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**Upcoming Events**

## Policy and Planning

### “Destinations Count” at 2009 research conference

The [Access to Destinations Study](#) will be the subject of the opening plenary session at the twentieth annual [CTS Transportation Research Conference](#) May 19–20. The conference will be held at the Sheraton Bloomington Hotel in Minneapolis.



“Destinations Count” will feature a presentation of findings from the Access to Destinations Study by study leaders, and a discussion of implications by a panel of transportation experts.

Panelists will include study co-leaders **David Levinson** and **Kevin Krizek**; **Tim Henkel**, modal planning and program management division director, Mn/DOT; **Curt Johnson**, Citistates Group; and **Maria Zimmerman**, vice president for policy, ReconnectingAmerica.

### Researcher looks to past lessons for funding transportation in the future

As leaders and the public wrangle over ways to fund critical transportation needs in Minnesota, researcher **Zhirong (Jerry) Zhao** said what is most important today is to focus on the future rather than on the past.

He reviewed key points in state transportation history to explain the current situation and laid out a comprehensive array of future funding options.



**Zhirong (Jerry) Zhao**

Zhao, an assistant professor in the [Humphrey Institute of Public Affairs](#) at the University of Minnesota, spoke February 10 as a part of a series of research seminars sponsored by CTS.

In recent research sponsored by CTS, Zhao has studied the funding mechanisms used for a variety of transportation projects in Minnesota, including highways, transit networks, and local roads. The study also sought to identify current and future policy issues likely to affect transportation funding, and examined funding options suggested by other researchers. The goal of this work, Zhao said, is to encourage better understanding and management of issues related to transportation funding in the state.

Zhao’s presentation, titled “Transportation Funding in Minnesota – Past, Present, and Prospects,” focused on how transportation is funded by federal, state, and local sources; how funding is distributed between transit development and highway funds; and what direction Minnesota transportation funding should take in the future.

That future may include a different role for motor vehicle fuel taxes, which have been an important source of transportation funds. Because these taxes are assessed on the basis of the amount of fuel consumed rather than on the basis of fuel price, higher prices at the pump may reduce tax revenues by encouraging drivers to cut back, Zhao noted.

A [chart from the presentation](#) (PDF), also included in Zhao’s recent research report, summarizes the revenue streams available to the state for

transportation projects and suggests some of the issues that transportation agencies may face in planning for the future.

Streaming video of Zhao's full presentation is available on the [CTS Seminars Web page](#).

Zhao's research report, [Funding Surface Transportation in Minnesota: Past, Present and Prospects](#) (CTS 08-23) is available on the CTS Web site.

## **New Bus Rapid Transit service will put ITS technologies in the spotlight**

A team of engineers and researchers from the ITS Institute's [Intelligent Vehicles Laboratory](#) and [HumanFIRST Program](#) is getting ready to put a new spin on public transportation in the Twin Cities. By early 2010, a fleet of 10 buses equipped with advanced driver-assistive technologies is scheduled to begin offering bus rapid transit (BRT) service on one of the area's most important commuter routes, the I-35W/Cedar Avenue corridor linking downtown Minneapolis to the southern suburbs.



**Intelligent Vehicles Laboratory research associate Pi-Ming Cheng and graduate student Eddie Arpin assemble computer hardware for the BRT driver-assistive system.**

The project, funded by the [ITS Institute](#), [Hennepin County](#), the [Minnesota Valley Transit Authority](#), and the U.S. Department of Transportation's Urban Partnership Agreement (UPA) program, is part of Minnesota's efforts to improve the performance of its transportation system under the UPA program. In June 2008, the federal agency selected Minnesota to receive \$133.5 million under the program to fund a variety of innovative congestion reduction measures along the corridor.

### **ITS meets BRT**

Bus rapid transit uses transit buses to provide the kind of fast commuter service usually associated with light-rail transit systems. Because it does not require the construction of rail lines or other specialized facilities, BRT is highly cost-effective and relatively easy to implement, making it a good option for rapidly improving commuter transit service, says ITS Institute director **Max Donath**.

