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CTS Research E-News brings you the latest research project milestones, published reports, and seminar coverage.

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**Announcements****CTS director Robert Johns accepts position with USDOT; McGinnis named acting director****Robert Johns****Laurie McGinnis**

CTS director **Robert Johns** has been appointed by the Obama administration to serve as the new director of the [John A. Volpe National Transportation Systems Center](#). He began his new position September 28. **Laurie McGinnis**, the former associate director of CTS, will serve as acting director until the new director of CTS is named.

The Volpe Center, which operates out of the [U.S. Department of Transportation's Research and Innovative Technology Administration](#) in Boston, is charged with improving the nation's transportation system through collaborations between the USDOT and other federal, state, local, and international agencies and entities.

Johns was with CTS for 21 years as director, deputy director, associate director, and research coordinator. Under his directorship, CTS grew from \$8 million to more than \$20 million in external funding, making CTS one of the nation's leading research and policy centers on transportation. Nationally, Johns is active in the [Transportation Research Board](#) (TRB) of the National Academies. He currently is chair of the TRB Technical Activities Council, providing oversight to TRB's 200 technical committees that address all aspects of transportation. While at CTS Johns also chaired the Board of the [Intelligent Transportation Systems Institute](#), a federal university transportation center.

A civil engineer, McGinnis also holds Master's of Public Affairs and Master's of Business Administration degrees. As CTS associate director since 2001, she has worked closely with stakeholders, faculty and staff, funding organizations, and the Center's advisory committees to coordinate research conducted by academic departments. McGinnis has also overseen the development and delivery of technical assistance and training, information products, and outreach services that support the Center's programs. Nationally, McGinnis is active in the Transportation Research Board and the International Advisory Board of the Women's Transportation Seminar.

A search for a new CTS director will be launched at the end of the calendar year.

**Policy & Planning****Research highlights economic benefits of innovative contracting**

A recent article by University of Minnesota economics professor **Patrick Bajari** and Harvard University assistant



**Patrick Bajari**

professor **Greg Lewis** discusses the impacts of user costs associated with roadway construction—including increased delays and driver frustration—and highlights some of the innovative contracting procedures that Minnesota and other states are putting into practice to help minimize them.

The research was supported by the [Center for Urban and Regional Affairs](#), the [University of Minnesota](#), and the [National Science Foundation](#).

Bajari and Lewis applied lessons from pioneering work in the field of mechanism design by the late University of Minnesota economist **Leonid Hurwicz**, who received the [2007 Nobel Prize in Economics](#) for his pioneering work. Mechanism design attempts to shape systems in order to achieve desired goals; Hurwicz emphasized the importance of designing systems with rules that take advantage of people’s innate self interest. In the case of highway repair contracting, this means using the contractor’s desire for maximum profits to ensure that total costs—including the user costs—are kept to a minimum.

One example of this approach is A+B bidding, in which a contractor is selected based on a bid for time and materials (the “A” bid) and a bid for completion time (the “B” bid). This system was used successfully by Mn/DOT in the reconstruction of the I-35W bridge over the Mississippi River, which was completed on time and within budget. The design of bidding procedures is crucial for the success of A+B bidding, the researchers note; poorly designed rules may give contractors the opportunity to take advantage of the system rather than improving efficiency.

The researchers applied economic theory to the real world of highway contracting, examining practices such as “A+B” contracts and lane rentals by contractors, to determine how agencies could achieve more efficient results. Such innovative practices, which are gaining ground in public works contracting, have the potential to speed up highway repair operations and enhance the overall social welfare, they conclude.

“Speeding Road Construction: Efficient Contract Design Can Lead to Faster Repairs, Fewer Delays, and Lower Commuter Costs” by Patrick Bajari and Greg Lewis appeared in the [Spring/Summer 2009 issue of the CURA Reporter](#) (vol. 39, no. 1–2).

### **Who you know, where you go**



**Nebiyou Tilahun**

Social networks and communication technologies play an important role in determining where and why people travel, according to University of Minnesota researchers. In a new research report, **Nebiyou Tilahun** and **David Levinson** of the civil engineering department explore the effects of social networks and information and communication technologies (ICTs) on residential and employment location decisions.

