CENTER FOR TRANSPORTATION STUDIES

Center for Transportation Studies

2007
ANNUAL REPORT

UNIVERSITY OF MINNESOTA

Center for Transportation Studies

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Center for Transportation Studies

2007 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 2006 through June 2007 (fiscal year 2007).

This report is organized using the Center's five areas of excellence as defined by the CTS Executive Committee, key goals it considers critical for innovation in transportation: fostering ideas and knowledge development, championing formal education, promoting applied problem-solving, initiating public and stakeholder participation, and strengthening University expertise.

Contents

Director's Message

Our Center for Transportation Studies has always worked to be a resource for many audiences, including the academic, public, and private sectors.

Robert C. Johns

While we continue to focus on our early audiences of faculty, students, and transportation professionals, we increasingly have moved into being a resource for elected officials, business leaders, and the media.

The tragic collapse of the Minneapolis I-35W bridge in August of 2007 has accelerated our involvement as a resource to policy leaders. There is increased interest in finding answers to difficult questions about the condition of our infrastructure, the state of engineering practices, funding needs and strategies, and other issues.

We have been able to participate as a resource during this intense time of scrutiny due to previous efforts in developing this role. In January 2007, our center hosted two workshops for Minnesota legislators. (*For more, see* page 16.) Brief lectures by faculty—on topics such as transportation finance and alternative fuels—were intermixed with extensive time for legislators to ask questions and to discuss and debate policy directions.

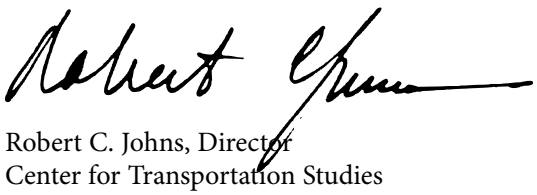
Legislative leaders and others reacted positively to these workshops. We were seen as non-partisan teachers—presenting facts and ideas, and facilitating dialogue and learning. As in many educational endeavors, there was not agreement on the "right" answers, but these policy leaders left with new knowledge that will produce more informed debate and decisions that benefit our transportation system. Similar results were produced in events that we hosted this past year for national policy leaders.

Immediately following the I-35W bridge collapse, our civil engineering faculty attracted research funding from the National Science Foundation. Structures faculty are looking at potential causes of the bridge collapse using sophisticated computer models. Traffic faculty are using unique data and our new Minnesota Traffic Observatory to better understand how travelers adjust to dramatic change.

We expect the results of this research to generate strong interest by the Minnesota legislature, Congress, and other leaders, just as the other research described in these pages will—whether it is our studies on the impacts of transportation design on communities, the use of new technologies for intersection control, or new approaches for resilient pavement infrastructure.

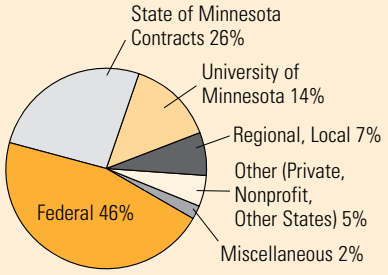
Being a resource to policy leaders is a difficult role, especially when transportation issues become politicized. Our researchers need to learn new ways of communicating their research findings to broader audiences. Our center needs to continually reinforce our role of "neutrality"—of being an educational resource and not an advocate. We are confident we can meet these challenges.

Public engagement is a strategic priority of the University of Minnesota. We look forward to helping the University advance this goal as we bring new knowledge to policy leaders and the public and continue to serve students and professionals.



Robert C. Johns, Director
Center for Transportation Studies

FY07 Budget



CTS total annual revenues FY07: $22,583,494

Ideas and Knowledge Development

Photo by Chuck Heiney, courtesy of Progressive AE

This "green" facility in Michigan is one of the examples analyzed in the Moving Communities Forward study.

CTS fosters the development of new ideas and knowledge through faculty-led research projects and interdisciplinary teams that the Center administers and supports. The Center advances the University research mission by encouraging publication of research results and development of graduate students in the field of transportation.

In FY07, funding for transportation research reached an unprecedented level at $14.9 million, an increase of nearly 19 percent over FY06. This growth can be attributed to a substantial increase in funding for the ITS Institute, along with the University's success in leveraging a diverse set of local, state, and national funding opportunities.

Planning: Research explores how well-designed transportation projects can enhance communities

In 2006, the American Institute of Architects selected CTS to conduct a pioneering research study—named *Moving Communities Forward*—to explore how well-designed transportation projects can enhance communities.

To address the interdisciplinary issues raised by the study, CTS assembled and led a research team drawn from multiple fields, with Robert Johns and Lance Neckar providing overall direction. Research was allocated to five projects; a sixth project synthesized the study's key findings into a single document highlighting major themes and recommendations:

Promoting Economic Development: John Adams and Barbara VanDrasek, Department of Geography

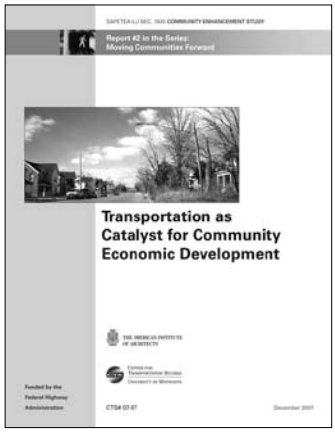
Improving Health and the Environment: John Carmody and Virajita Singh, Center for Sustainable Building Research

Designing Great Places: Ann Forsyth, Metropolitan Design Center

Fostering Civic Participation: Carissa Schively Slotterback, Humphrey Institute of Public Affairs

Making Communities Safer: Gary Davis, Department of Civil Engineering

Study Synthesis: Lance Neckar, Department of Landscape Architecture



The research team employed a case study-based approach, analyzing nearly 30 transportation projects that represent a broad spectrum of regions, demographics, and project types. The team identified key principles and practices that designers and others can use—in the context of their unique situation and environment—to realize multiple enhancements to their communities.

Results of this research are available in a series of reports on the CTS Web site. CTS also began developing a *Moving Communities Forward* Web site with AIA as part of a coordinated outreach effort designed to share the research findings and recommended practices with transportation and design professionals, policymakers, and the public.

Funding for the study was derived from a grant to the American Institute of Architects (AIA) from the Federal Highway Administration (FHWA), authorized by Congress in SAFETEA-LU.

Access to Destinations Study Update

Asking the Right Questions About Transportation and Land Use, a research summary from the Access to Destinations Study published in March 2007, serves as both an introduction to the Access to Destinations Study and a summary of the study's initial findings. It is the first in a planned series of research summaries that will present findings and policy implications to a broad audience of transportation stakeholders, policymakers, and others interested in the future of the transportation system.

At the heart of the summary are the findings of the first Access to Destinations research report, published in November 2006. Report authors David Levinson, associate professor of civil engineering, and Ahmed El-Geneidy, a researcher with the Department of Civil Engineering and the Humphrey Institute of Public Affairs, explored techniques for measuring accessibility—particularly the access of workers to jobs and of employers to labor—using automobiles as the primary mode of transportation.

In a second Access to Destinations project, published in June 2007, Kevin Krizek, associate professor of urban planning and public affairs with the Humphrey Institute, and El-Geneidy focused on non-automobile travel modes as important components of transportation accessibility. In addition, they took on the challenge of devising accurate ways to describe trips made by walking, bicycling, and riding public transit. (Krizek and El-Geneidy have since left the University but continue to be involved in the Access Study.)

Safety: Preventing crashes at rural highway intersections

Intersections make up only a small part of the U.S. highway network, but intersection crashes account for more than 30 percent of all vehicle crashes nationwide. In rural Minnesota, crash records show that approximately one-third of all crashes occur at intersections—and research has found that failure to select a safe gap in traffic is a factor in more than three-quarters of these incidents.

In an effort to help prevent such crashes, researchers from the Intelligent Transportation Systems (ITS) Institute, housed at CTS, and the Minnesota Department of Transportation are contributing their ideas to the Cooperative Intersection Collision Avoidance Systems (CICAS) initiative, a national effort to develop technologies that will reduce intersection crashes. The Minnesota researchers will focus on infrastructure-based solutions.

CICAS brings together federal agencies, automobile manufacturers, and university transportation centers with the goal of developing new technologies to prevent collisions that kill thousands of Americans and injure more than 1 million every year.