One of the advantages of the new UPA funding is that it enables the IV Lab to leverage previous BRT-related collaboration with the Minnesota Valley Transit Authority (MVTA), which has operated transit service along the corridor for several years, says IV Lab director **Craig Shankwitz**, who is also the lead

researcher on the project. The Minnesota Department of Transportation and local transit agencies have worked together to provide service on shoulder lanes for several years. Bus drivers on designated highway routes are allowed to operate their vehicles in shoulder lanes at their discretion to avoid traffic congestion on the main roadway.

The bus-only shoulder program has proven extremely popular with transit riders—in fact, transit officials report that riders call in to complain if their drivers are not taking advantage of an open shoulder. However, operating a 9-foot-wide bus in a 10-foot shoulder lane can be challenging for even experienced drivers. To ensure safety, the decision to use a shoulder lane is always left to the operator's discretion, and they may decide to stay in the main roadway if visibility of the shoulder lane is low.

In 2002, Donath and Shankwitz saw an opportunity to use the ITS Institute's expertise in driver-assistive systems to improve transit service on bus-only shoulders. The lab had already been working on a suite of driver-assistive systems for special-purpose vehicles such as snowplows, including lane guidance based on high-accuracy Global Positioning System data, digital mapping, obstacle detection, and head-up display technologies. In a series of research projects, IV Lab engineers began to adapt these technologies for the unique needs of transit vehicle operations, and they were tested in collaboration with Metro Transit, the largest transit operator in the Twin Cities.

Those efforts led to a successful multi-year collaboration with the MVTA in which driver-assistive technologies developed by the ITS Institute were tested and deployed on an MVTA bus. The feedback from experienced bus drivers using the equipment under real-world conditions has been instrumental in refining the driver-assistive systems for the specific needs of BRT operations.

Read the [complete story in the Sensor](#), the newsletter of the [Intelligent Transportation Systems Institute](#).

## **Transportation and the Environment**

### **Less to fear from airborne invaders**

The risk of widespread Canada thistle seed dispersal by restless prairie winds seems to be overstated, according to a new study by researchers from the University of Minnesota's [Department of Agronomy and Plant Genetics](#) and the USDA's North Central Soil Conservation Research Laboratory. Faculty members **Roger Becker** and **Milton Haar** were among the researchers who monitored seed dispersal at test sites of Canada thistle in an effort to identify appropriate control measures for this invasive weed. The project was sponsored by the [Minnesota Department of Transportation](#).

According to the researchers' report, most of the seed bodies produced by Canada thistles fall quite close to the parent plant. The feathery tufts attached to seeds do not appear to routinely carry the seeds long distances to start new thistle colonies.

The report notes that mowing can prevent the production of seeds if it is done within a short time after the first blooms become visible; mowing may also be effective once seed dispersal has begun if the plants are wet, making the seeds less likely to be widely dispersed. Applying herbicides during seed dispersal, the researchers note, is likely to be ineffective. Destruction of the plant's extensive root system remains the most effective way of eliminating it, although multiple tillage or herbicide treatments may be required.

*Production and Wind Dispersal of Canada Thistle (Cirsium arvense L.) Achenes* (Mn/DOT 2008-39) is available from the CTS Web site.

## **Transit, Bicycling, and Walking**

### **TCRP research publications available online**

The federal Transit Cooperative Research Program (TCRP), administered by the Transportation Research Board, provides practical transit research to address technical and operational issues. TCRP emphasizes putting research results into the hands of organizations and individuals that can use them to solve problems.

Recent TCRP publications include:

- ◆ [Shared Use of Railroad Infrastructure with Noncompliant Public Transit Rail Vehicles: A Practitioner's Guide](#) (TCRP Report 130)
- ◆ [Light Rail Vehicle Collisions with Vehicles at Signalized Intersections](#) (TCRP Synthesis 79)

# Transportation Infrastructure

## CE researchers to evaluate I-35W bridge data

**Catherine French**, along with co-investigators **Carol Shield** and **Henryk Stolarski**, will receive more than \$235,000 over 40 months from the [Minnesota Department of Transportation](#) (Mn/DOT) to evaluate data from instrumentation on the new I-35W bridge. All three are professors in the [Department of Civil Engineering](#) (CE); French and Shield are CTS Faculty Scholars.



The new bridge was instrumented with “smart bridge technology” to monitor the performance of the structure during service. Instrumentation includes vibrating wire and resistive strain gages and thermistors in the foundation, bridge piers, and superstructure. The bridge superstructure also incorporates fiber optic sensors, string potentiometers, and accelerometers.

