee Alexander, Pi-Ming Cheng, Max Donath, Alec Gorjestani, Arvind Menon, Craig Shankwitz  
Mn/DOT 2007-30

*Intersection Decision Support: An Overview*  
Max Donath, Craig Shankwitz, Nic Ward, Janet Creaser  
Mn/DOT 2007-33

*Multi-Camera Monitoring of Human Activities at Critical Transportation Infrastructure Sites*  
Evan Ribnick, A. Joshi, Nikolaos P. Papanikolopoulos  
CTS 08-08

*Review of Georgia's Rural Intersection Crashes: Application of Methodology for Identifying Intersections for Intersection Decision Support (IDS)*  
Howard Preston, Richard Storm, Max Donath, Craig Shankwitz  
Mn/DOT 2007-28

*Review of Iowa's Rural Intersection Crashes: Application of Methodology for Identifying Intersections for Intersection Decision Support (IDS)*  
Howard Preston, Richard Storm, Max Donath, Craig Shankwitz  
Mn/DOT 2007-27

*Rural and Urban Safety Cultures: Human-Centered Interventions Toward Zero Deaths in Rural Minnesota*  
Mick Rakauskas, Nic Ward, Susan G. Gerberich, Bruce H. Alexander  
Mn/DOT 2007-41

*A Simulator-Based Evaluation of Smart Infrastructure Concepts for Intersection Decision Support for Rural Thru-STOP Intersections*  
Janet Creaser, Mick Rakauskas, Nic Ward, Jason Laberge  
Mn/DOT 2007-31

*Traffic Safety Methodologies*  
Gary A. Davis  
CTS 07-11

*Using Archived ITS Data to Improve Transit Performance and Management*  
Ahmed M. El-Geneidy, Jessica Horning, Kevin Krizek  
Mn/DOT 2007-44

### Transportation Infrastructure research

*Adaptation of the 2002 Guide for the Design of Minnesota Low-Volume Portland Cement Concrete Pavements*

Iliya Yut, Shariq Husein, Carly Turgeon, Lev Khazanovich  
Mn/DOT 2007-23

*Automated Winter Road Maintenance Using Road Surface Condition Measurements*  
Gurkan Erdogan, Lee Alexander, Piyush Agrawal, Rajesh Rajamani  
Mn/DOT 2007-37

*Cone Penetration Testing in Pavement Design*  
William Dehler, Joseph F. Labuz  
Mn/DOT 2007-36

*Determination of Optimum Time for the Application of Surface Treatments to Asphalt Concrete Pavements—Phase II*  
Mihai O. Marasteanu, Raul Velasquez, William Herb, John Tweet, Mugur Turos, Mark Watson, Heinz G. Stefan  
Mn/DOT 2008-16

*Development of Improved Test Rolling Methods for Roadway Embankment Construction*  
J. P. Hambleton, Andrew Drescher  
Mn/DOT 2008-08

*Development of a PC-Based Eight-Channel WIM System*  
Taek Mu Kwon, Bibhu Aryal  
Mn/DOT 2007-45

*Effects of Seasonal Changes on Ride Quality at MnROAD*  
Lev Khazanovich, Peter Bly, Atika Shamin, Randal J. Barnes  
Mn/DOT 2008-23

*Implementation of Ground Penetrating Radar*  
Yuejian Cao, Shongtao Dai, Joseph F. Labuz, John Pantelis  
Mn/DOT 2007-34

*Incorporation of Fatigue Detail Classification of Steel Bridges into the Minnesota Department of Transportation Database*  
Adam Y. Lindberg, Arturo E. Schultz  
Mn/DOT 2007-22

**Intelligent Compaction Implementation: Research Assessment**

Joseph F. Labuz, Bojan Guzina, Lev Khazanovich  
Mn/DOT 2008-22

**Investigation of Low Temperature Cracking in Asphalt Pavements National Pooled Fund Study 776**

Mihai O. Marasteanu, Adam Zofka, Mugur Turos, Xinjun Li, Raul Velasquez, Xue Li, William Buttlar  
Mn/DOT 2007-43

**Pavement Rehabilitation Selection**

Shongtao Dai, Eugene L. Skok, Thomas M. Westover, Joseph F. Labuz, Erland Lukanen  
Mn/DOT 2008-06

**Shear Capacity of Prestressed Concrete Beams**

Brian Runzell, Carol K. Shield, Catherine E. French  
Mn/DOT 2007-47

**TH 241 Column-Supported Embankment**

Gregory Wachman, Joseph F. Labuz  
CTS 08-11

**Transportation Planning and the Environment research****Access to Destinations: How Close Is Close Enough? Estimating Accurate Distance Decay Functions for Multiple Modes and Different Purposes**

Michael Iacono, Kevin Krizek, Ahmed M. El-Geneidy  
Mn/DOT 2008-11

**Access to Destinations: Parcel Level Land Use Data Acquisition and Analysis for Measuring Non-Auto Accessibility**

Jessica Horning, Ahmed M. El-Geneidy, Kevin Krizek  
Mn/DOT 2008-19

**Biological Control of Canada Thistle in Wetland Prairie Restoration**

Kari Eichstaedt, Donald Wyse, Gregg Johnson  
Mn/DOT 2007-38

**Compaction Remediation for Construction Sites**

Jonathan Chaplin, Min Min, Reid Pulley  
Mn/DOT 2008-01

**Development of a Trash Harvester for MnDOT—Phase II**

Jonathan Chaplin, Emmanuel Magisson  
Mn/DOT 2008-21

**Enhancing Environment and Health in Transportation Project Design**

John T. Carmody, Virajita Singh  
CTS 07-08

**Improving Capacity Planning for Demand-Responsive Paratransit Services**

Diwakar Gupta, Hao-Wei Chen, Lisa Miller, Fajarrani Surya  
Mn/DOT 2008-09

**An Inventory of the Public Land Surveys Records for Minnesota: The Special Instructions**

Rod Squires  
Mn/DOT 2008-05

**Management Practices for Weed Control in Roadway Rights-of-Way**

Caleb Arika, Donald Wyse, R. Moon  
Mn/DOT 2007-42

**Methods to Incorporate Historic Surface Hydrology Layer in Mn/Model (Phase 4) Using Existing Geographic Information System Data**

Stacey L. Stark, Patrice M. Farrell, Susan C. Mulholland  
Mn/DOT 2008-13

**Moving Communities Forward: Synthesis**

Lance M. Neckar  
CTS 07-12

**Moving Design: Spaces of Transportation**

Ann Forsyth, Justin Jacobson, Katie Thering  
CTS 07-09

**Performance Assessment of Underground Stormwater Treatment Devices**

Matthew Wilson, John S. Gulliver, Omid Mohseni, Ray Hozalski  
Mn/DOT 2007-46

**Reducing Greenhouse Gas Emissions From Transportation Sources in Minnesota**

Adam Boies, David B. Kittelson, Winthrop J. Watts, Jan Lucke, Laurie McGinnis, Julian Marshall, Tyler M. Patterson, Peter Nussbaum, Elizabeth Wilson  
CTS 08-10

**A Smaller Carbon Footprint: Research Suggests Combining Strategies to Meet Legislative Goals in the Transportation Sector**

Adam Boies, David B. Kittelson, Winthrop J. Watts, Jan Lucke, Laurie McGinnis, Julian Marshall, Peter Nussbaum, Elizabeth Wilson  
CTS 08-10S