Craig Shankwitz (director of the ITS Institute's Intelligent Vehicles Lab), Max Donath, and Arvind Menon with components of the Rural Intersection Decision Support System

ITS Institute researchers created the Rural Intersection Decision Support (IDS) system, which is a new approach to preventing crashes at rural highway intersections where a low-volume rural road crosses a high-speed, high-volume rural expressway. Instead of relying on traffic signals, which are often unsuitable for deployment at such intersections, IDS builds on advances in intelligent transportation systems technologies to give drivers better information about approaching traffic.

The ITS Institute began the ambitious IDS research effort in 2002 to develop infrastructure-based technologies capable of reducing driver error at unsignalized rural highway intersections.

Max Donath, director of the ITS Institute, says that participation in CICAS is a direct outgrowth of the IDS research program. "We see this as a tremendous opportunity to build on what our researchers have accomplished in the areas of sensing and driver interface design," Donath said. "Making vehicle-based and infrastructure-based systems work together smoothly is a challenge, but the potential payoff in terms of road safety is enormous."

Infrastructure: Research points the way for better, more durable asphalt pavements

Minnesota's frigid winters don't just take a toll on people—the cold weather affects the roads too. Low-temperature cracking accelerates aging of asphalt pavements and necessitates annual maintenance and repairs costing millions of dollars. Associate professor Mihai Marasteanu of the University of Minnesota's civil engineering department is working to improve pavement durability by developing better asphalt materials.

Marasteanu has researched these issues since 2003 both in the laboratory and at the Minnesota Road Research Project (MnROAD) facility, where materials and construction techniques can be tested under real-world traffic and environmental conditions. Now in its 14th year of operations, MnROAD, run by the Office of Materials at the Minnesota Department of Transportation, has made important contributions to the understanding of pavement design and performance.

A 2007 report from Marasteanu's research group compares the characteristics of several asphalt mixtures as measured in the laboratory with performance in the real world. Several recent studies have indicated that field mixtures may behave differently than their laboratory counterparts, and the reasons for these differences must be understood in order to develop effective mechanistic-empirical design procedures for asphalt roads. Moreover, the effects of aging are highly important to the performance of asphalt mixtures in the field.

Researchers found that new asphalt like this ages differently than its lab counterparts.

Samples from three pavement cells at MnROAD were tested and the results compared to previous experiments on the mixtures carried out in the lab. Properties of asphalt binders in the field were found to differ from those of laboratory-aged binders. Overall performance differences between the three mixtures were confirmed under real-world conditions. The results suggest new directions for low-temperature cracking research, which should shed further light on the effects of aging and crack propagation.

TERRA

CTS provides administrative support for TERRA—the Transportation Engineering and Road Research Alliance. TERRA is a research governance structure formed in 2004 by Minnesota transportation leaders to foster a comprehensive road research program.

In 2007, TERRA proposed 13 pooled-fund projects involving approximately $3.8 million, 15 states, the federal government, the Minnesota Local Road Research Board (LRRB), and private industry. Projects range from such topics as low-temperature cracking (see above) to recycled unbound materials and composite pavements. As of July 1, 2007, seven projects were fully funded and are part of the construction planned at the MnROAD pavement research facility. Minnesota is moving forward as sole sponsor for three other projects, and three proposed projects were dropped or incorporated into the other projects.

University Expertise

Visualization tools in the Minnesota Traffic Observatory allow researchers to study complex traffic systems.

CTS strengthens the research and education expertise in transportation-related fields among the faculty and staff within the University. In addition to expanding the expertise of current faculty with whom it works, the Center works to attract other faculty in the University to transportation-related fields and create new faculty and research positions in areas where expertise is lacking.

In FY07, the number of academic departments receiving funding for transportation research increased to 25 from 16 in FY06, demonstrating the multidisciplinary expertise utilized to address complex transportation issues and the Center's efforts to convene interdisciplinary research teams.

Minnesota Traffic Observatory opens

In May 2007, the Minnesota Traffic Observatory (MTO) opened its eyes on the Twin Cities' traffic network and gave researchers a powerful new set of tools for studying complex traffic systems.

A joint effort of the Intelligent Transportation Systems Institute and the Department of Civil Engineering, the observatory boasts the ability to integrate real-time traffic data with state-of-the-art simulation systems, making it possible to analyze existing conditions and compare real-world observations with the results of simulated conditions. A wall-sized projection screen displays live video from several traffic cameras, offering the ability to look at large systems where many different parts interact instead of looking at just one or two locations.

MTO director John Hourdos gained considerable experience in both traffic monitoring and simulation during his doctoral research, carried out largely in the MTO's predecessor facility, the ITS Laboratory. He worked with civil engineering professor Panos Michalopoulos, ITS Lab manager Ted Morris, and educational systems engineer Chen-Fu Liao on video-based data gathering for monitoring vehicle movements.

Much of the work carried out in the ITS Laboratory laid the foundations for establishing the Minnesota Traffic Observatory, according to ITS Institute director Max Donath. With Morris and Liao joining Hourdos in the new facility, the MTO builds on its predecessor's successes and adds new capabilities to work with researchers from a wide range of fields.

Xinkai Wu, Ted Morris, Chen-Fu Liao, and John Hourdos at the GIS/MAP table

MTO Quick Facts

In addition to data from the thousands of pavement-embedded loop detectors throughout the Twin Cities traffic system, the observatory exploits the advantages of video-based traffic monitoring.

- The observatory is connected by fiber-optic lines to the Regional Traffic Management Center (RTMC) at the Minnesota Department of Transportation, allowing it to capture live feeds from up to 16 of the more than 300 cameras the agency uses to monitor the metropolitan freeway system.
- The MTO also relies on a dedicated video-based traffic monitoring system covering the I-94/35W Commons freeway interchange area in Minneapolis, one of the state's most accident-prone freeway areas.

Visualization Tools

In addition to a large projection wall, two innovative pieces of equipment provide researchers with powerful interactive visualization capabilities.

- The GIS/MAP table, built by Hourdos and the observatory staff, combines the large horizontal working surface of a traditional drafting table with the interactive capabilities of Geographic Information Systems technology.
- The Digital Environment, or DEN, takes a different approach—putting viewers in the center of the action via 3D immersive graphics. A user wearing specially polarized glasses sees a different image with each eye, producing a realistic sense of three-dimensional space.

CTS Faculty and Research Scholars Program

CTS works with 33 CTS Faculty Scholars and 14 CTS Research Scholars from a variety of University of Minnesota departments to address transportation issues.

Under the CTS Faculty and Research Scholars Program, begun in 2003, scholars have joint appointments at CTS as well as in their own departments. The program provides an ongoing forum for faculty and researchers to meet with CTS staff to provide feedback, discuss interdisciplinary research opportunities, develop new education initiatives, and discuss ways to improve expertise in response to external demands. The program also addresses how to provide support and guidance to new faculty.

The researchers listed below were selected as scholars because of the transportation focus in their research and education activities, their ongoing involvement with CTS, and their successful relationships with transportation research sponsors. Their CTS Scholar appointments may be renewed or rotated to other candidates.

Learn more about CTS Faculty and Research Scholars at **www.cts.umn.edu/scholars**.

CTS staff embarked on an initiative assisting CTS Scholars with the development, preparation, and submission of research proposals in response to competitive federal funding opportunities. Five proposals were submitted to the Federal Highway Administration, and three proposals were submitted to the Strategic Highway Research Program (SHRP2), a research program administered by the Transportation Research Board. Proposal teams often included interdisciplinary research teams convened by CTS.