The role of the University is to evaluate the data to be obtained from the instrumentation and to provide an annual report to Mn/DOT regarding the bridge’s performance. The study will also provide valuable information regarding the evaluation of the instrumentation technology for consideration in other bridge monitoring applications in the state.

The researchers also played a consulting role in reviewing and commenting on the instrumentation plan for the new I-35W bridge, and participated in a truck test of the bridge prior to its opening.

The research is discussed in the March 2 issue of BusinessWeek in an article titled “[The Bridge to Smart Technology.](#)”

## Roadway subgrade drainage systems compared

A recent study by University of Minnesota researchers sheds new light on the underground world of subsurface pavement drainage systems. Over a two-year period, professor **John Nieber** and researcher **Dario Canelon** of the [Department of Bioproducts and Biosystems Engineering](#) monitored several drainage configurations designed to remove excess water from roadway bases, conducting tests to determine their efficiency. The findings of the study, sponsored by the [Minnesota Local Road Research Board](#), have been published in a new research report.



**Pavement damage may result from poor subgrade drainage.**

Effective subsurface drainage reduces the need for roadway maintenance by preventing pavement damage. As the researchers note in their report, an effective drainage system can pay for itself by reducing maintenance costs despite significant installation costs during construction or when retrofitting existing roadways.

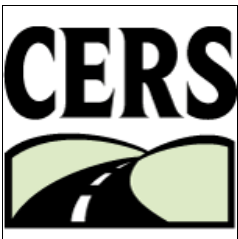
Since the first set of design recommendations for subsurface drainage systems were published by the Federal Highway Administration in the 1950s, many state and local agencies have attempted to identify systems that address their local or regional conditions. Over the same time period, many new techniques and materials have been developed.

The researchers installed three different drainage treatments using both centerline and edge drains beneath a section of rural highway in southwestern Minnesota. They monitored drainage volumes and tested the electrical conductivity of subgrade materials (an indicator of soil moisture characteristics), using statistical analysis to compare the various drainage treatments.

The researchers also developed a numerical simulation of drainage flows under roadway pavements where drainage tiles have been installed. In addition, they studied the effects of crushed concrete in the roadway base on drainage tiles, in order to ascertain whether the material interfered with the tiles’ ability to take in water.

[Evaluating Roadway Subsurface Drainage Practices](#) (Mn/DOT 2009-08) is available from the CTS Web site.

## CERS publishes second rural safety research summary about Minnesota counties



A second research summary in the [Center for Excellence in Rural Safety’s](#) Improving Rural Transportation Safety series summarizes the characteristics of the fatal rural roadway crashes within five Minnesota counties and describes some of the safety improvement programs or campaigns being used in this five-county area. The report, by CERS director **Lee Munnich** and research assistant **Tyler Patterson**, also makes several recommendations that focus on improving rural roadway safety data and analyses. Evaluations of safety improvement programs and campaigns are also proposed.

Approximately 56 percent of the roadway crash fatalities in the United States occur along rural roadways, but only 23 percent of the population resides within areas defined as rural. Almost 70 percent of the crash fatalities in Minnesota are in rural areas. Past research has shown that some of the typical characteristics of fatal rural roadway crashes include younger drivers, alcohol involvement, lack of seat belt use, and speeding.

[Five-County Minnesota Case Study: Rural Roadway Fatal Crash Characteristics and Select Safety Improvement Programs](#) is available from the CTS Web site.

## More Upcoming Events

### April 2

[Transit Fare Collection Technology: Current Status and Future Prospects](#); Nigel Wilson; 3:30 p.m. – 4:30 p.m. CST; Room 1130, Mechanical Engineering Building. The seminar also will be broadcast live on the Web and available for later viewing.

### April 7–8

[Workshop on Poly Phosphoric Acid Modification of Asphalt Binders](#), Minneapolis Airport Marriott, MN.

### April 8

[Toward Zero Deaths Stakeholder Breakfast](#), Shoreview, MN.

### April 25–29

American Planning Association National Planning Conference, Minneapolis, MN.

**April 30**

TH-36 Full Road Closure: Lessons for the Future; John Hourdos; 2:30 p.m. – 3:30 p.m. CST; Room 1130, Mechanical Engineering Building. The seminar also will be broadcast live on the Web and available for later viewing.