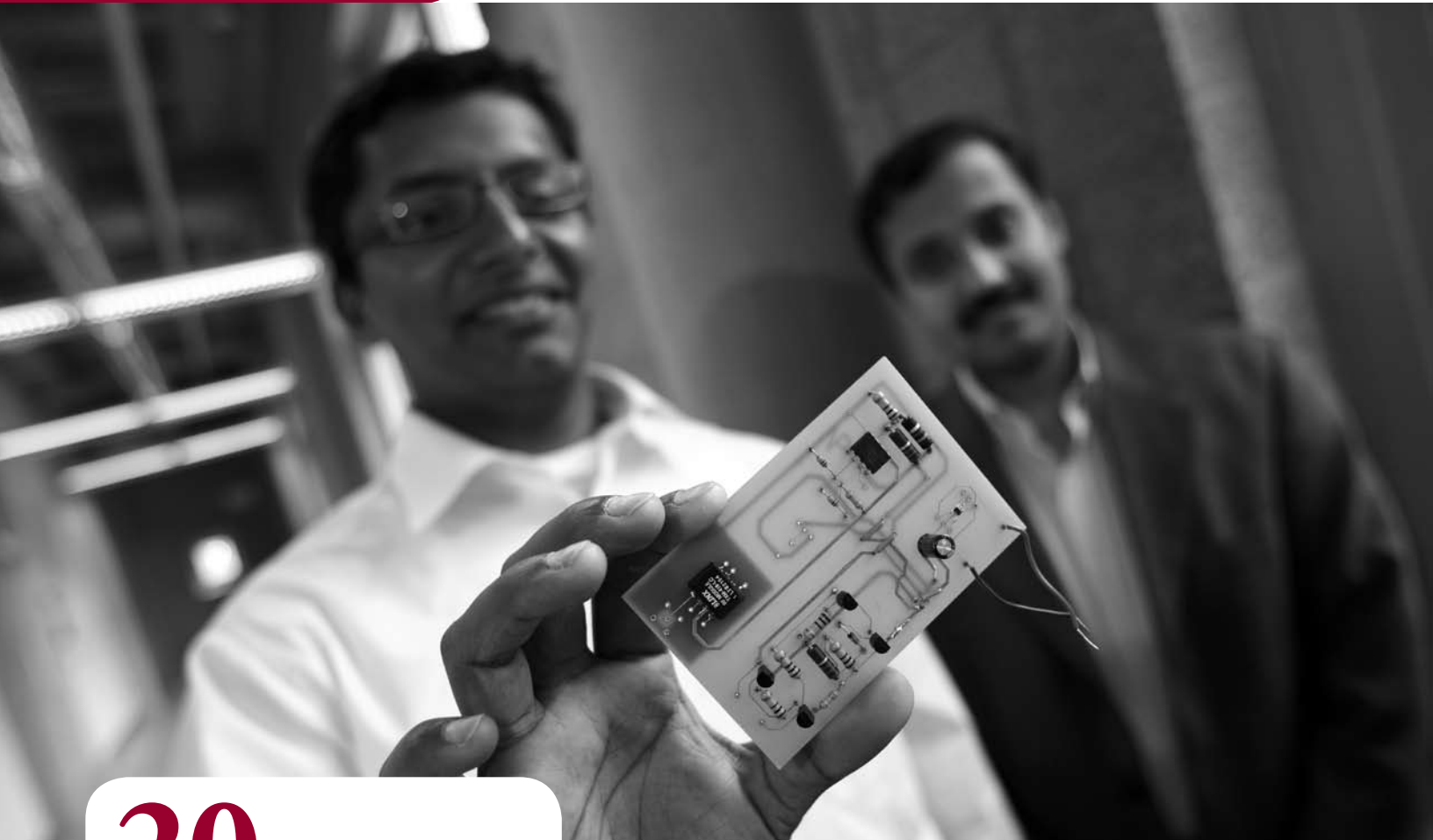
## Patents

**► Generating royalties**

A patent for a “virtual mirror” was granted to Professor Max Donath, Intelligent Vehicles Lab director Craig Shankwitz, and research staff Pi-Ming Cheng and Sameer Pardhy of the Department of Mechanical Engineering. The technology, originally developed to help bus drivers operate on narrow road shoulders, has also been applied on snowplows. The virtual mirror uses a lidar (laser-based) side-scanning unit to detect vehicles, which are then tracked by the onboard computer and displayed as icons on a small electronic panel display.

CTS contributed research reports for one of the first collections in the University Digital Conservancy, a freely accessible online repository for the University community, which launched in August 2007.

**RESEARCHERS**



**20** years...

**70** faculty in 25  
departments

[www.cts.umn.edu/FacultyStaff](http://www.cts.umn.edu/FacultyStaff)



## CTS Faculty and Research Scholars Program

► CTS works with CTS Faculty and Research Scholars from a variety of University of Minnesota departments to address transportation issues. Scholars have joint appointments at CTS as well as in their own departments.

### 2008 FACULTY AND RESEARCH SCHOLARS

#### Bridge Engineering



**Catherine French**  
Professor,  
Civil Engineering



**Shashi Shekhar**  
Professor,  
Computer Science and  
Engineering



**Gerard McCullough**  
Associate Professor,  
Applied Economics



**John Bloomfield**  
Research Associate,  
Center for Human  
Factors Systems  
Research and Design,  
College of Design



**Arturo Schultz**  
Professor,  
Civil Engineering



**Saif Benjaafar**  
Professor, Mechanical  
Engineering



**Zhirong (Jerry)  
Zhao**  
Assistant Professor,  
Humphrey Institute of  
Public Affairs



**Janet Creaser**  
Research Fellow,  
HumanFIRST Program,  
ITS Institute



**Carol Shield**  
Professor,  
Civil Engineering



**Karen Donohue**  
Associate Professor,  
Operations and  
Management Sciences,  
Carlson School of  
Management



**David Biesboer**  
Professor,  
Plant Biology



**Kathleen Harder**  
Senior Research Associate,  
Center for Human Factors  
Systems Research and  
Design, College of Design

#### Data Systems



**Taek Kwon**  
Professor,  
Electrical and  
Computer Engineering  
(Duluth)



**Jerry Fruin**  
Associate Professor,  
Applied Economics



**Paul Bloom**  
Professor,  
Soil, Water, and Climate



**Michael Manser**  
Director,  
HumanFIRST Program,  
ITS Institute



**Chen-Fu Liao**  
Educational Systems  
Manager, Minnesota  
Traffic Observatory, ITS  
Institute



**Diwakar Gupta**  
Professor,  
Mechanical Engineering



**John Gulliver**  
Professor,  
Civil Engineering



**Michael (Mick)  
Rakauskas**  
Research Fellow,  
HumanFIRST Program,  
ITS Institute



**Vassilios Morellas**  
Director,  
Safety, Security, and  
Rescue Research Center,  
Computer Science and  
Engineering