Social networks, which may be centered on the home neighborhood or the workplace, can be important sources of information when searching for available residences or employment opportunities. The researchers found evidence of significant home-work co-location in data on residential and employment locations in the Minneapolis-St. Paul area.

The researchers also examined the role of the Internet and newspaper advertising in the job search process, and how these methods can affect employment location decisions. Finally, they looked at social meetings in order to learn where, when, and why people travel socially.

[Social Networks and ICT in Location Choice](#) (CTS 09-19) is available from the ITS Institute Web site.

### **Journal of Transportation and Land Use**

CTS is pleased to announce the publication of Vol. 2, issue 2 of the [Journal of Transport and Land Use](#), available at <http://jtlu.org>.

The *Journal of Transport and Land Use* is an open-access, peer-reviewed online journal publishing original interdisciplinary papers on the interaction of transport and land use. Domains include: engineering, planning, modeling, behavior, economics, geography, regional science, sociology, architecture and design, network science, and complex systems.

Contents:

*Access, Aging, and Impairments Part B: Accessibility Planning*  
Jan-Dirk Schmöcker, Tokyo Institute of Technology

*Implementing accessibility in municipal planning—Planners’ view*  
Hanna Wennberg, Agneta Ståhl, and Christer Hydén, Lund University, Sweden

*Can measuring the benefits of accessible transport enable a seamless journey?*  
Alice Maynard, Future Inclusion, Ltd.

*Assessing the extent of transport social exclusion among the elderly*  
Helena Titheridge, Kamalashudhan Achuthan, and Roger Mackett  
Centre for Transport Studies, University College London  
Juliet Solomon, TRaC, London Metropolitan University

*Older people and local public transit: Mobility effects of accessibility improvements in Sweden*  
Anders Wretstrand, Lund University, Sweden  
Helena Svensson, Jönköping University, Sweden  
Sofi Fristedt, Jönköping University, Sweden  
Torbjörn Falkmer, Curtin University of Technology, Australia;  
Jönköping University, Sweden; Linköping University, Sweden

*Correspondence: Urban Mobility Plans and Accessibility*  
Maryvonne Dejeannes  
Certu, France

*Book Review: Code and the City*, by Eran Ben-Joseph  
Arthur Huang, University of Minnesota

## **Intelligent Transportation Systems**

## Cellular Phone-Based Teen Driving Support System aims to help young drivers stay safe



HumanFIRST  
research fellow  
Janet Creaser

University of Minnesota researchers are using “smart” cell phones to help teen drivers keep out of trouble behind the wheel. The design and evaluation of a Teen Driver Support System (TDSS) is documented in a report authored by HumanFIRST Program research fellow [Janet Creaser](#), program director [Mike Manser](#), graduate student [Richard Hoglund](#), and ITS Institute director [Max Donath](#).

The first Teen Driver Support System (TDSS) prototype, developed by Institute researchers in 2006, gave drivers real-time auditory and visual feedback but the system was bulky and complicated to install.

Because the new TDSS system is based on smart-phone technology, it is designed to be less expensive and easier to implement than an earlier prototype system developed by the ITS Institute that was based on special dedicated hardware. The research was supported by the University of Minnesota’s [Intelligent Transportation Systems Institute](#) and the U.S. Department of Transportation’s [Research and Innovative Technologies Administration](#) (RITA).

The smart phone is placed on the dashboard in such a way that the driver can readily see both the phone’s screen and the road. Four different items are displayed on the screen: vehicle speed, the quality of the GPS signal, the name of the street the vehicle is traveling on, and a traffic sign icon.

The traffic sign icon displays various traffic control signs that correspond to the actual driving environment. For example, if the driver is driving at or below the speed limit, a white speed limit sign is shown. If the driver exceeds the limit, the sign turns red and the speed limit value flashes. Stop signs and yellow diamond curve signs can be displayed as well.

In addition, the phone communicates with the Road Weather Information Service server so drivers are alerted to low visibility, high wind, snow, rain, hail, or ice by pre-recorded auditory messages stored on the phone. When the weather warrants a reduction in speed, the speed limit sign in the picture box turns blue and shows the recommended speed.