2007 Faculty and Research Scholars

Bridge Engineering

Catherine French
Professor,
Civil Engineering

Nikolaos Papanikolopoulos
Professor,
Computer Science and Engineering

Robert Johns
Director,
Center for Transportation Studies

Paul Bloom
Professor,
Soil, Water, and Climate

Arturo Schultz
Associate Professor,
Civil Engineering

Shashi Shekhar
Professor,
Computer Science and Engineering

Alfred Marcus
Professor,
Carlson School of Management

John Gulliver
Professor,
Civil Engineering

Economics and Management

Carol Shield
Associate Professor,
Civil Engineering

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

Gerard McCullough
Associate Professor,
Applied Economics

Julian Marshall
Assistant Professor,
Civil Engineering

Data Systems

Taek Kwon
Professor,
Electrical and Computer Engineering (Duluth)

Jerry Fruin
Associate Professor,
Applied Economics

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

Bruce Wilson
Professor,
Bioproducts and Biosystems Engineering

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

Diwakar Gupta
Professor,
Mechanical Engineering

Environmental Impacts

David Biesboer
Professor,
Plant Biology

Human Factors

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

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

Derek Tompkins
Associate Director,
Pavement Research Institute

Jason Cao
Assistant Professor,
Humphrey Institute of Public Affairs

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

Michael Manser
Interim Director,
HumanFIRST Program, ITS Institute

Pavement Engineering

Michael Darter
Director,
Pavement Research Institute

Andrew Drescher
Professor,
Civil Engineering

Lev Khazanovich
Associate Professor,
Civil Engineering

Joseph Labuz
Professor,
Civil Engineering

Mihai Marasteanu
Associate Professor,
Civil Engineering

Traffic Engineering and Management

Gary Davis
Professor,
Civil Engineering

John Hourdos
Director,
Minnesota Traffic Observatory, ITS Institute

David Levinson
Associate Professor,
Civil Engineering

Henry Liu
Assistant Professor,
Civil Engineering

Panos Michalopoulos
Professor,
Civil Engineering

Transportation Planning and Policy

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

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

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

Barbara Lukermann
Senior Fellow Emeritus,
Humphrey Institute of Public Affairs

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

Lance Neckar
Professor,
Landscape Architecture, College of Design

Carissa Schively Slotterback
Assistant Professor,
Humphrey Institute of Public Affairs

Barbara VanDrasek
Research Associate,
Geography

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

Vehicle Systems and Fuels

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

David Kittelson
Professor,
Mechanical Engineering

Rajesh Rajamani
Professor,
Mechanical Engineering

Craig Shankwitz
Director,
Intelligent Vehicles Laboratory, ITS Institute

Accomplishments

- A paper coauthored by mechanical engineering professor Rajesh Rajamani on tire-road friction estimation was selected for the 2007 O. Hugo Schuck Award.
- ITS Institute director Max Donath received the George W. Taylor Award for Distinguished Service from the University's Institute of Technology.
- Computer science and engineering professor Nikolaos Papanikolopoulos received a 2007 Distinguished McKnight University Professorship.
- Civil engineering professor Catherine French received the Institute of Technology (IT) Distinguished Professorship at the University of Minnesota.
- Aerospace engineering and mechanics assistant professor Demoz Gebre-Egziabher was named a 2006 McKnight Land-Grant Professor.

Max Donath, ITS Institute director

Awards

- Civil engineering professor Gary Davis and MTO director John Hourdos received research funding from the National Academies of Science through the Strategic Highway Research Program (SHRP2). CTS staff assisted with the proposal preparation and are conducting administrative functions for the project.
- The University's Center for Distributed Robotics, led by computer science and engineering professor Nikolaos Papanikolopoulos, was awarded $1.95 million in the 2007 defense appropriations bill.

New faces

Professor Roberto Ballarini succeeded Professor John Gulliver as head of the Department of Civil Engineering. Gulliver served as department head for 10 years.

Michael Darter was appointed director of the Pavement Research Institute (PRI), a joint program of the Department of Civil Engineering (CE) and CTS. Derek Tompkins was appointed associate director of PRI.

Researcher Vassilios Morellas joined the University of Minnesota's Security in Transportation Technology Research and Applications (SECTTRA) program, bringing additional expertise in vision-based security systems.

Assistant professors Zhirong (Jerry) Zhao and Jason Cao joined the faculty at the Humphrey Institute of Public Affairs. Zhao is focusing his research on local and nonprofit financial issues, and Cao's focus is regional policy and planning. Cao is also an affiliate with the Department of Civil Engineering.

Julian Marshall joined the Department of Civil Engineering as an assistant professor of environmental engineering. He is also an affiliate with the Department of Mechanical Engineering.

CTS provided funding to accelerate faculty searches in civil engineering and the Humphrey Institute of Public Affairs to expand the number of transportation faculty at the University.

Research reports published in FY2007

Transportation and the Economy

Beyond Business as Usual: Ensuring the Network We Want Is the Network We Get
David M. Levinson, Norah Montes de Oca, Feng Xie
Mn/DOT 2006-36

Capacity Expansion in the Twin Cities: The Roads-Transit Balance
Gary A. Davis, Kate Sanderson, HunWen Tao
Mn/DOT 2006-44

Local Road Tax Options: Is Minnesota Really That Different?
Barry Ryan
Mn/DOT 2006-17

Transportation Safety and Traffic Flow

A Nonlinear State Space Approach to Arterial Travel Time Prediction
Jiann-Shiou Yang
Mn/DOT 2006-05

Better Understanding the Potential Market of Metro Transit's Ridership and Service
Kevin Krizek, Ahmed M. El-Geneidy
CTS 06-09

Employment of the Traffic Management Lab for the Evaluation and Improvement of Stratified Metering Algorithm—Phase III
Henry Liu, Xinkai Wu, Panos Michalopoulos, John Hourdos
Mn/DOT 2007-13

Evaluating the Effectiveness of the Minnesota Speed Management Program
Kathleen A. Harder, John Bloomfield
Mn/DOT 2007-21

An Exploratory Survey of Potential Community Transportation Providers and Users
Gary Barnes, Heather Dolphin
CTS 06-08

Reasons for Recent Large Increases in Commute Durations
Gary Barnes
Mn/DOT 2007-02

Safety Effects of Left-Turn Phasing Schemes at High-Speed Intersections
Gary A. Davis, Nathan Aul
Mn/DOT 2007-03

The Safety of Pedestrian and Bicycle Travel in Minnesota: Inventory, Analysis and Prospectus
Kevin Krizek, Gavin Poindexter, Ahmed M. El-Geneidy, Edward Sanderson
Mn/DOT 2007-04

Stopping Behavior at Real-World Stop-Controlled Intersections With and Without In-Lane Rumble Strips
Kathleen A. Harder, John Bloomfield, Benjamin J. Chihak
Mn/DOT 2006-42

Transportation Infrastructure

Application of Precast Decks and Other Elements to Bridge Structures
Charles M. Bell, Catherine E. French, Carol K. Shield
Mn/DOT 2006-37

Determining Economic Strategies for Repair and Replacement of Low Slump Overlays of Bridge Decks
Justin M. Zimmerman, Steven A. Olson, Arturo E. Schultz
Mn/DOT 2007-14

Load Rating of Composite Steel Curved I-Girder Bridges Through Load Testing with Heavy Trucks
Dan P. Krzmarzick, Jerome F. Hajjar
Mn/DOT 2006-40

MnROAD Lessons Learned
Derek Tompkins, Lev Khazanovich
Mn/DOT 2007-06

Pavement Design Using Unsaturated Soil Technology
Satish Gupta, Andry Ranaivoson, Tuncer Edil, Craig Benson, Auckpath Sawangsuriya
Mn/DOT 2007-11

Resilient Modulus and Strength of Base Course With Recycled Bituminous Material
Woosung Kim, Joseph F. Labuz
Mn/DOT 2007-05

Strength and Stability of Prestressed Concrete Through-Girder Pedestrian Bridges Subjected to Vehicular Impact
Eray Baran, Arturo E. Schultz, Catherine E. French
Mn/DOT 2007-08

Transportation Planning and the Environment

Access to Destinations: Refining Methods for Calculating Non-Auto Travel Times
Kevin Krizek, Ahmed M. El-Geneidy, Michael Iacono, Jessica Horning
Mn/DOT 2007-24, Series: No. 2 in the Access to Destinations Study

Asking the Right Questions About Transportation and Land Use: Access to Destinations Research Summary No. 1
CTS 07-03

Chemical Inventory and Database Development for Recycled Material Substitutes
Kim Grosenheider, Paul Bloom, Thomas Halbach, Matt Simick
Mn/DOT 2006-28

Commuter Bicyclist Behavior and Facility Disruption
Francis Harvey, Kevin Krizek
Mn/DOT 2007-15

Improving the Ability of Drivers to Avoid Collisions With Snowplows in Fog and Snow
Albert Yonas, Lee Zimmerman
Mn/DOT 2006-29

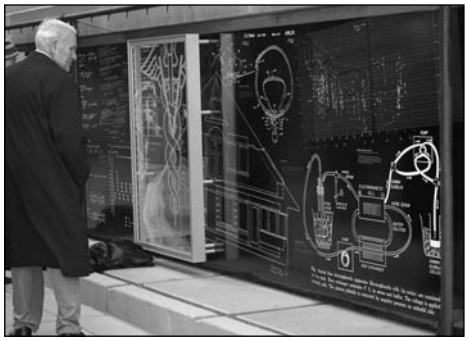
Politics and Freeways: Building the Twin Cities Interstate System
Patricia Cavanaugh
CURA 06-01

The Transportation Needs of People with Developmental Disabilities
Rania Wasfi, David M. Levinson
CTS 07-02

The Transportation Needs of Seniors
David M. Levinson, Rania Wasfi
CTS 07-01

Urbanization of Minnesota's Countryside, 2000-2025: Evolving Geographies and Transportation Impacts
John Adams, Barbara VanDrasek
Mn/DOT 2006-23

Water Quality Performance of Dry Detention Ponds with Under-Drains
Chaudhry F. Hussain, Joshua Brand, John S. Gulliver, Peter Weiss
Mn/DOT 2006-43



Professors Max Donath and Panos Michalopoulos are among 92 University of Minnesota faculty and alumni represented on the Wall of Discovery, which was unveiled in September 2006 along with another new campus monument, the Scholars Walk.