**Robert Johns**  
Director,  
Center for  
Transportation Studies



**Julian Marshall**  
Assistant Professor,  
Civil Engineering



**Michael Darter**  
Director,  
Pavement Research  
Institute



**Nikolaos  
Papanikolopoulos**  
Professor,  
Computer Science and  
Engineering



**Alfred Marcus**  
Professor,  
Carlson School of  
Management



**Bruce Wilson**  
Professor,  
Bioproducts and  
Biosystems Engineering



**Andrew Drescher**  
Professor,  
Civil Engineering

Researchers



**Bojan Guzina**  
Shimizu Professor, Civil Engineering



**Eil Kwon**  
Director, Northland Advanced Transportation Systems Research Laboratory, ITS Institute



**Keith Knapp**  
Research Manager, Center for Excellence in Rural Safety, Humphrey Institute



**Barbara VanDrasek**  
Research Associate, Geography



**Lev Khazanovich**  
Associate Professor, Civil Engineering



**David Levinson**  
Associate Professor, Civil Engineering



**Adeel Lari**  
Research Fellow, State and Local Policy Program, Humphrey Institute of Public Affairs



**Mary Vogel**  
Senior Research Fellow and Director, Center for Changing Landscapes, College of Design



**Joseph Labuz**  
Professor, Civil Engineering



**Henry Liu**  
Assistant Professor, Civil Engineering



**Barbara Lukermann**  
Senior Fellow Emeritus, Humphrey Institute of Public Affairs



**Elizabeth Wilson**  
Assistant Professor, Humphrey Institute



**Mihai Marasteanu**  
Associate Professor, Civil Engineering



**Panos Michalopoulos**  
Professor, Civil Engineering



**Lee Munnich**  
Senior Fellow and Director, State and Local Policy Program, Humphrey Institute of Public Affairs



**Vehicle Design and Fuels**

**Max Donath**  
Professor and Director, Intelligent Transportation Systems (ITS) Institute



**Derek Tompkins**  
Associate Director, Pavement Research Institute



**Transportation Planning and Policy**

**John Adams**  
Professor Emeritus and Associate Dean for Academic Programs, Humphrey Institute of Public Affairs



**Lance Neckar**  
Professor, Landscape Architecture, College of Design



**David Kittelson**  
Professor, Mechanical Engineering

**Traffic Engineering and Management**



**Gary Davis**  
Professor, Civil Engineering



**Jason Cao**  
Assistant Professor, Humphrey Institute of Public Affairs



**Carissa Schively Slotterback**  
Assistant Professor, Humphrey Institute of Public Affairs



**Rajesh Rajamani**  
Professor, Mechanical Engineering



**Demoz Gebre-Egziabher**  
Associate Professor, Aerospace Engineering and Mechanics



**Frank Douma**  
Assistant Director, State and Local Policy Program, Humphrey Institute of Public Affairs



**Thomas M. Scott**  
Director, Center for Urban and Regional Affairs



**Craig Shankwitz**  
Director, Intelligent Vehicles Laboratory, ITS Institute



**Nikolas Geroliminis**  
Assistant Professor, Civil Engineering



**Yingling Fan**  
Assistant Professor, Humphrey Institute



**John Hourdos**  
Director, Minnesota Traffic Observatory, ITS Institute



**Michael Iacono**  
Research Fellow, Civil Engineering

**NEW FACES**

Four new faces with transportation experience were added to the University talent pool: Yingling Fan, assistant professor in the Humphrey Institute of Public Affairs; Nikolas Geroliminis, assistant professor in the Department of Civil Engineering; Keith Knapp, research manager with the Center for Excellence in Rural Safety; and Greg Lindsey, associate dean of the Humphrey Institute and professor in the urban and regional planning program.

## AWARDS & HONORS

- Access to Destinations study faculty David Levinson (the Braun/CTS Chair in Transportation Engineering) and Kevin Krizek (now with the University of Colorado, formerly with the Humphrey Institute of Public Affairs) co-authored their first book, *Planning for Place and Plexus*. The book aims to take many of the ideas emerging from recent research beyond the university classroom and into contemporary policy discussions.
- Assistant Professor Henry Liu of the Department of Civil Engineering was the recipient of the 2007 New Faculty Award from the Council of University Transportation Centers and the American Road and Transportation Builders Association.
- Professor Rajesh Rajamani of the Department of Mechanical Engineering received the Ralph R. Teeter Award from the Society of Automotive Engineers for contributions to automotive research and education.
- Elizabeth Wilson, assistant professor at the Humphrey Institute, was a recipient of a 2008 McKnight Land-Grant Professorship.

## AFFILIATED FACULTY

### Aerospace Engineering and Mechanics

Demoz Gebre-Egziabher\*  
William Garrard  
Yiyuan Zhao

### Agronomy and Plant Genetics

Roger Becker  
Nancy Ehlke  
Donald Wyse

### Applied Economics

Jerry Fruin\*  
William Gartner  
Gerard McCullough\*  
Tom Stinson  
Douglas Tiffany

### Biosystems and Agricultural Engineering

Jonathan Chaplin  
John Nieber  
Gary Sands  
Bruce Wilson\*

### Carlson School of Management

Fred Beier  
Karen Donohue\*  
Alfred Marcus\*  
Mahmood Zaidi

### Child Development

Herbert Pick  
Albert Yonas

### Civil Engineering

Roberto Ballarini  
Randal Barnes  
Paul Bergson  
Gary Davis\*  
Andrew Drescher\*  
Cathy French\*  
Ted Galambos  
Nikolas Geroliminis\*  
John Gulliver\*

Bojan Guzina\*

Kimberly Hill  
Miki Hondzo  
John Hourdos\*  
Mike Iacono\*  
Lev Khazanovich\*  
Joseph Labuz\*  
David Levinson\*  
Chen-Fu Liao\*  
Henry Liu\*  
Mihai Marasteanu\*  
Bernadette Marion  
Julian Marshall\*  
Panos Michalopoulos\*  
Ted Morris  
Arturo Schultz\*  
Carol Shield\*  
Gene Skok  
Karl Smith  
Henryk Stolarski  
Vaughan Voller

### College of Design

John Bloomfield\*  
John Carmody  
Kathleen Harder\*  
Lance Neckar\*  
Robert Sykes  
Mary Vogel\*

### Computer Science and Engineering

Mats Heimdahl  
Ravi Janardan  
Vassilios Morellas\*  
Nikolaos Papanikolopoulos\*  
Shashi Shekhar\*  
Jim Slagle  
Richard Voyles

### Economics

Patrick Bajari

### Electrical and Computer Engineering

Vladimir Cherkassky  
Ahmed Tewfik

### Geography

Francis Harvey  
Rod Squires  
Barbara VanDrasek\*

### Horticulture Science

Susan Galatowitsch

### Humphrey Institute of Public Affairs

John Adams\*  
Richard Bolan  
John Bryson  
Jason Cao\*  
Barbara Crosby  
Frank Douma\*  
Yingling Fan\*  
Tom Horan  
Keith Knapp\*  
Adeel Lari\*  
Barbara Lukermann\*  
Lee Munnich\*  
Carissa Schively Slotterback\*  
Melissa Stone  
Elizabeth Wilson\*  
Zhirong (Jerry) Zhao\*

### Kinesiology

Mary Jo Kane  
Thomas Smith  
Michael Wade

### Law School

Stephen Simon

### Mechanical Engineering

Lee Alexander  
Saifallah Benjaafar\*  
Pi-Ming Cheng  
Janet Creaser\*  
Max Donath\*  
William Durfee  
Peter Easterlund  
Alec Gorjestani  
Diwakar Gupta\*  
David Kittelson\*  
Perry Li

