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

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Policy and Planning

Right-of-way acquisition: issues and perspectives

Acquiring right-of-way is often one of the most expensive parts of a transportation construction project. In a new report, CTS Scholar **Adeel Lari** and graduate student **Sara Aultman** examine the economic factors affecting right-of-way acquisition—particularly early acquisition—in the context of transportation corridor development.



Adeel Lari

Lari and Aultman's work, sponsored by the Minnesota Department of Transportation (Mn/DOT), addresses issues raised in earlier research by University of Minnesota researchers **Gary Barnes** and **Sarah Watters**, which concluded that early right-of-way acquisition is often not warranted, because the rate of return on other investments is often higher than the rate of property value appreciation. Barnes and Watters therefore suggested that investment of funds, rather than early acquisition of right-of-way, is likely to provide greater benefits to transportation agencies.

In light of these conclusions, Lari and Aultman examined the Minnesota Department of Transportation's current procedures for advanced right-of-way acquisition. The researchers were particularly interested in the possibility that land parcels along transportation corridors may appreciate differently from parcels in other areas.

Based on surveys of Mn/DOT regional offices, a statistical analysis of parcel acquisition, and a set of case studies of parcel acquisition along transportation corridors, the researchers' final report recommends that the state develop guidelines preserving right-of-way without early acquisition and implement a monitoring program to track subdivisions and changes of land use along corridors—especially in the Twin Cities area, where the potential for property value appreciation is high.

Lari and Aultman's final report, *Advanced Acquisition of Right-of-Way: Best Practices and Corridor Case Studies* (Mn/DOT 2009-07) as well as the earlier report by Barnes and Watters, *The Financial Benefits of Early Acquisition of Transportation Right-of-Way* (2005-35), are available from the CTS Web site.

Collaboration key to complex transportation projects

Under the U.S. Department of Transportation's [Urban Partnership Agreement](#) program, the Minnesota Department of Transportation and other agencies are involved in a complex collaborative effort to implement congestion reduction measures in the Twin Cities area. The process may hold important lessons for Minnesota and other states as they address their transportation challenges.

A group of researchers (**John M. Bryson**, **Barbara C. Crosby**, **Melissa M. Stone**, and **J. Clare Mortensen**) from the [Public and Nonprofit Leadership Center](#) at the [Hubert H. Humphrey Institute of Public Affairs](#) has studied the early stages of UPA implementation to understand the factors that contribute to success. The study was sponsored by the Intelligent Transportation Systems Institute and the [U.S. Department of Transportation's Research and Innovative Technologies Administration](#).

The researchers' study of collaboration revealed that people, processes, politics, and structures all played important roles in the UPA. Several

roles were identified for organizations and individuals, including neutral conveners that brought stakeholders together, sponsors, champions, process designers, and technical experts. Neutral organizations and individuals emerged as particularly important, with participants pointing out the crucial role played by organizations that facilitated interactions between stakeholders.

Technology also emerged as an important factor, by making possible many of the transportation options supported by the UPA funds, by facilitating communication between stakeholders, and by attracting participants who were excited about working on the cutting edge of transportation technology.

Although the Minnesota UPA has not yet attracted significant media attention, the researchers predict that it will become more widely publicized as component projects are implemented. Based on their research to date, the researchers predict that the program will be a success, and that the lessons learned will prove valuable for the implementation of other complex transportation projects in the future.

Collaboration in Fighting Traffic Congestion: A Study of Minnesota's Urban Partnership Agreement (CTS 08-25) is available from the Center for Transportation Studies Web site.

2009 International Transport Economics Conference

The Center for Transportation Studies will host the 2009 *International Transport Economics Conference (ITrEC)* June 15–16 on the University of Minnesota's Minneapolis campus.

ITrEC brings together researchers, practitioners, and policymakers interested in questions of transport economics. Topics include economic questions relating to revenue and finance; congestion, pricing, and investment; production and cost estimation; transport demand; energy and environment; safety; institutions and industrial organization; and transport and land use. The conference is designed to appeal to participants from varied backgrounds, including economists and transport professionals in particular.

The conference has previously taken place at the University of Alberta (2006), the Catholic University of Leuven (2007), and the Paris School of Economics (2008).

Online registration is now available. Early registration rates are available until May 15.

- ◆ Practitioner: US\$450 (before May 15)/\$500 (after May 15)
- ◆ Presenter: \$295/\$395
- ◆ Student: \$95/\$145

For more information, contact associate professor David Levinson, dlevinson@umn.edu, or conference coordinator Sara Van Essendelft, cceconf5@umn.edu, 612-624-3708. Information is also available on the conference Web site, www.transporteconomics.org.

Intelligent Transportation Systems

ITS research aims to understand, prevent urban highway collisions

Researchers at the *Minnesota Traffic Observatory* (MTO) are using a crash-prone section of urban freeway to uncover the conditions that can lead to crashes—and to develop countermeasures that improve traffic flow and safety. MTO director **John Hourdos**, civil engineering professor **Panos Michalopoulos**, and graduate student **Wuping Xin** recently completed a study that used advanced visualization and simulation techniques to identify new ways of improving traffic safety on a westbound section of I-94 near downtown Minneapolis.