To evaluate this TDSS prototype, the researchers completed a small usability study. The 16 participants were licensed drivers aged 18 and 19. Among them, they had a total of 11 previous moving violations—one for inattentive driving and the rest for speeding. Participants also reported a total of seven previous crashes for which they were considered at fault.

The participants drove an 8.7-mile circuit in Hennepin County both with and without the TDSS. They received visual and audio feedback, and text messages were sent (to one of the researchers) when they failed to alter their behavior. In general, the TDSS encouraged lower speeds in this group of drivers—although this may have been due, at least in part, to the presence of the researcher in the vehicle. The participating teens reported that very little mental effort was required to interact with the TDSS while driving, but they also reported that the system made driving more stressful.

Still needed is a more detailed field study to determine whether the system really changes driver behavior over the long term. “We want to see if drivers simply rely on the warnings provided by the system, or if the feedback really helps them learn to monitor their own behavior,” Creaser says.

*[Development and Evaluation of a Cellular Phone Based Teen Driver Support System](#) (CTS 09-22) is available on the ITS Institute 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:

- ◆ [Practical Measures to Increase Transit Advertising Revenues](#) (TCRP Report 133)
- ◆ [First Amendment Implications for Transit Facilities: Speech, Advertising, and Loitering](#) (TCRP Legal Research Digest 29)
- ◆ [Appendixes to TCRP Report 135: Controlling System Costs: Basic and Advanced Scheduling Manuals and Contemporary Issues in Transit Scheduling](#) (TCRP Web-Only Document 45)

## Transportation Infrastructure

### Fly Ash: more useful than it sounds



Fly ash can be used to stabilize subgrade materials when reconstructing roads.

What to do with the ash left over when coal is burned to generate electricity? With the right techniques, fly ash can be combined with recycled pavement materials to form the base of reconstructed roadways. As a stabilizing agent, fly ash improves the strength and stiffness of the recycled materials. University of Minnesota researcher [Paul Bloom](#) and a team from the [University of Wisconsin](#) examined the use of fly ash in the reconstruction of bituminous roads in order to develop new design procedures for working with this material. The research was funded by the [Minnesota Department of Transportation](#) and the [U.S. Department of Energy](#).

Recycling pavement materials saves money and time on reconstruction projects, but correct preparation use of recycled materials is essential to achieving acceptable subgrade performance. Recycled base materials often contain asphalt binder, fine particles, and other materials that reduce their stability and stiffness. But binders such as fly ash, cement, or other substances can give recycled materials the right properties for subgrade use.

The researchers’ goal was to develop a practical method for designing local roadways using recycled pavement materials stabilized with Class C fly ash as a base layer. Base course materials were tested in the laboratory, in prototype form, and by monitoring their performance in the field. The project included studying the implications of freeze-

thaw cycling and long-term curing.

Because fly ash may contain heavy metals such as lead and arsenic, researchers also conducted environmental tests in the laboratory, modeled possible effects on groundwater, and monitored the field sites for groundwater contamination. Although trace elements were found to leach from recycled materials containing fly ash, the research indicated that dilution and attenuation would normally keep their levels within acceptable limits.

*Use of Fly Ash for Reconstruction of Bituminous Roads* (Mn/DOT 2009-27) is available from the CTS Web site.

## Upcoming Events

### Fall 2009 Advanced Transportation Technologies Seminar Series

The Intelligent Transportation Systems Institute invites transportation professionals and students to join University of Minnesota researchers and guests for presentations on current ITS-related research.

The ITS Institute's semester-long [seminar series](#) provides updates on research projects in the Institute's core science and technology areas—human factors, intelligent vehicles, traffic modeling and management, sensing, communications, and controls. Research projects cover a wide range of disciplines such as mechanical engineering, electrical engineering, human factors, computer science and engineering, and civil engineering.

The seminars are free and open to all, and advance registration is not required. Seminars are also broadcast live on the Web and archived for later viewing.