Michael Manser\*

Arvind Menon  
Bryan Newstrom  
Curt Olson  
Rajesh Rajamani\*  
Mick Rakauskas\*  
Craig Shankwitz\*  
Patrick Starr

### Pavement Research Institute

Mike Darter\*  
Derek Tompkins\*

### Plant Biology

David Biesboer\*  
Iris Charvat

### Public Health

Judith Garrard

### St. Anthony Falls Laboratory

Jeff Marr  
Omid Mohseni  
Peter Weiss

### Soil, Water and Climate

Paul Bloom\*  
Peter Graham  
Satish Gupta  
Thomas Halbach  
Mark Seeley  
Dong Wang

### Urban and Regional Affairs

William Craig  
Thomas Scott\*

### Wood and Paper Science

Bob Seavey

### University of Minnesota – Duluth Chemistry and Biochemistry

John Evans

### Civil Engineering

Eil Kwon\*

### Computer Science

Carolyn Crouch  
Donald Crouch  
Richard Maclin  
Peter Willemssen

### Electrical and Computer Engineering

Stanley Burns  
Mohammed Hasan  
Taek Kwon\*  
Hua Tang  
Jiann-Shiou Yang

### Geography

Stacey Stark

### Mathematics and Statistics

Zhuangyi Liu  
Harlan Stech

### Mechanical/Industrial Engineering

Robert Feyen  
Richard Lindeke  
Ryan Rosandich  
David Wyrick  
Xun Yu

### Natural Resources Research Institute (NRRI)

Brian Brashaw  
Kurt Johnson  
Ron Moen  
Gary Niemi  
Lawrence Zanko

### Physics

Michael Sydor

\*denotes CTS Faculty and Research Scholars as of December 1, 2008

# EDUCATION



**20** years...

**12,000** students  
(FY08, approx.)

[www.cts.umn.edu/Education](http://www.cts.umn.edu/Education)

## K-12

### ► Creating high school curricula

Pre-college students are being exposed to transportation engineering issues through an online intersection control game aimed at high school science classrooms. The game was integrated into a high school curriculum that was used and tested at the University of Minnesota's Institute of Technology Summer Exploration in Engineering, Science and Math Camp. The camp, for women and diverse students, was held in the summer of 2008. The game was created by Chen-Fu Liao, the senior educational systems engineer with the Minnesota Traffic Observatory (a lab within the ITS Institute).



*Pre-college students are being attracted to the transportation field online and in the classroom.*



*Lee Alexander demonstrated a prototype vehicle at TechFest.*

### ► Sparking interest in transportation careers

A prototype narrow commuter vehicle being developed by University of Minnesota researchers with ITS Institute funding proved a popular attraction at the University's Institute of Technology Alumni Society annual TechFest. The event, which aims to interest grade-school-age students in science and technology, is held every year at The Works, a "hands-on" science and technology museum for children aged 5 to 15. This year's event drew more than 1,000 visitors—the largest one-day attendance in the museum's history. Lee Alexander, a member of the team of engineers developing the vehicle, accompanied the prototype and explained the vehicle's cutting-edge features to children and their parents.

### ► Hosting teachers and potential students

Several groups visited the University to learn about careers in transportation and see demos of current research technologies, including approximately 75 high school students enrolled in a summer transportation camp through the Fond du Lac Tribal and Community College; students and teachers from the Blaine High School Center for Engineering, Math, and Science; and students in the St. Cloud Summer Transportation Academy.

Pictured left: High school students attending a summer transportation camp toured ITS Institute labs.

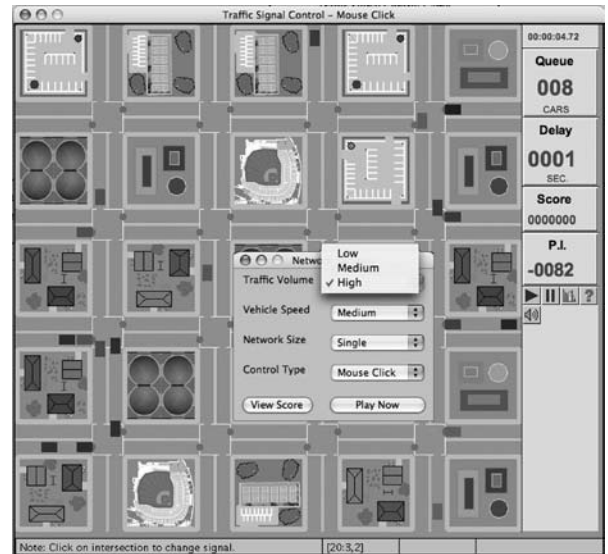
## Undergraduate and graduate students

### ► Developing course modules

Chen-Fu Liao, the Minnesota Traffic Observatory’s senior educational systems engineer, developed several interactive course modules to help students understand complex ITS topics such as intersection signal control and vehicle guidance. The Online Application for Signal Intersection Simulation (OASIS) and Roadway Online Application for Design (ROAD) have been incorporated into the curriculum of the civil engineering department’s Introduction to Transportation Engineering course.

### ► Strengthening undergraduate courses

Assistant Professor Henry Liu, Braun/CTS Chair David Levinson, and Chen-Fu Liao were funded by the National Science Foundation (NSF) to develop Web-based simulation modules to improve instruction in the Introduction to Transportation Engineering course that is a standard part of undergraduate civil engineering programs. The modules will be evaluated and tested in course offerings from civil engineering programs across the country and will be disseminated to the general public through interactive exhibits at venues such as the Minnesota Transportation Museum and the Minnesota State Fair.



An online learning module helps students examine the effects of different signal timing strategies.

## GRADUATE CERTIFICATE IN TRANSPORTATION STUDIES

### FY08 RECIPIENTS

William Chester	Thomas More	Xinkai Wu
Rueben Collins	Pavithra Kandadai	Feng Xie
Jose Fischer	Parthasarathi	Hui Xiong
Cole Hiniker	Andrew Schlack	Hongbing Zhang
Jessica Horning	HunWen Tao	Shanjiang Zhu
Yan Huang	Nebiyu Tilahun	
David Kmiec	Ryan Wilson	

Research universities provide two resources crucial for today’s global economy: new knowledge and a pool of educated professionals.

## TRAVEL AWARDS

### ITS Institute Student Travel Award Recipients

Adam Danczyk  
Jordan Deckenbach  
Chinweike Eseonu-Fall  
Saif Jabari  
Wenteng Ma  
Pavithra Parthasarathi  
Jory Schwach  
Nebiyu Tilahun  
Carly Turgeon  
Ryan Wilson  
Xinkai Wu  
Feng Xie  
Zhiqiang Xing  
Hui Xiong  
Kelcie Young  
Shanjiang Zhu

### CTS Travel Award Recipients

Anil Singh Bika  
Fay Cleveland  
James Hambleton  
Jessica Horning  
Thomas More  
Roberto Piccinin  
Bereket Tewoldebrhan  
Mugur Turos

## STUDENT AWARDS

### ► ITS Institute Student of the Year:

Michael (Mick) Rakauskas, a doctoral student in the University of Minnesota's Cognitive and Biological Psychology program, was presented the ITS Institute's 2007 Outstanding Student of the Year Award. The award is sponsored by the USDOT Research and Innovative Technology Administration.