These reports are available in PDF format at www.cts.umn.edu/Publications/ResearchReports.

Public and Stakeholder Participation

U.S. Transportation Secretary Mary Peters (center) chaired a national field hearing in April 2007, hosted by CTS.

CTS serves as a catalyst for focusing discussion on transportation-related issues while maintaining the role of an objective neutral facilitator. The Center is proactive in reaching the media, practitioners, elected officials, public interest groups, and ultimately the public on current and future issues in transportation.

CTS hosts national field hearing on surface transportation policy

CTS and the Minnesota Department of Transportation (Mn/DOT) hosted a field hearing convened by the National Surface Transportation Policy and Revenue Study Commission in April 2007 on the University of Minnesota campus.

The Minnesota hearing, one of several held around the country since July 2006, focused on five main transportation themes, with several expert witnesses testifying about each. U.S. Transportation Secretary Mary Peters chaired the two-day hearing. Two dozen regional and national transportation advocates, policymakers, researchers, and professionals participated, including Lt. Gov. Carol Molnau, CTS director Robert Johns, and Max Donath, director of the Intelligent Transportation Systems (ITS) Institute. Three CTS Executive Committee members also provided testimony.

The field hearing featured testimony on a number of interrelated topics, including traffic safety, visions for a new national transportation policy, the role of rural areas and local governments, multimodal measures to combat congestion, and issues facing the freight transportation industry. The commissioners learned about cutting-edge research in driver performance and behavior at the laboratory of the University of Minnesota's HumanFIRST (Human Factors Interdisciplinary Research in Simulation and Transportation) Program. Members of the commission also toured the I-394 MnPASS system and visited Mn/DOT's Regional Transportation Management Center.

CTS director Robert Johns (left) testified at the field hearing.

Congress created the commission in 2005 under the national transportation funding act, known as SAFETEA-LU. The Minnesota hearing was the last national hearing scheduled by the commission.

2006 CEO Leadership Forum

CTS conducted the 2006 CEO Leadership Forum for state DOT CEOs, focusing on three topics: roles and partnerships, customers and stakeholders, and finance and funding. The workshop was funded by the National Cooperative Highway Research Program (NCHRP), in cooperation with the American Association of State Highway and Transportation Officials, the Federal Highway Administration, and the Transportation Research Board. Sixty-five participants represented 24 states, AASHTO, FHWA, and TRB.

A discussion circle at the CEO forum

University research and expertise inform legislative transportation debate

To lend University research and expertise to the legislative debate about transportation, CTS piloted two new half-day seminars in January 2007 on the Minneapolis campus for Minnesota legislators. The seminars provided legislators with an overview of transportation trends and an opportunity to discuss policy implications with University and other experts.

Minnesota legislators participated in a CTS half-day briefing seminar in January 2007.

The first seminar examined the historical development of funding formulas and described current sources and allocation of funds for roads, transit, and other uses. The second seminar touched on two main themes: transportation and growth, and alternative modes and fuels. In addition to the instructors, a number of topic experts were on hand for questions.

More than 25 legislators attended both sessions, including the full House Transportation Finance Division Committee, led by chair Bernie Lieder and vice chair Ron Erhardt.

The seminars, which likely will be offered again in subsequent years, were sponsored by CTS in cooperation with the Minnesota Senate and House Transportation Committees, the Minnesota Department of Transportation (Mn/DOT), and the Metropolitan Council.

Web Sites Redesigned

The CTS, ITS Institute, and AirTAP Web sites underwent major structural and graphical redesigns. Objectives of the redesigns were to establish clearer and more consistent site navigation; make searching the sites easier and more robust; enhance content and update graphic looks; utilize University of Minnesota Web templates to tie in to the University's branding; and expand use of database-generated Web pages.

www.cts.umn.edu

www.its.umn.edu

www.airtap.umn.edu

Plug-in hybrids hold promise for U of M research

Momentum is growing at both the state and federal levels to accelerate the use of alternative fuels and technologies. In January 2007, speakers at a half-day roundtable in St. Paul discussed one option—plug-in hybrid electric vehicles (PHEVs)—and possible roles for Minnesota.

In the keynote address, James Eberhardt, chief scientist with the FreedomCAR and Vehicle Technologies Program of the U.S. Department of Energy (DOE), reviewed the status of PHEV technology. Plug-in hybrids are very similar to today's conventional hybrid vehicles but have a larger battery and can run on electricity alone.

During a panel discussion about Minnesota initiatives, David Kittelson, professor in the Department of Mechanical Engineering and a CTS Faculty Scholar, shared the work of a capstone design project. In a subsequent panel touching on implications for Minnesota, Kittelson envisioned the University promoting plug-in hybrids by conducting fundamental research and training a "new generation of students interested in renewable fuels conservation."

The event was sponsored by CTS, the Initiative for Renewable Energy and the Environment, and the State and Local Policy Program at the Humphrey Institute of Public Affairs, in cooperation with the Center for Diesel Research.

Attendees at the January 2007 plug-in hybrids roundtable inspected the latest available technology.

Web Sites New

CTS staff led the development of new Web sites for three affiliated programs: the Access to Destinations Study, the Transportation Engineering and Road Research Alliance (TERRA), and the Center for Excellence in Rural Safety.

www.cts.umn.edu/access-study

www.terraroadalliance.org

www.ruralsafety.umn.edu

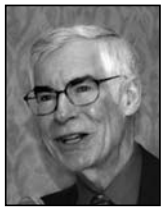
Event round-up

July 2006
Center for Excellence in Rural Safety first Summer Institute, featuring Rep. James L. Oberstar (Duluth, Minnesota)

September 2006
The first "Transportation Student Connector," hosted by CTS with the Interdisciplinary Transportation Student Organization (U of M Minneapolis campus)

October 2006
Third annual Airport Technical Assistance Program (AirTAP) Fall Forum (Breezy Point, Minnesota)

November 2006
Toward Zero Deaths Conference (Duluth, Minnesota)
CTS Fall Luncheon, featuring MIT's **Nigel H.M. Wilson** (U of M Minneapolis campus)


Nigel Wilson

Special transportation roundtable—"At 50: Economic Issues Facing an Aging Interstate System" (U of M Minneapolis campus)


First CERS Summer Institute, Duluth, Minnesota


AirTAP Fall Forum, Breezy Point, Minnesota

December 2006
Tenth Annual Freight and Logistics Symposium: "Greening the Supply Chain: Environmental Innovations" (Minneapolis)

January 2007
Two half-day seminars for Minnesota legislators, hosted by CTS (U of M Minneapolis campus)
A half-day roundtable on plug-in hybrid electric vehicles, cosponsored by CTS (U of M St. Paul campus)

February 2007
Minnesota Road Pricing Summit, featuring the U.S. DOT's Tyler Duvall (Metropolitan Council chambers, St. Paul, Minnesota)


Bruce Simons-Morton

CTS Winter Luncheon, featuring NIH's **Bruce Simons-Morton** (U of M Minneapolis campus)
11th Annual Minnesota Pavement Conference (U of M St. Paul campus)

March 2007
Interdisciplinary Transportation Student Organization (ITSO) student paper

Interstate at Age 50

In November 2006, CTS, along with the Humphrey Institute's State and Local Policy Program, the Minnesota Department of Transportation, and the Federal Highway Administration, sponsored a special transportation roundtable—"At 50: Economic Issues Facing an Aging Interstate System"—which reviewed the history of the interstate and shared predictions for the future.