A digital simulation of the high-crash area

In earlier research, Hourdos, Michalopoulos, and graduate student **Vishnu Garg** showed that it was possible to automatically identify specific traffic conditions associated with an increased likelihood of crashes. That study relied on a state-of-the-art video-based traffic monitoring system consisting of multiple cameras overlooking the freeway section, turning the area into a unique laboratory for studying freeway collisions. Following the completion of the initial study, Hourdos and Michalopoulos asked how the new knowledge of accident-prone conditions could be used to improve safety.

The MTO's Digital Environment (DEN) immersive 3-D visualization system gave the research team a powerful tool for examining different crash mitigation measures under a variety of traffic conditions. Using map data, road construction plans, and digital photography, the researchers were able to construct highly detailed digital model of the study area. Combined with traffic data, the environment enabled the team to see what drivers on the highway would see.

The researchers also explored the use of existing micro-simulation traffic models to evaluate safety improvements. This effort was hindered by the fact that current models are unable to realistically simulate vehicle collisions. In response, Hourdos, Michalopoulos, and Xin developed enhanced micro-simulation models that could accurately mimic collisions in response to crash-prone conditions. The findings from that study were used by the Minnesota Department of Transportation to improve traffic management in the study zone.

Three reports documenting the MTO research are available on the CTS Web site:

- ◆ *Accident Prevention Based on Automatic Detection of Accident Prone Traffic Conditions: Phase I* (CTS 08-12)
- ◆ *Enhanced Micro-Simulation Models for Accurate Safety Assessment of Traffic Management ITS Solutions* (CTS 08-17)
- ◆ *Development of Real-Time Traffic Adaptive Crash Reduction Measures for the Westbound I-94/35W Commons Section* (CTS 08-28)

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:

Transportation Infrastructure

NSF workshop explores future of bridge research

The need for better tools to assess the health and safety of bridge systems became all too clear on an August 2007 evening in Minneapolis. In November 2008, a group of approximately 40 leading engineering researchers and transportation infrastructure experts came together in Minneapolis to discuss the challenges of monitoring and maintaining bridges and to identify priorities for future research. Civil engineering professor **Catherine French** served as moderator.



Catherine French

Sponsored by the [National Science Foundation](#) (NSF), the two-day Bridge Condition Monitoring and Prognostication Workshop provided an interdisciplinary forum for leading researchers to formulate and advance next-generation research priorities.

Professor French, a CTS Faculty Scholar, served as chair of the steering committee for the workshop and was the principal investigator on the NSF grant that supported the conference. **Steve Crouch**, dean of the University of Minnesota's Institute of Technology, was one of several speakers who provided welcoming comments.

Attendees included faculty members and researchers from universities and corporations in the United States and other countries as well as representatives of the Federal Highway Administration, state transportation agencies, and the Los Alamos National Laboratories.

The workshop featured a series of keynote presentations highlighting current research in areas including remote sensing and networking, data interpretation, visualization techniques, and decision making.

Breakout sessions identified gaps in current knowledge and the associated technological challenges related to bridge monitoring and prognostication. Participants also generated ideas for multidisciplinary research.

The outcome of the workshop will be a document providing a clear list of priorities that can be used as a resource to inform the associated programs at NSF and the broader research community. The document will identify next-generation research directions associated with bridge sensing and prognostication including associated fields of sensors; data acquisition, networking, and communications; data management and interpretation; and decision making, with particular emphasis on the research needs associated with the integration across these major topic areas.

CTS assisted with the coordination of the event. For more information, see www.cts.umn.edu/Events/NSFBridge.

TERRA publishes annual report, fact sheets

The Transportation Engineering Road Research Alliance (TERRA) has published its 2008 annual report. It is available for download at www.terreroadalliance.org. TERRA is a dynamic partnership of government, industry, and academia that continuously advances innovations in road engineering and construction.

The alliance also published its fourth fact sheet recently. The new document highlights previous concrete research and implementation. Previous concrete, which allows some water infiltration, is attracting growing interest as an option for reducing storm water runoff and its harmful effects on lakes and streams.

The other three TERRA fact sheets cover full-depth reclamation, implementation of new technologies (intelligent compaction, dynamic cone penetrometer, ground penetrating radar), and low volume roadways. All are on the TERRA Web site.

For more information about TERRA, please contact Stephanie Malinoff at malinoff@cts.umn.edu or 612-624-8398.

U of M leadership evident at TRB annual meeting

Minnesota's leadership across the transportation spectrum was clear at the Transportation Research Board 88th annual meeting, January 11-15, 2009, in Washington, D.C. Representatives from the University of Minnesota and other state organizations presented topics ranging from pavement design to car sharing.

The five-day event brings together more than 10,000 researchers, students, and professionals from around the world to exchange information, knowledge, and insights on research that can be put to work for a better transportation system.