Mike Manser, Mick Rakauskas, Gina Baas

► **Huber Award:** Nebiyou Tilahun, a student in the University's civil engineering Ph.D. program under Braun/CTS Chair David Levinson, was one of two recipients of this year's Matthew J. Huber Award for Excellence in Transportation Research and Education. Tilahun's work on the value of different features of bicycle facilities, which made up his master's thesis, was incorporated into National Cooperative Highway

Research Program (NCHRP) report 552, *Guidelines for Analysis of Investments in Bicycle Facilities*.

The other Huber winner this year was Raul Velasquez, who is also working toward his Ph.D. in civil engineering, under advisor Mihai Marasteanu. Velasquez has worked as a research assistant on many projects related to pavement engineering and pavement design and was a teaching assistant in civil engineering classes.



David Levinson, Nebiyou Tilahun, Gina Baas



Mihai Marasteanu, Raul Velasquez, Gina Baas

## INTERDISCIPLINARY TRANSPORTATION STUDENT ORGANIZATION, CAREER EXPO

► CTS assisted the Interdisciplinary Transportation Student Organization in planning its Fourth Annual Student Paper Conference. The conference concluded with a luncheon sponsored by the North Central chapter of the Institute of Transportation Engineers, during which guest speakers discussed speed management in Minnesota. The annual CTS Transportation Career expo followed the conference.

## FY08 CTS STUDENT AFFILIATES AND ADVISORS

### UNDERGRADUATE STUDENTS

**Lucas Andruylsk**, BS, Wood Science, Iowa State (Brian Brashaw)  
**Emma Burgstahler**, BS, Biomedical Engineering (William Durfee)  
**Brian Bell**, BS, Civil Engineering (Omid Mohseni)  
**Ryan Bowlds**, BS, Mechanical and Industrial Engineering—UMD (Xun Yu)  
**Russell Depuydt**, BS, Bioproducts and Biosystems Engineering (John Nieber)  
**Nicole Dobmeier**, BS, Statistics—Morris (Stephen Burks)  
**David Fick**, BS, Biosystems Engineering (Jonathan Chaplin)  
**Derek Ganzhorn**, BS, Economics—Morris (Stephen Burks)  
**Missy Gettel**, BS, Civil Engineering (John Gulliver)  
**Angie Graham**, BS, Bioproducts and Biosystems Engineering (John Nieber)  
**Teigan Gulliver**, BS, Civil Engineering (John Gulliver; Omid Mohseni)  
**Baily Jones**, BA, Liberal Arts (Frank Douma)  
**Cathie Joyce**, BS, Mechanical Engineering (William Durfee)  
**Dave Klaseus**, BS, Civil Engineering (Cathy French)  
**Geoffrey Kramer**, BS, Bioproducts and Biosystems Engineering (Bruce Wilson)  
**Jacob Krokum**, BS, Industrial and Mechanical Engineering—UMD (Brian Brashaw)  
**Lisa Lenzmeier**, BS, Economics—Morris (Stephen Burks)  
**Michael Levin**, BS, Computer Science and Engineering (Vassilios Morellas)  
**Erik Lindholm**, BS, Economics—Morris (Stephen Burks)  
**Grant Miller**, BS, Computer Science and Engineering (Vassilios Morellas)  
**Nick Moore**, BS, Bioproducts and Biosystems Engineering (John Nieber)  
**Sarah Noe**, BS, Civil Engineering (Cathy French)  
**Jason Novek**, BS, Computer Science—UMD (Carolyn Crouch)  
**Michele Olsen**, BS, Computer Science—UMD (Peter Willemsen)  
**Nicholas Olson**, BS, Civil Engineering (John Gulliver)  
**Greta Schmale**, BS, Civil Engineering (John Gulliver)  
**Daniel Schobert**, BS, Computer Science—UMD (Peter Willemsen)  
**Jeffrey Sharkey**, BS, Computer Science—UMD (Donald Crouch)  
**Matthew Verreaux**, BS, Electrical and Computer Engineering—UMD (Brian Brashaw)  
**Chris Weyandt**, BS, Civil Engineering (Julian Marshall)

### MASTER'S STUDENTS

**Eddie Arpin**, MS, Mechanical Engineering (Max Donath, Craig Shankwitz)  
**Bibhu Aryal**, MS, Electrical and Computer Engineering—UMD (Taek Kwon)  
**Brian Ashman**, MS, Bioproducts and Biosystems Engineering (Bruce Wilson)  
**Prafulla P. Bhalekar**, MS, Computer Science—UMD (Donald Crouch)  
**Esha Bhargava**, MS, Mechanical Engineering (Janet Creaser)  
**Sundeep Bhimireddy**, MS, Civil Engineering (Henry Liu)  
**Peter Bly**, MS, Civil Engineering (Lev Khazanovich)  
**Sara Breakiron**, MPP, Humphrey Institute (Frank Douma)  
**Nihdi Chadda**, MPP, Humphrey Institute (Frank Douma)