Used with permission of Henry Benbrooke Hall, Minnesota Historical Society

I-35E construction during the 1960s in St. Paul, Minnesota

TZD Conference, Duluth, Minnesota

Freight and Logistics Symposium, Minneapolis

conference (U of M Minneapolis campus)

Mn/DOT Environmental Stewardship and Streamlining Workshop: "Making the Best Decisions in the Face of Conflicting Values"

CTS Annual Meeting and Awards Luncheon (U of M Minneapolis campus)

April 2007

A two-day field hearing for the National Surface Transportation Policy and Revenue Study Commission, hosted by CTS with Mn/DOT and chaired by U.S. DOT secretary Mary Peters (U of M Minneapolis campus)

May 2007

CTS Eighteenth Annual Transportation Research Conference and Spring Luncheon, featuring the University of Michigan's **Jonathan Levine** (St. Paul, Minnesota)

Jonathan Levine

Program round-up

Access to Destinations Study

CTS launched a series of outreach activities related to the Access to Destinations Study including a Web site, a workshop series that was also made available live over the Web site, a quarterly electronic newsletter, and a policy summary that provided an overview of the study and offered highlights of the study's first research report.

Center for Excellence in Rural Safety

CTS staff led the delivery of several outreach activities for the Center for Excellence in Rural Safety (CERS). They include the Center's first Summer Institute event, a one-pager, a Web site, and a quarterly electronic newsletter. In addition, a news release on rural fatalities sent out by CERS staff and the University News Service prior to the July 4th holiday generated almost 30 print and electronic media stories from around the country.

CERS
Center for Excellence in Rural Safety

TERRA
Transportation Engineering and Road Research Alliance

CTS created award-winning logos for the Center for Excellence in Rural Safety and TERRA.

Toward Zero Deaths

In 2006, 494 Minnesotans died on state roadways—the lowest number of annual traffic deaths recorded in the state since 1945. Officials attributed the significant decrease in traffic deaths in part to the Toward Zero Deaths program, a multi-agency partnership that includes CTS. TZD combines the resources of state and local agencies, county engineers, and community organizations to address traffic safety issues through the "Four Es": enforcement, engineering, education, and emergency trauma care. Coverage of the progress—and calls for further improvement—appeared in newspapers and other media around the state, and on the TZD Web site, maintained by CTS.

TERRA

CTS also launched a Web site and quarterly electronic newsletter for TERRA—the Transportation Engineering and Road Research Alliance—and published the first TERRA annual report. In addition, CTS developed an article about TERRA that appeared in the March–April 2007 issue of *TR News* (#249). *TR News* is published bimonthly by the Transportation Research Board.

Applied Problem-Solving

The application of CTS research is making our roads—both urban and rural—less dangerous.

CTS brings expertise from multiple disciplines and organizations together to identify emerging transportation-related issues and to promote actions beyond research that lead to solutions on these issues. The Center works with faculty and practitioners to facilitate the implementation of research results and best practices, recognizing that additional resources for outreach and technology transfer efforts may be required.

University researchers evaluate Minnesota's speed management program

The Minnesota State Patrol has embraced a new procedure of using automatic traffic recorder (ATR) data to schedule enforcement of speeding, based upon results of a University evaluation of Minnesota's Speed Management Program.

University of Minnesota researchers Kathleen Harder and John Bloomfield delivered the first comprehensive evaluation of the effectiveness of the Minnesota Speed Management Program (MSMP), also known as Highway Enforcement of Aggressive Traffic (HEAT), in mitigating speeding and reducing crashes on Minnesota highways. The results of the study showed that slightly increased speed limits paired with increased enforcement can decrease the overall quantity of speeding violations.

In 1995, speed limits on many Minnesota highways were increased, and subsequent sharp increases in highway fatality rates influenced the development of the MSMP. Minnesota's Department of Transportation and Department of Public Safety launched the program in September 2005.

Under the MSMP, speed limit increases from 55 mph to 60 mph on roughly 850 miles of highway were accompanied by increases in the level of enforcement on the affected roadways to ensure compliance. In addition, a public safety education campaign relying heavily on radio was launched to focus attention on the safety issues surrounding excessive vehicle speeds.

Harder and Bloomfield used data on travel speeds and crash rates from different types of highways across the state to analyze the program's effectiveness at reducing the number of speeding drivers and reducing crashes. They also analyzed driver perceptions based on surveys administered before and after the implementation of the program.

The researchers concluded that by reducing the economic costs to society of injuries and fatalities—estimated to be more than $3 million for a single serious crash—the program has almost certainly paid for itself.

ACRP Guidebook for Managing Small Airports

CTS was awarded a $397,000 contract from the Airport Cooperative Research Program (ACRP), which is administered by the Transportation Research Board, to create a guidebook for managing small airports throughout the United States. The project will give operators and managers of small airports current, comprehensive advice to help them do their jobs.

CTS also manages the Airport Technical Assistance Program (AirTAP), which will serve as a resource along with several partners to create the guidebook. AirTAP provides assistance to Minnesota airport operators and aviation personnel through education and information resources, training programs, technical assistance, access to experts, and printed materials.

University research of merge area on I-94 reduces multicar pileups

Several years ago, the Minnesota Department of Transportation (Mn/DOT) turned to CTS for an analysis of and possible solutions to a crash-prone stretch of I-94 in downtown Minneapolis. At its peak, the flow in this area reaches 2,700 vehicles per hour, per lane, resulting in dense, fast-moving traffic. In response, the ITS Institute, housed within CTS, designed and employed observation stations on rooftops on both sides of I-94 westbound, allowing video coverage across this entire area.

After reviewing the video—which captured 95 crashes in about a year—researchers determined the core problem: a shockwave from the downstream merge moves backwards, meeting oncoming traffic at speeds between 5 and 25 miles per hour. Drivers merging too soon, despite space further ahead beyond a curve, caused the shockwave. This effect happened in both lower and higher traffic conditions.

The most affordable and easiest solution for Mn/DOT was to change the merge location of the downstream entrance by extending road markings. In October 2006, Mn/DOT painted a double white line to guide merging behavior. The striping extended the acceleration lane of an incoming double ramp by roughly 700 feet.

The most important effect of the markings is that crash severity has been reduced. Five- and six-car crashes have been eliminated, and the number of three- and four-car crashes was greatly reduced. The right lane flows more smoothly, reducing the likelihood of multi-vehicle crashes. And congestion in the right lane shrank about 30 minutes before and after the peak period.

Eventually, Mn/DOT plans to install an Interstate Grade Curb System on top of the double white lines as a possible permanent solution. The Minnesota Traffic Observatory, a lab of the ITS Institute, is continuing its study of the area.

To read more about the MTO, see page 9.

Changes recommended by ITS Institute researchers have improved traffic flow and safety at this stretch of I-94 in Minneapolis.

Patents

Two transportation-related patents were granted to University researchers affiliated with CTS during the past year.

- "Intersection Assistance System and Method" was developed by a team of mechanical engineering faculty and researchers, including Lee Alexander, Pi-Ming Cheng, Max Donath, Alec Gorjestani, Arvind Menon, Bryan Newstrom, and Nic Ward.
- "Real Time High Accuracy Geospatial Database for Onboard Intelligent Vehicle Applications" was developed by Max Donath and Bryan Newstrom from the mechanical engineering department.

An intersection assistance system deployed at a Minnesota site

Minnesota LTAP

The Minnesota Local Technical Assistance Program (LTAP), which is administered by CTS, provides critical training, information, and technical assistance for Minnesota's local transportation agencies. It conducts workshops and seminars, conferences, customized training, demonstrations, and distance learning.

Minnesota LTAP partnered with the Minnesota Local Road Research Board (LRRB) to develop the *2006 Minnesota Seal Coat Handbook*. A Seal Coat Operations training course based on the handbook was successfully developed and conducted.

Minnesota LTAP also partnered with LRRB's Research Implementation Committee and Gale-Tec Engineering to develop and conduct training during the past year on the applications and inspection of geosynthetics.

Minnesota LTAP includes several other programs. The Circuit Training and Assistance Program (CTAP) uses a fully equipped van to provide on-site technical assistance and training to maintenance personnel throughout Minnesota. The Roads Scholar Program offers a valuable professional development credential (see below). The Minnesota Truck-Weight Compliance Program promotes voluntary compliance through educational workshops and online tools and information to significantly reduce damage to public roads and highways.