### Time and Location

3:30 p.m.–4:30 p.m. CDT, unless otherwise noted  
[1130 Mechanical Engineering](#)

Parking is available at the [Washington Avenue Ramp](#), at the [Church Street Garage](#), or at the [Oak Street Ramp](#). For transit information, call Metro Transit at 612-373-3333 or visit [www.metrotransit.org](http://www.metrotransit.org).

For more information, contact Shawn Haag, [haag0025@umn.edu](mailto:haag0025@umn.edu), 612-625-5608.

In the first two seminars this year, [Humphrey Institute of Public Affairs](#) researcher **Frank Douma** addressed the implications of current and emerging privacy laws for ITS and human factors researcher **Janet Creaser** discussed research into the effects of alcohol on motorcycle riding skills. Video recordings of both seminars are available for online viewing.

The seminar schedule for the rest of fall 2009 includes:

#### October 8

[Relieving Congestion and Saving Energy by Cooperative Intelligent Transportation Systems](#)  
Steve Shladover, Research Engineer, California Partners for Advanced Transit and Highways (PATH)

#### October 22

[Ramp Metering for Postponing Freeway Breakdown](#)  
Lily Elefteriadou, Professor and Director, Transportation Research Center, University of Florida

#### November 5

[Considerations for Aging Road Users](#)  
Johnell Brooks, Assistant Professor, Psychology, Clemson University

#### November 19

[Non-Intrusive Detection of Driver Drowsiness](#)  
Xun Yu, Assistant Professor, Mechanical and Industrial Engineering, University of Minnesota Duluth

#### December 3

[Novel Battery-Less Wireless Sensor for Traffic Flow Measurement](#)  
Rajesh Rajamani, Professor, Mechanical Engineering

### Call for Presentations: 2010 research conference

CTS has issued a Call for Presentations for its 21st Annual Transportation Research Conference. The call invites all interested individuals to submit a one-page abstract for a presentation (or poster) at the conference, to be held April 27–28, 2010.

Please note that the 2010 conference returns to the RiverCentre in St. Paul.

If you or your organization would like to share the results of your research or innovations in transportation-related fields, please submit an abstract by November 13.

All abstracts must be submitted electronically. Go to the CTS Web site at [www.cts.umn.edu/events/rescon](http://www.cts.umn.edu/events/rescon) and follow the instructions to submit your abstract.

For further information, contact Sara Van Essendelft, 612-624-3708, [cceconf5@umn.edu](mailto:cceconf5@umn.edu).

## Other Upcoming Events

#### October 1

[CTS Seminar Series: Urban Partnership Agreement - Technology and Collaboration in Effective Transportation Policy](#), Mechanical Engineering Bldg, University of Minnesota

**October 8**

CTS Seminar Series: Relieving Congestion and Saving Energy by Cooperative Intelligent Transportation Systems, 3:30 p.m. – 4:30 p.m., 1130 Mechanical Engineering

**October 9**

Rethinking Transportation Finance Roundtable: Public Acceptance of Toll Lane Options, Humphrey Institute, University of Minnesota

**October 12**

Between a rock and a hard place: Exploring the effects of behavioral and situational correlates and objects of impact in the injury outcomes of motorcycle collisions, Center for Excellence in Rural Safety, University of Minnesota

**October 13**

ITS Minnesota Fall Meeting, Continuing Education and Conference Center, Saint Paul

**October 15**

CTS Seminar Series: Evaluating Roadway Subsurface Drainage Practices, , Mechanical Engineering Bldg, University of Minnesota

**October 28-29**

Toward Zero Deaths Annual Conference, Duluth, MN

**October 29**

CTS Seminar Series: The Economic Impact of Upgrading Roads, 3:30 p.m. – 4:30 p.m., 1130 Mechanical Engineering

**November 10**

CTS Fall Luncheon, McNamara Alumni Center, University of Minnesota

**November 12**

CTS Seminar Series: Speed and Efficiency in Government Procurement of Transportation-Related Construction Services, 3:30 p.m. – 4:30 p.m., 1130 Mechanical Engineering

**December 4**

2009 Freight and Logistics Symposium, Ramada Plaza Hotel, Minneapolis