**Hairong Chang**, MS, Electrical and Computer Engineering (Hua Tung)  
**Fay Cleaveland**, MURP, Humphrey Institute (Frank Douma)  
**Ajit Datar**, MS, Computer Science—UMD (Donald Crouch)  
**Adam Danczyk**, MS, Civil Engineering (Henry Liu)  
**Jordan Deckenbach**, MPP/JD, Humphrey Institute and Law School (Frank Douma, Stephen Simon)  
**Greg DeGroot**, MS, Civil Engineering (John Gulliver)  
**William Dehler**, MS, Civil Engineering (Joseph Labuz)  
**Siddharth Deokar**, MS, Computer Science—UMD (Peter Willemsen)  
**Ozer Dereli**, MS, Civil Engineering (Carol Shield, Cathy French)  
**Daniel Drew**, MS, Mechanical Engineering (Janet Creaser)  
**Whitney Eriksson**, MS, Civil Engineering (Carol Shield, Cathy French)  
**Chinwike Eseonu**, MS, Engineering Management (Robert Feyen)  
**Brian Finstrom**, MS, Chemistry and Biochemistry—UMD (John Evans)  
**Ryan Gaug**, MURP, Humphrey Institute (Frank Douma)  
**Aaron Hagar**, MURP, Humphrey Institute (Frank Douma)  
**Kyle Hoegh**, MS, Civil Engineering (Lev Khazanovich)  
**Richard Hoglund**, MS, Mechanical Engineering (Max Donath, Craig Shankwitz, Janet Creaser)  
**Feili Hong**, MS, Civil Engineering (John Hourdos)  
**Shan Hu**, MS, Mechanical and Industrial Engineering—UMD (Xun Yu)  
**Basil Iannone**, MS, Horticultural Science (Susan Galatowitsch)  
**Priya S. Iyer**, MS, Electrical Engineering (Chen-Fu Liao)  
**Saif Jabari**, MS, Civil Engineering (Henry Liu)  
**Rachel Jordan**, MURP, Humphrey Institute (Jason Cao)  
**Apeckchya Karki**, MURP, Humphrey Institute (Frank Douma)  
**H. Katmale**, MS, Engineering Management—UMD (Richard Lindeke)  
**Scott Klar**, MS, Electrical and Computer Engineering—UMD (Taek Kwon)  
**Kate Ko**, MURP, Humphrey Institute (Frank Douma)  
**Nikhila Krishnan**, MS, Electrical and Computer Engineering (Ahmed Tewfik)  
**Dustin Kuchera**, MS, Industrial and Systems Engineering (Diwakar Gupta)  
**Harish Loganathan**, MS, Computer Science (Henry Liu)  
**E. Magisson**, MS, Bioproducts and Biosystems Engineering (Jonathan Chaplin)  
**Jason Menard**, MA, Anthropology (Francis Harvey)  
**Katie Meyer**, MPP, Humphrey Institute (Elizabeth Wilson)  
**Ki Hoon Moon**, MS, Civil Engineering (Mihai Marasteanu)  
**Alec Moore**, MPP, Humphrey Institute and Civil Engineering (Frank Douma)  
**Ginger Murphy**, MURP, Humphrey Institute (Jason Cao)  
**Peter Nussbaum**, MPP, Humphrey Institute (Elizabeth Wilson)  
**Tyler Patterson**, MPP/MS, Humphrey Institute and Civil Engineering (Frank Douma)  
**Amy Peterson**, MS, Industrial and Systems Engineering (Diwakar Gupta)  
**Aditya Polumetta**, MS, Computer Science—UMD (Carolyn Crouch)  
**Reid Pulley**, MS, Biosystems and Agricultural Engineering (Jonathan Chaplin)  
**Charles Roberts**, MURP, Humphrey Institute (Carissa Schively Slotterback, Frank Douma)  
**Ryan Rohle**, MS, Civil Engineering (Lev Khazanovich)  
**Katie Roth**, MURP, Humphrey Institute (Frank Douma)  
**Brian Runzel**, MS, Civil Engineering (Cathy French)  
**David Sadoris**, MS, Civil Engineering (John Gulliver; Omid Mohseni)  
**Andrew Sander**, MS, Civil Engineering (Heinz G. Stefan)  
**Annika Schilke**, MURP, Humphrey Institute (Jason Cao)  
**Matthew Schmit**, MURP, Humphrey Institute (Frank Douma)  
**Jory Schwach**, MS, Civil Engineering (Panos Michalopoulos)  
**Atika Shamin**, MS, Civil Engineering (Lev Khazanovich)  
**Matt Smith**, MS, Civil Engineering (Carol Shield, Cathy French)  
**HunWen Tao**, MS, Civil Engineering (Gary Davis)  
**Bereket Teweldebrhan**, MS, Civil Engineering (Lev Khazanovich)  
**Luke Thompson**, MS, Civil Engineering (Joe Labuz)  
**Hoang Ton**, MURP, Humphrey Institute (Frank Douma)  
**Mugurel Turos**, MS, Civil Engineering (Mihai Marasteanu)  
**Kirti Vardhan Das**, MPP, Humphrey Institute (Zhirong Zhao)  
**Madhavan Vasudervan**, MS, Electrical and Computer Engineering (Ahmed Tewfik)  
**R. Verma**, MS, Engineering Management (Richard Lindeke)  
**Aishwarya Vijaykumar**, MS, Civil Engineering (Mihai Marasteanu)  
**Mark Watson**, MS, Civil Engineering (Mihai Marasteanu)  
**Ryan Weidemann**, MS, Electrical and Computer Engineering—UMD (Taek Kwon)  
**Ryan Wilson**, MS/MURP, Humphrey Institute (Elizabeth Wilson, Kevin Krizek, David Levinson)  
**(Lisa) Fang Wu**, MS, Applied Economics (Jerry Fruin)  
**Kelcie Young**, MURP, Humphrey Institute (Frank Douma)  
**Hui Xiong**, MS, Civil Engineering (Gary Davis)  
**Hongbing Zhang**, MS, Civil Engineering (Panos Michalopoulos)  
**Yi Zheng**, MS, Electrical and Computer Engineering—UMD (Hua Tung)

### DOCTORAL STUDENTS

**Romeo Ahohe**, Ph.D., Aerospace Engineering and Mechanics (Demoz Gebre-Egziabher)  
**Stefan Atev**, Ph.D., Computer Science and Engineering (Vassilios Morellas)  
**Elena Beyhaut**, Ph.D., Soil, Water, and Climate (Peter Graham)  
**Adam Boies**, Ph.D., Mechanical Engineering (David Kittelson)  
**Yuejian Cao**, Ph.D., Civil Engineering (Bojan Guzina)  
**Hao-Wei Chen**, Ph.D., Industrial and Systems Engineering (Diwakar Gupta)  
**Gurkan Erdogan**, Ph.D., Mechanical Engineering (Rajesh Rajamani)  
**Bulent Erkmen**, Ph.D., Civil Engineering (Carol Shield, Cathy French)  
**Duc Fehr**, Ph.D., Computer Science and Engineering (Nikos Papanikolopoulos)  
**James Hambleton**, Ph.D., Civil Engineering (Andrew Drescher)  
**Xiaozheng He**, Ph.D., Civil Engineering (Henry Liu)  
**Heng Hu**, Ph.D., Civil Engineering (Henry Liu)



**Arthur Huang**, Ph.D., Civil Engineering (David Levinson)  
**Ajay Joshi**, Ph.D., Computer Science and Engineering (Vassilios Morellas, Nikos Papanikolopoulos)  
**Greg LeFevre**, Ph.D., Civil Engineering (John Gulliver)  
**Wenteng Ma**, Ph.D., Civil Engineering (Henry Liu)  
**Eric Novotny**, Ph.D., Civil Engineering (Heinz G. Stefan)  
**Pavithra Parthasarathi**, Ph.D., Civil Engineering (David Levinson)  
**Gridsada Phanomchoeng**, Ph.D., Control Science and Dynamic Systems Program (Rajesh Rajamani)  
**Roberto Piccinin**, Ph.D., Civil Engineering (Carol Shield, Cathy French)  
**Andrey Pyatigorets**, Ph.D., Civil Engineering (Mihai Marasteanu)

**Evan Ribnick**, Ph.D., Computer Science and Engineering (Vassilios Morellas, Nikos Papanikolopoulos)  
**Guruprasad Somasundaram**, Ph.D., Computer Science (Thomas J. Smith, Nikos Papanikolopoulos)  
**Senthil Swaminathan**, Ph.D., Mechanical Engineering (William Durfee)  
**Nebiyou Tilahun**, Ph.D., Civil Engineering (David Levinson)  
**Mikhail Titov**, Ph.D., Bioproducts and Biosystems Engineering (John Nieber)  
**Raul Velasquez**, Ph.D., Civil Engineering (Mihai Marasteanu)  
**Krishna Vijayaraghavan**, Ph.D., Mechanical Engineering (Rajesh Rajamani)

**Qiang Wang**, Ph.D., Civil Engineering (Lev Khazanovich)  
**Xinkai Wu**, Ph.D., Civil Engineering (Henry Liu, Panos Michalopoulos)  
**Feng Xie**, Ph.D., Civil Engineering (David Levinson)  
**Zhiqiang Xing**, Ph.D., Aerospace Engineering and Mechanics (Demoz Gebre-Egziabher)  
**Hui Xiong**, Ph.D., Civil Engineering (Gary Davis)  
**Shanjiang Zhu**, Ph.D., Civil Engineering (David Levinson)  
**Adam Zofka**, Ph.D., Civil Engineering (Lev Khazanovich)  
**Xi Zou**, Ph.D., Civil Engineering (David Levinson)

## Professional development

### ► Linking alumni and students

CTS created a database of University of Minnesota transportation alumni who want to stay in touch with their alma mater and with each other. By joining the Transportation Alumni Group, members receive electronic updates about student activities, special events, and other transportation-related news at the University. Graduates of other institutions are welcome to join. Joining also gives alumni a way to support current students by becoming a mentor or speaking to student groups.