Minnesota LTAP also partners with several state organizations to hold an annual spring maintenance training expo for transportation professionals, especially those in the maintenance area, to exchange ideas and information and learn about new technologies, practices, and materials.

Vendors displayed their wares at the Minnesota Spring Maintenance Training Expo, cosponsored by Minnesota LTAP.

Roads Scholars

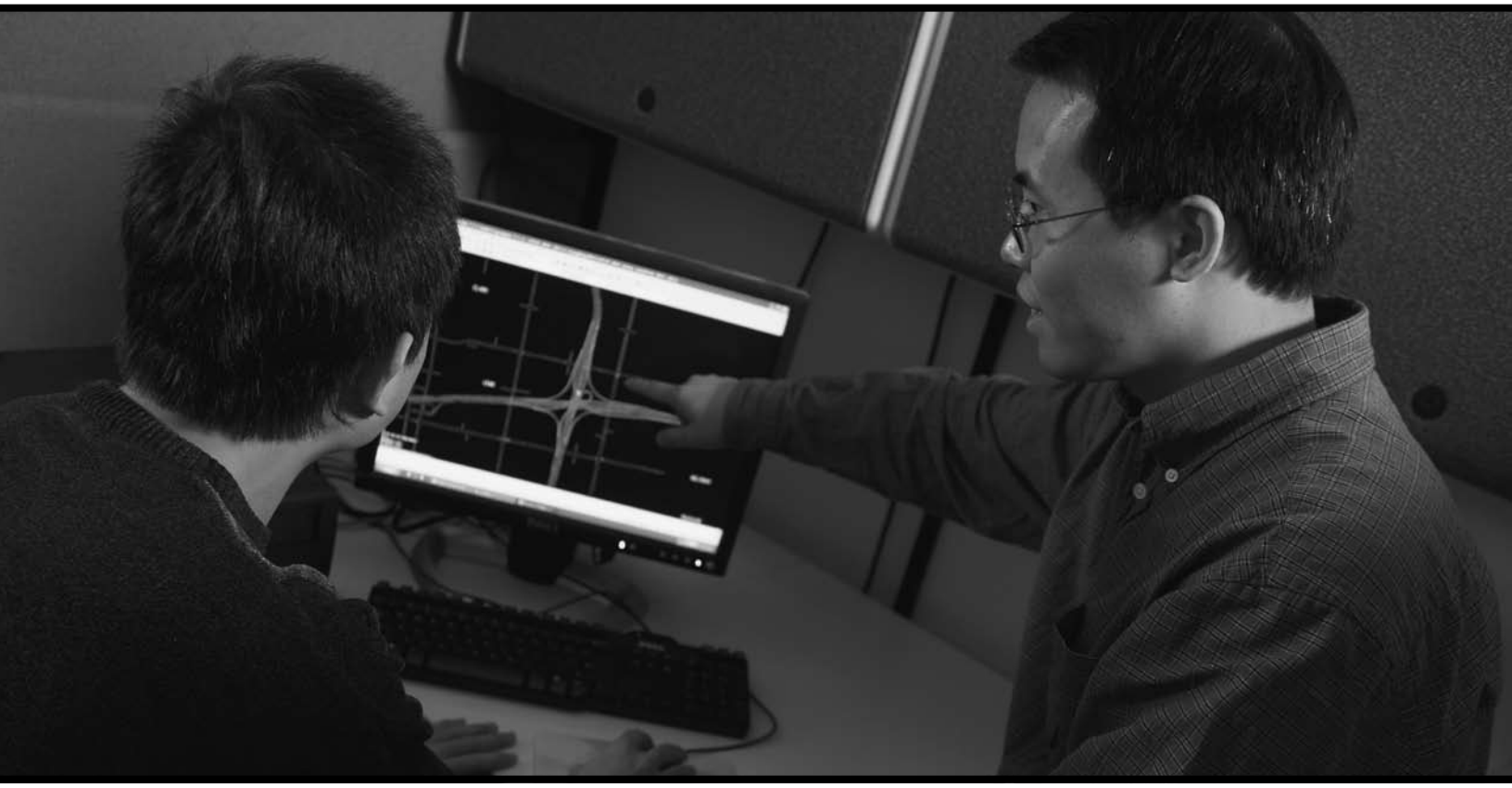
Minnesota LTAP announced its second Roads Scholar Program graduating class at the 2007 Spring Maintenance Training Expo. Six local agency maintenance personnel from around the state were recognized for their accomplishments.

The Roads Scholar Program combines a range of training opportunities—LTAP workshops, maintenance expos, and more—into a structured training curriculum.

More information about Minnesota LTAP and the Roads Scholar Program is online at www.mnltap.umn.edu/RoadsScholar.

Mindy Carlson (left) and Jim Grothaus (right) of Minnesota LTAP with the 2007 Roads Scholars: Robert Hummel (Jackson County), Mark Henry (Castle Rock Township), Dave Luhmann (Jackson County), Scott Fiebelkorn (Scott County), and Pat Pitlick (Scott County). (Not shown: Les Wick, Cottage Grove)

Formal Education



Faculty such as Henry Liu (right) educate the transportation workforce of the future.

CTS champions formal, credentialed education initiatives by supporting the development of more University education programs in transportation-related areas and degree-related education. These programs offer credentials such as degrees, minors, and certificates, and are available for new students, working professionals, and policymakers.

Braun CTS Chair expands civil engineering department

The three-year fundraising campaign for the Richard P. Braun CTS Chair in Transportation Engineering reached its goal of $500,000 in private and industry support. In July 2006, more than 130 honored donors, fundraising committee members, and transportation faculty celebrated the successful campaign in Minneapolis.

The Braun CTS Chair is a leadership position that will build on the legacy started by the late civil engineering (CE) professor Matthew Huber, an early leader in transportation education in Minnesota.

In addition to donor gifts, the civil engineering department and CTS are providing matching funds for a total $1.5 million endowment. CTS is committing royalties from the Autoscope video detection system, which was invented by CE professor Panos Michalopoulos and patented by the University.

The selection committee for the Braun CTS Chair was unanimous in recommending that CE associate professor David Levinson, a CTS Faculty Scholar, be appointed the inaugural chair. The

Key players in the endowment gathered to celebrate: Richard P. Braun, Elliot Perovich, John Gulliver, Bob Roscoe, Robert Johns, and Doug Differt.

David Levinson

Braun CTS Chair appointment, effective fall semester 2006, allowed the civil engineering department to expand its transportation engineering faculty with a new member.

In addition, the transportation engineering program is expanding to include:

- New undergraduate courses in transportation and traffic planning, design, and engineering
- New short courses for professionals in transportation and traffic planning, design, and engineering
- A series of seminars or workshops at various locations for government and private sector transportation engineers

Intelligent Ground Vehicles Competition

A year's worth of hard work paid off for a team of University students at the 15th annual Intelligent Ground Vehicles Competition in Rochester, Michigan. Mechanical engineering master's students Eddie Arpin and Rich Hoglund, along with computer science doctoral student Seth Berrier, took second and fourth place in two of the June competition's three categories with their robot vehicle, AWESOM-O. There were 36 other teams in this year's competition.

Seth Berrier, Rich Hoglund, Eddie Arpin, and Max Donath with their vehicle AWESOM-O

The competition test track

2007 CTS student affiliates and advisors

Student researchers

Undergraduates

Emma Burgstahler, B.S., Mechanical Engineering (Will Durfee)
Duc Fehr, B.S., Computer Science and Engineering (Nikolaos Papanikolopoulos)
David Fick, B.S., Biosystems Engineering (Jonathan Chaplin)
Nicolas Formet, B.S., Computer Science and Engineering (Nikolaos Papanikolopoulos)
Johnross Hammond, B.S., UMD Computer Science (Donald Crouch)
Paul Hood, B.A., UMD Geography (Stacey Stark)
Grant Miller, B.S., Computer Science and Engineering (Nikolaos Papanikolopoulos)
Dave Minner, B.S., Biosystems Engineering (John Nieber)
Nick Moore, B.S., Biosystems Engineering (John Nieber)
Jason Novek, B.S., UMD Computer Science (Carolyn Crouch)
Troy Roth, B.S., Biosystems Engineering (John Nieber)
Andrew Scribbins, B.A., UMD Geography (Stacey Stark)
Jeffrey Sharkey, B.S., UMD Computer Science (Donald Crouch)
Aditya Srinath, B.S., Mechanical Engineering (Will Durfee)
Mike Talbot, B.S., Biosystems Engineering (John Nieber)
Sarah Trainor, B.S., UMD Mechanical and Industrial Engineering (David Wyrick)
Mercedes Tuma-Hansen, B.A., History (Robert Johns)
Matthew Verreaux, B.S., UMD Natural Resources Research Institute (Brian Brashaw)