Two interdisciplinary studies led by CTS were featured. A poster session titled "Climate Change Mitigation: Measurement and Policies" included results from the Reducing Greenhouse Gas Emissions from Transportation Sources in Minnesota study, completed last year (for more about the study, see www.cts.umn.edu/Research/GreenhouseGas). Presenters were **Adam Boies** of the Department of Mechanical Engineering (ME) and **Peter Nussbaum** of the Hubert H. Humphrey Institute of Public Affairs. Other authors of the final report were **David Kittelson** and **Winthrop Watts** of ME; **Jan Lucke** and **Laurie McGinnis** of CTS; **Julian Marshall** of Civil Engineering; **Elizabeth Wilson** of the Humphrey Institute; and **Tyler Patterson** of the Washington State Department of Transportation (Patterson was formerly with the Humphrey Institute).

A workshop explored progress at the midpoint of the Nonmotorized Transportation Pilot Program. Funded under SAFETEA-LU, the program provides funds to four communities to develop balanced and connected networks that combine biking and walking (with transit) and evaluate impacts on congestion, energy, air quality, and public health. The session explored the work done to date by the pilot communities and the research design that is in place to gather data and evaluate the benefits of nonmotorized transportation. **Kevin J. Krizek** of the University of Colorado (formerly of the Humphrey Institute) was one of the presenters.

In other sessions, CTS director **Robert Johns**, chair of the TRB Technical Activities Committee, presented the TRB Paper Awards at the Thomas B. Deen Distinguished Lecture and Paper Award ceremony. One of the paper awards was given to **Yingling Fan**, a CTS Scholar from the Humphrey Institute. Johns also gave an update on the committee's activities at the TRB Chairman's Luncheon.

CTS associate director **Laurie McGinnis** was part of a roundtable titled "Optimizing Opportunities and Overcoming Challenges to EU-US Collaboration in Transportation Research," during which she shared insight gained through her participation in a 2008 international scanning tour. She also moderated a workshop on the conduct of environmental research. In addition, she received appreciation for her six years of service as chair of the Conduct of Research Committee.

University of Minnesota faculty, staff, and students included:

- ◆ Center for Human Factors Systems Research and Design: Kathleen Harder
- ◆ CTS: Gina Baas, Jim Grothaus, Jan Lucke, Arlene Mathison, Linda Preisen, Dawn Spanhake
- ◆ Civil Engineering: Sundeep Bhimireddy, Peter Bly, Adam Danczyk, Gary A. Davis, Gaurav Gaurav, Nikolas Geroliminis, Xiaozheng He, Kyle Hoegh, Heng Hu, Michael Iacono, Saif Jabari, Lev Khazanovich, Woosung Kim, Joseph Labuz, David Levinson, Chen-Fu Liao, Jason Lim, Henry Liu, Wenteng Ma, Mihai Marasteanu, Ki Hoon Moon, Paul M. Morris, Pavithra Parthasarathi, Priyam Saxena, Atika Shamim, HunWen Tao, Mugurel Turos, Mary Vancura, Raul Velasquez, Steven Wojtkiewicz, Xinkai Wu, Feng Xie, Hui Xiong, Shanjiang Zhu
- ◆ Geography: Francis Harvey, Jason Menard
- ◆ Humphrey Institute of Public Affairs: Xinyu (Jason) Cao, Fay Cleaveland, Frank Douma, Ed Goetz, Aaron Hagar, Ton Hoang, Keith Knapp, Kate Ko, Lee Munnich, Katie Roth, Carissa Schively Slotterback
- ◆ HumanFIRST Program: Michael Rakauskas
- ◆ Intelligent Transportation Systems Institute: Max Donath
- ◆ Mechanical Engineering: Diwakar Gupta, Dustin Kuchera
- ◆ Mechanical and Industrial Engineering, University of Minnesota Duluth (UMD): Xun Yu
- ◆ Minnesota Traffic Observatory: John Hourdos
- ◆ Natural Resources Research Institute, UMD: Lawrence Zanko
- ◆ Pavement Research Institute: Michael Darter, Derek Tompkins
- ◆ Transportation Research Programs, UMD: Eil Kwon

More Upcoming Events

February 19

Seminar: Determining Shear Capacity of Prestressed Concrete Beams. 2:45–3:45 p.m. CST, Room 1130, Mechanical Engineering Building. In conjunction with the CTS Transportation Infrastructure Research Council meeting, which begins at 3:45 p.m.

March 10

ITS Minnesota 15th Annual Meeting and Information Exchange, Continuing Education and Conference Center, University of Minnesota, St. Paul Campus. Call 612-624-3492 or e-mail cceconf3@umn.edu.

April 25–29

American Planning Association National Planning Conference, Minneapolis.

May 19

CTS Spring Luncheon featuring Tom Vanderbilt, author of *Traffic: Why We Drive the Way We Do (and What It Says About Us)*, Sheraton Hotel, Bloomington. Contact Sara Van Essendelft, 612-624-3708, cceconf5@umn.edu.

May 19–20

20th Annual CTS Transportation Research Conference, NEW LOCATION: Sheraton Hotel, Bloomington.

June 15–16

Fourth International Transport Economics Conference (ITrEC). Incorporating the International Conference on Funding Transport Infrastructure. University of Minnesota, Minneapolis.