### ► Educating the workforce

Technical assistance and customized training courses continue to be an important part of CTS. Professional development hours (PDHs) are offered at a number of events, workshops, and seminars.

The Minnesota Local Technical Assistance Program (LTAP) offered workshops on topics ranging from seal coat operations to bridge maintenance. Fifteen students graduated from LTAP's Roads Scholar program, which has an enrollment of more than 1,800 students. The Circuit Training and Assistance Program (CTAP) delivered technical assistance and training to 2,964 state and local agency personnel in two topic areas: work-zone traffic control and

### ► Providing lifelong learning

CTS launched its Fall Transportation Seminar Series in September 2007. The series combines the following:

- CTS Research Seminars, held as part of CTS research council meetings.
- Advanced Transportation Technologies Seminars, sponsored by the Intelligent Transportation Systems (ITS) Institute each fall semester. (The seminars are offered for credit and are required as a course for the Graduate Certificate in Transportation Studies.)
- Access to Destinations Study workshops, communicating findings of this interdisciplinary research effort.

Each seminar qualifies for one professional development hour (PDH). Seminars are broadcast live on the Web and are available for later viewing.



*LTAP director Jim Grothaus (bottom left) and training coordinator Mindy Carlson (top right) with the Roads Scholar class of 2008*

flagger safety, and snow and ice material applications/environmental impacts.

CTS managed a number of customized training courses for Mn/DOT. Topics included advanced skills for project managers, context-sensitive design, and “hear every voice” public participation.

# OUTREACH AND PUBLIC ENGAGEMENT



**20** years...

**22,000** newsletters  
(mailed in FY08, approx.)

[www.cts.umn.edu/Events](http://www.cts.umn.edu/Events)

[www.cts.umn.edu/Publications](http://www.cts.umn.edu/Publications)

[www.cts.umn.edu/LibraryServices](http://www.cts.umn.edu/LibraryServices)

## CTS 20th Anniversary Celebration

► CTS celebrated its 20<sup>th</sup> Anniversary in October 2007 with a special half-day forum and reception. CTS director Robert Johns gave a brief timeline of CTS. (To download the timeline, see [www.cts.umn.edu/About/History](http://www.cts.umn.edu/About/History).)

Johns then introduced Genevieve Giuliano, who gave the event's keynote presentation. Giuliano, a former chair of the Transportation Research Board Executive Committee, is a professor in the School of Policy, Planning, and Development and a senior associate dean for research and technology at the University of Southern California. She shared her outlook for the future of transportation research, predicting that dramatic changes under way in the policy environment may make it harder for research to shape transportation policy in the future.

Following the keynote, two University of Minnesota faculty panels reviewed how the University has contributed to state and national transportation issues in the past two decades and suggested future research possibilities.

The celebration concluded with a reception and program moderated by CTS associate director Laurie McGinnis. A highlight was the debut of a video that introduces CTS and its programs. The video is available on the CTS Web site.



*Genevieve Giuliano, Robert Johns*



*A faculty panel at the 20th anniversary: Max Donath, Nikolaos Papanikolopoulos, Catherine French, Panos Michalopoulos, and Mihai Marasteanu, with CTS director Robert Johns*

## Access to Destinations Conference

► CTS sponsored the Second International Access to Destinations Conference on August 23 and 24, 2007. It brought together leading researchers from 10 countries whose work examines intersections of transportation, land use, and public policy. Speakers included David Levinson and Kevin Krizek, who lead the Access to Destinations study (see page 5). Thirty-five papers were presented and published in a proceedings; the document was downloaded more than 4,500 times from the study Web site.



*David Levinson*



*Kevin Krizek*

*Pictured at left: A faculty panel at the 20th anniversary—Mary Vogel, John Adams, Lee Munnich, and Gary Davis*

## Oberstar Forums



James Oberstar

▶ The sixth James L. Oberstar Forum on Transportation Policy and Technology addressed the challenges posed by the nation's aging infrastructure. The forum, held October 8, 2007, came just two months after the I-35W bridge collapse in Minneapolis. The public portion of the forum began with Congressman Oberstar's keynote speech, "The Government's Role in Ensuring a Strong Transportation Infrastructure." Panel discussions with state and national leaders—including U.S. Senator Amy Klobuchar, former USDOT secretary Norman Mineta, and former U.S. Rep. Bud Shuster—followed.

The seventh Oberstar Forum, held on April 7, 2008, addressed potential directions for the next authorization of the federal transportation act, which is set to expire in 2009. The forum used as one source of information

the report *Transportation for Tomorrow*, created by the National Surface Transportation Policy and Revenue Study Commission. The report recommends dramatic institutional reform and revamping of federal transportation programs and policy. U.S. Rep. Tim Walz was one of the forum speakers.



Amy Klobuchar



Tim Walz



Norman Mineta



Bud Shuster

## Other transportation events

### July 2007

- Center for Excellence in Rural Safety second Summer Institute

### September 2007

- Toward Zero Deaths Conference

### October 2007

- Fourth annual Airport Technical Assistance Program (AirTAP) Fall Forum

### November 2007

- 11th Annual Freight and Logistics Symposium

### February 2008

- CTS Winter Luncheon, featuring Ronald Medford, National Highway Traffic Safety Administration
- 12th Annual Minnesota Pavement Conference

### April 2008

- Minnesota Spring Maintenance Training Expo

### May 2008

- CTS 19th Annual Transportation Research Conference, with opening speaker David Horner, U.S. Department of Transportation, and the CTS Spring Luncheon, featuring Stephen Schneider, Stanford University



Ron Medford



David Horner



Stephen Schneider

## Policy seminars

▶ CTS continued to serve as an information resource for legislators and local elected officials. In January, a workshop was held for city and county elected officials on transportation finance. In June, CTS conducted a workshop for legislators and legislative staff that featured the results of the Greenhouse Gas study.

## Digital resources

▶ A new Web-based academic journal, *Journal of Transport and Land Use*, was initiated by David Levinson (Braun/CTS Chair) and Kevin J. Krizek (former faculty with the Humphrey Institute of Public Affairs). The journal includes work from the fields of engineering, planning, modeling, behavior, economics, geography, regional science, sociology, architecture and design, network science, and complex systems.

▶ CTS expanded its offering of webinars to include all CTS, ITS Institute, Greenhouse Gas study, and Access to Destinations study seminars. One seminar, featuring research manager Keith Knapp of the Center for Excellence in Rural Safety, attracted more than 60 online participants, representing at least a dozen state DOTs.



▶ CTS completed a major redesign of the LTAP Web site and developed Web sites for the Minnesota Traffic Observatory, the HumanFIRST Program, and the Intelligent Vehicles Laboratory. New features were added to the CTS Web site: the capability to search for research projects by topic area; a “Meet a Researcher” feature on the Research page; CTS capabilities and expertise in the “About CTS” section; and CTS non-research projects.

▶ The Center for Excellence in Rural Safety, directed by Lee Munnich, and CTS were asked by the USDOT to develop and host a national Rural Highway Safety Clearinghouse Web site. Deputy Secretary Thomas Barrett participated in a media event to announce the site.