Master's Students

Eddie Arpin, M.S., Mechanical Engineering (Craig Shankwitz)
Bibhu Aryal, M.S., UMD Electrical and Computer Engineering (Taek Kwon)
Brooke Asleson, M.S., Civil Engineering (John Gulliver)
Meagan Beekman, M.A., Humphrey Institute (Carissa Schively Slotterback)
Mathew Bevilacqua, M.S., Mechanical Engineering (Max Donath)
Prafulla Bhalekar, M.S., UMD Computer Science (Donald Crouch)
Esha Bhargava, M.S., Division of Health Informatics (Nicholas Ward)
Sundeep Bhimireddy, M.S., Civil Engineering (Henry Liu)
Cynthia Carlson, M.A., Humphrey Institute (Carissa Schively Slotterback)
Endong Cheng, M.S., Mechanical Engineering (Nicholas Ward)
Rueben Collins, M.S., Civil Engineering and M.A., Humphrey Institute (Francis Harvey)
Michael Corbett, M.S., Civil Engineering (David Levinson)
Adam Dancyzk, M.S., Civil Engineering (Henry Liu)
ReAnn Dargus, M.S., Mechanical Engineering (Will Durfee)
Ajit Datar, M.S., UMD Computer Science (Donald Crouch)
Ozer Dereli, M.S., Civil Engineering (Cathy French)
Vivek Deshpande, M.S., Civil Engineering (David Levinson)
Dan Drew, M.S., Mechanical Engineering (Nicholas Ward)
Karl Eichstaedt, M.S., Agronomy and Plant Genetics (Donald Wyse)
Whitney Eriksson, M.S., Civil Engineering (Carol Shield)
Chinweike Eseonu, M.S., UMD Engineering Management (David Wyrick)
Steve Frooman, M.A., Humphrey Institute (Frank Douma)
Noa Funk, M.S., Civil Engineering (Mihai Marasteanu)
Xiaozheng He, M.S., Civil Engineering (Henry Liu)
Jessica Horning, M.A., Humphrey Institute (Kevin Krizek)
Shariq Husain, M.S., Civil Engineering (Lev Khazanovich)
Michael Iacono, M.S., Civil Engineering (David Levinson)
Basil Iannone, M.S., Ecology, Evolution, and Behavior (Susan Galatowitsch)
Saif Jabari, M.S., Civil Engineering (Henry Liu)
Ajay Joshi, M.S., Computer Science and Engineering (Nikolaos Papanikolopoulos)
Hilal Katmale, M.S., UMD Mechanical and Industrial Engineering (Richard Lindeke and David Wyrick)
Prahlad Kilambi, M.S., Computer Science and Engineering (Nikolaos Papanikolopoulos)

Huber Award

Michael "Mick" Rakauskas, a research fellow with the HumanFIRST Program and a Ph.D. candidate in the psychology department, received the Matthew J. Huber Award for Excellence in Transportation Research and Education. Rakauskas (center) is pictured with HumanFIRST director Nic Ward (left), who nominated him, and CTS associate director Cheri Marti. (Marti and Ward have since left the University.)

Xiaozheng "Sean" He, a second-year graduate student pursuing both M.S. and Ph.D. degrees in the Department of Civil Engineering, also received the Huber Award. He (center) is pictured with his adviser, civil engineering assistant professor Henry Liu, and Marti.

Woosung Kim, M.S., Civil Engineering (Joseph Labuz)
Saiyam Kohli, M.S., UMD Computer Science (Donald Crouch)
Adam Kokotovich, M.S., Science, Technology, and Environmental Policy (Lee Munnich)
Adam Lindberg, M.S., Civil Engineering (Arturo Schultz)
Emmanuel Magisson, M.S., Bioproducts and Biosystems Engineering (Jonathan Chaplin)
Christopher Mitchell, M.A., Humphrey Institute (Lee Munnich)
Alec More, M.A., Humphrey Institute (Lee Munnich)
Flavia Nardi, M.S., Statistics (Janet Creaser and Nicholas Ward)
Rebecca Nestingen, M.S., Civil Engineering (John Gulliver)
Tyler Patterson, M.A., Humphrey Institute (Lee Munnich)
Steven Peterson, M.A., Humphrey Institute (Frank Douma)
Aditaya Polumetla, M.S., UMD Computer Science (Donald and Carolyn Crouch)
Reid Pulley, M.S., Biosystems and Agricultural Engineering (Jonathan Chaplin)
Ravi Raju, M.A., Humphrey Institute (Frank Douma)
Jennifer Reed, M.A., Humphrey Institute (Carissa Schively Slotterback)
Jake Reneson, M.S., Civil Engineering (Arturo Schultz)
Ruth Roberson, M.S., Soil, Water, & Climate (Satish Gupta)
Ryan Rohne, M.S., Civil Engineering (Lev Khazanovich)
Brian Runzell, M.S., Civil Engineering (Carol Shield and Cathy French)
Edward Sanderson, M.A., Humphrey Institute (Kevin Krizek)
Todd Schmidt, M.S., Bioproducts and Biosystems Engineering (Bruce Wilson)
Matthew Schmit, M.A., Humphrey Institute (Lee Munnich)
Atika Shamin, M.S., Civil Engineering (Lev Khazanovich)
Matthew Smith, M.S., Civil Engineering (Cathy French and Carol Shield)
Susan Sloper, M.A., Humphrey Institute (Carissa Schively Slotterback)
Guruprasad Somasundaram, M.S., Computer Science and Engineering (Nikolaos Papanikolopoulos)
Britta Stein, M.A., Humphrey Institute (Frank Douma)
Fajarrani Surya, M.S., Industrial and Systems Engineering (Diwakar Gupta)
HunWen Tao, M.S., Civil Engineering (Gary Davis)
Bereket Tewoldebrhan, M.S., Civil Engineering (Kimberly Hill)
John Tweet, M.S., Civil Engineering (Mihai Marasteanu)
Ravi Verma, M.S., UMD Mechanical and Industrial Engineering (Richard Lindeke)
Aishwarya Vijaykumar, M.S., Civil Engineering (Mihai Marasteanu)
Gregory Wachman, M.S., Civil Engineering (Joseph Labuz)
Fenghuan Wang, M.S., UMD Math and Statistics (Harlan Stech)
Mark Watson, M.S., Civil Engineering (Mihai Marasteanu)
Ryan Weidemann, M.S., UMD Electrical and Computer Engineering (Taek Kwon)
Tom Westover, M.S., Civil Engineering (Joseph Labuz)
Matthew Wilson, M.S., Civil Engineering (Omid Mohseni and John Gulliver)
Ryan Wilson, M.A., Humphrey Institute (Kevin Krizek)
Hui Xiong, M.S., Civil Engineering (Gary Davis)
Ilya Yut, M.S., Civil Engineering (Lev Khazanovich)

Doctoral Students

Romeo Ahohe, Ph.D., Aerospace Engineering and Mechanics (Demoz Gebre-Egziabher)
Stefan Atev, Ph.D., Computer Science and Engineering (Nikolaos Papanikolopoulos)
Elena Beyhaut, Ph.D., Soil, Water and Climate (Peter Graham)
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 and Cathy French)
Baichun Feng, Ph.D., Civil Engineering (Panos Michalopoulos)
James Hambleton, Ph.D., Civil Engineering (Andrew Drescher)
Kyle Hoegh, Ph.D., Civil Engineering (Lev Khazanovich)
Bernard Izevbekhai, Ph.D., Civil Engineering (Lev Khazanovich)

Eno Foundation

Tyler Patterson, a dual-degree student working toward a master's degree in urban and regional planning and a master's of science in civil engineering with a focus on transportation, was one of 20 students selected nationally by the Eno Transportation Foundation as a 2007 Eno Fellow.

ITE Student Paper Award

Xinkai Wu, a student advised by civil engineering assistant professor Henry Liu, won the 2007 Institute of Transportation Engineers (ITE) Midwestern District's Student Paper Award for a paper titled "Improving Queue Size Estimation for Minnesota's Stratified Zone Metering Strategy." The paper, based on a recently completed research project supported by Mn/DOT, was co-authored by Liu and Professor Panos Michalopoulos, the project's co-investigators.