Thomas Barrett, Lee Munnich

## AWARDS AND PARTICIPANTS



**20** years...

**675** council and  
committee volunteers

[www.cts.umn.edu/About](http://www.cts.umn.edu/About)

## Annual CTS awards

CTS presented the following awards at its Annual Meeting and Awards Luncheon on April 24 in Minneapolis.

**Richard P. Braun Distinguished Service Award:** Randy Halvorson, senior associate with Cambridge Systematics and former division director for program management at Mn/DOT

**Ray L. Lappegaard Distinguished Service Award:** Connie Kozlak, systems planning and programming manager for the Metropolitan Council and chair of the CTS Transportation Planning and the Environment Council

**William K. Smith Distinguished Service Award:** Cathy Petersen, principal for CJ Petersen & Associates, a research, training, and consulting firm, and the author of three books on international trade

**Distinguished Public Leadership Award:** Fred Corrigan, executive director of the Aggregate & Ready Mix Association of Minnesota and chair of the CTS Executive Committee

### CTS Research Partnership Award

A system for constructing bridges more quickly and with less impact on the environment garnered the 2008 CTS Research Partnership Award. The project—“Full-Depth Precast Concrete Bridge Deck System”—was sponsored by Mn/DOT. It focused on systems that eliminate the need to place and remove formwork, thus accelerating on-site construction and improving safety.

The partnership resulted in a new system that Mn/DOT can use in place of traditional cast-in-place slab superstructures. Thanks to the project, 5 more of these bridges have been constructed in Minnesota, and 11 are in the planning stage. In addition, Mn/DOT has presented the lessons learned from the project at workshops and to the Federal Highway Administration, and the Wisconsin DOT is using the system to build a bridge.

Project partners:

- University of Minnesota Department of Civil Engineering: Carol Shield, Cathy French, Matthew Smith, Charles Bell II (now with Opus)
- Mn/DOT Bridge Office: Dan Dorgan, Kevin Western, Erik Wolhowe, Paul Kivisto, Keith Molnau, Steve Ellis, Joe Fishbein, Kevin Hagen (now with Earth Tech), Jeff Erickson (now with Minnesota DNR)
- Mn/DOT Construction: Steve Kordosky, Jennifer Read
- Mn/DOT Research Services: Alan Rindels
- Federal Highway Administration: Romeo Garcia
- County Prestress: Don Hall, Don Lowe
- Lunda Construction: Dennis Behnke

*Pictured left: Charles Bell, Paul Kivisto, Kevin Western, Kevin Hagen, Keith Molnau, Matthew Smith, Don Hall, Erik Wolhowe, Catherine French, Alan Rindels, and Linda Preisen*



*Robert Johns, Randy Halvorson, Richard Braun*



*Robert Johns, Connie Kozlak, Mary Hill Smith*



*Robert Johns, Cathy Petersen, Richard Murphy Jr.*



*Robert Johns, Fred Corrigan, Colleen Landkamer*

## CTS Executive Committee



**Chair: Fred Corrigan**  
Executive Director,  
Aggregate & Ready  
Mix Association



**Andy Furco**  
Associate for  
Public Engagement,  
University of  
Minnesota



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Institute of Public  
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Government  
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Construction



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Minnesota Senate



**James Hovland,**  
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**Colleen Landkamer**  
Commissioner, Blue  
Earth County



**Mary Hill Smith**  
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**Douglas Differt**  
Director of  
Engineering  
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Cardiovascular  
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**Tom Fisher**  
Professor, College of  
Design, University of  
Minnesota



**Rick Krueger**  
Executive Director,  
Minnesota  
Transportation  
Alliance

**Left during FY08:**

**Lisa Freese**, Deputy Commissioner,  
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**Carol Molnau**, Commissioner,  
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**Craig Shankwitz**, Mechanical Engineering, University of Minnesota  
**Shashi Shekhar**, Computer Science and Engineering, University of Minnesota  
**Al Smith**, Minnesota State Patrol  
**Ray Starr**, Mn/DOT  
**Daryl Taavola**, URS  
**Linda Taylor**, Mn/DOT  
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**Nic Ward**, HumanFIRST Program, University of Minnesota

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**Matthew Zeller**, Concrete Paving Association of Minnesota

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**Larry Blackstad**, Blackstad Consulting

## Awards and Participants

**Paul Bloom**, Soil, Water, and Climate, University of Minnesota  
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**Elizabeth Colburn**  
**Frank Douma**, Humphrey Institute of Public Affairs, University of Minnesota  
**John Gulliver**, Civil Engineering, University of Minnesota  
**Chris Hiniker**, SEH  
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**Bill Towle**, St. Cloud Regional Airport  
**Harold Van Leeuwen**, Bemidji Regional Airport  
**Duane Wething**, Detroit Lakes Airport

## CTS staff partners

CTS works in partnership with the College of Continuing Education (CCE) to conduct many of its events. This partnership also allows CTS to offer an event-planning service for other organizations interested in holding a transportation-related event. CCE staff involved in the partnership are:

**Lori Graven**  
Department Director

**Gene Anderson**  
Program Director

**Teresa Washington**  
Program Associate

**Shirley Mueffelman**  
Program Administrative Specialist

**Clair Daley**  
Program Administrative Specialist

**Catherine Flannery**  
Program Director

**Julie Bodurtha**  
Program Manager

**Heather Dorr**  
Program Associate

**Sara Van Essendelft**  
Program Administrative Specialist

CTS also works in partnership with CCE to administer the Graduate Certificate in Transportation Studies. CCE staff involved in the partnership are:

**Judi Linder**  
Director, Credit Certificate Programs

**Kelly Culhane**  
Associate Program Director

**Teresa Fruen**  
Student Support Services Assistant

## CTS staff



*Shawn Haag, Joe Barbeau, C.J. Loosbrock, Dawn Spanhake, Penny Harris, Mindy Carlson, Jim Grothaus, Mary Snyder, Keith Carlson, Michael McCarthy, Arlene Mathison, Pam Snopl, Robert Johns, Peter Park Nelson, Stephanie Malinoff, Toni Prekker, Laurie McGinnis, Linda Preisen, Cadie Wright Adhikary, Gina Baas, Jan Lucke, Amy Friebe*

**Robert C. Johns**  
Director

**Laurie McGinnis**  
Associate Director

**Cadie Wright Adhikary**  
Graphic Designer

**Gina Baas**  
Communications and  
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**Joe Barbeau**  
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Operations Manager

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Intelligent Transportation  
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Information Technology  
Professional

**Jan Lucke**  
Program Coordinator

**Stephanie Malinoff**  
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**Arlene Mathison**  
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Executive Assistant

**Dawn Spanhake**  
Financial Strategy and  
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*Left during FY08:*

**Charlie Grussing-Neitzel**

**Tom Helms**

**Chad Rathmann**

### CTS student interns during FY08

Mike Anderson  
Jeff Blanchard  
Leah Brink  
Meagan Buechel  
Emily Buhrow  
Krystal Calubayan  
Kate Croswell

Jakub Dajc  
Sandeep Dhull  
Grace Gathaara  
Victor Gauto  
Nyssa Gesch  
Marni Ginther  
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Heather Hoffman  
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Mallory Kurkoski  
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Alec More  
Margaret Ostrander  
Matt Rogers  
Jay Roth

Katrina Sanders  
Marie Schneider  
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Nate Steffan  
Greg Summins  
Max Yang