ITS Institute Student of the Year

Adam Kokotovich received the ITS Institute's annual Outstanding Student of the Year award, sponsored by the U.S. Department of Transportation's Research and Innovative Technology Administration (RITA). Kokotovich's research focuses on emerging technologies and their social and ethical implications, including privacy concerns related to some ITS technologies. His adviser is Lee Munnich of the Humphrey Institute.

Justin Jacobson, Ph.D., Geography (Ann Forsyth)
Samuel Kidane, Ph.D., Mechanical Engineering (Rajesh Rajamani)
Xinjun Li, Ph.D., Civil Engineering (Mihai Marasteanu)
Wenteng Ma, Ph.D., Civil Engineering (Henry Liu)
Michael Marich, Ph.D., Humphrey Institute (Lee Munnich)
Eric Novotny, Ph.D., Civil Engineering (Heinz Stefan)
Pavithra Parthasarathi, Ph.D., Civil Engineering (David Levinson)
Roberto Piccinin, Ph.D., Civil Engineering (Carol Shield, Cathy French, and Arturo Schultz)
Andrey Pyatigorets, Ph.D., Civil Engineering (Mihai Marasteanu)
Michael Rakauskas, Ph.D., Cognitive Psychology (Nicholas Ward)
Brian Shea, Ph.D., Statistics (Gary Oehlert)
Seshan Srirangarajan, Ph.D., UMD Electrical and Computer Engineering (Ahmed Tewfik)
Senthilkumar Swaminathan, Ph.D., Mechanical Engineering (Will Durfee)
Nebiyou Tilahun, Ph.D., Civil Engineering (David Levinson)
Derek Tompkins, Ph.D., Civil Engineering (Lev Khazanovich)
Raul Velasquez, Ph.D., Civil Engineering (Mihai Marasteanu)
Krishna Vijayaraghavan, Ph.D., Mechanical Engineering (Rajesh Rajamani)
Feng Xie, Ph.D., Civil Engineering (David Levinson)
Wuping Xin, Ph.D., Civil Engineering (Panos Michalopoulos)
Qiang Wang, Ph.D., Civil Engineering (Lev Khazanovich)
Xinkai Wu, Ph.D., Civil Engineering (Panos Michalopoulos and Henry Liu)
Hongbing Zhang, Ph.D., Civil Engineering (Panos Michalopoulos)
Shanjiang Zhu, Ph.D., Civil Engineering (David Levinson)
Adam Zofka, Ph.D., Civil Engineering (Mihai Marasteanu)
Xi Zou, Ph.D., Civil Engineering (David Levinson)

Graduate Certificate in Transportation Studies students

Twenty students are enrolled in the program, up from eight in FY06.

Enrolled
Steve Barrett, Minnesota Department of Transportation (Graduate Certificate)
Sundeep Bhirmireddy (M.S., Civil Engineering)
Adam Danczyk (M.S., Civil Engineering)
Jose Fischer, Minnesota Department of Transportation (M.S., Agricultural/Applied Economics)
Steven Frooman (M.S., Civil Engineering)
Xiong Hui (M.S., Civil Engineering)
Saif Jabari (M.S., Civil Engineering)
Andrew Johnson, Oregon Dept of Transportation (Graduate Certificate)
David Kmiec (Ph.D., Civil Engineering)
Wenteng Ma (Ph.D., Civil Engineering)
Eric Marquardt, Minnesota Department of Transportation (M.S., Geographic Information Sciences)
Tyler Patterson (M.S., Civil Engineering, and M.U.R.P., Humphrey Institute)
Nicole Rosen, Minnesota Department of Transportation (Graduate Certificate)
Damon Sather, University of Minnesota (M.S., Geographic Information Sciences)
Andrew Schlack (M.U.R.P., Humphrey Institute)
Jeremy Stahl, Land O' Lakes (Graduate Certificate)
HenWen Tao (Ph.D., Civil Engineering)
Nebiyou Tilahun (Ph.D., Civil Engineering)
He Xiaozheng (M.S., Civil Engineering)
Wu Xinkai (Ph.D., Civil Engineering)
Honbing Zhang (Ph.D., Civil Engineering)

Travel Awards

ITS Institute Student Travel Award Recipients
Xiaozheng He
Saif Jabari
Wenteng Ma
Ryan Wilson
Xinkai Wu
Feng Xie
Wuping Xin
Shanjiang Zhu

CTS Travel Award Recipients
Jessica Horning
Adam Lindberg
Tyler Patterson
Steve Peterson
Raul Velasquez
Qiang Wang
Thomas Westover
Adam Zofka

Education round-up

CTS Research Seminar Series
During the 2006–2007 academic year, CTS continued to host research seminars to provide University researchers from a variety of disciplines an opportunity to share their findings. Research seminars were held in conjunction with meetings of the CTS Transportation Research Councils (Planning and the Environment, Safety and Traffic Flow, Economy, and Infrastructure).

Spring seminars
- Stopping Behavior at Real-World Stop-Controlled Intersections With and Without In-Lane Rumble Strips (Kathleen Harder, Center for Human Factors Systems Research and Design)
- MnROAD Lessons Learned (Derek Tompkins, Pavement Research Institute)
- The Role of Well-Designed Transportation Projects in Enhancing Communities—Overview (Lance Neckar, Landscape Architecture, and Robert Johns, Director, CTS)
- Protecting Public Health, Safety and the Environment (John Carmody, Center for Sustainable Building Research)
- Promoting Economic Development (John Adams, Geography)

Fall seminars
- Water Retention in Soils and Its Implications on Pavement Design (Satish Gupta, Soil, Water, and Climate)
- Hybrids: Hype or Hope? (Alfred Marcus, Strategic Management and Organization)
- Cost-Effectiveness of Storm Water Runoff Best Management Practices for Water Quality Enhancement, (John Gulliver, Civil Engineering)
- Safety Effect of Left-Turn Phasing Schemes at High-Speed Intersections—Guidelines (Gary Davis, Civil Engineering)
- Capacity Expansion in the Twin Cities: The Roads-Transit Balance (Kate Sanderson, URS Corporation and Civil Engineering Ph.D. student)
- Exercise Medicine Study for "Destination Exercise" (Dr. Dan Halvorsen, University of Minnesota Medical School and ExMed Clinic)
- MAST Lab Tour (Paul Bergson, Civil Engineering)
- Stop Sign Gap Assistance for Cooperative Intersection Collision Avoidance Systems (Max Donath, Director, ITS Institute and Professor, Mechanical Engineering)

Advanced Transportation Technologies Seminars
This was the sixth year that the ITS Institute sponsored the multidisciplinary Advanced Transportation Technologies seminar series at the University. These seminars feature presentations by local and national researchers addressing diverse areas of ITS research. The seminars are offered for credit and are required as a course for the Graduate Certificate in Transportation Studies.
- Developing ITS to Serve a Diverse Population (Frank Douma, State and Local Policy Program, Humphrey Institute of Public Affairs)
- Addressing the Driver's Role in Motor Vehicle Crashes: Past Failures, Future Successes (Rob Foss, Highway Safety Research Center, University of North Carolina)
- Development and Evaluation of a Novel Traffic-Friendly Commuter Vehicle (Rajesh Rajamani, Mechanical Engineering)
- Toward Scalable and Privacy-Aware Location-Based Services in Transportation (Mohamed Mokbel, Computer Science and Engineering)
- Portable Video Data Processor (Nikolaos Papanikolopoulos, Computer Science and Engineering)
- Collective Responsibility in Freeway Rear-end Collisions—An Application of Causal Models (Gary Davis, Civil Engineering)
- Where Is the U.S. VII Program Going? (Ron Heft, Nissan Technical Center–North America)

2007 ITSO Student Transportation Conference

The 2007 Interdisciplinary Transportation Student Organization (ITSO) student transportation conference, held in March at the University's Coffman Memorial Union, featured transportation research presentations from six students, several awards, and an inside look at Minneapolis-St. Paul (MSP) International Airport from executive director Jeff Hamiel. CTS, a primary supporter of the student organization, assisted ITSO in planning this third annual event.

Jeff Hamiel (at podium) spoke to students at the ITSO conference.

People

Boards and steering committees guide CTS programs.

The many important and innovative research, education, and outreach efforts at CTS are possible only because of the hard work and dedication of our faculty, staff, and scores of volunteers. These listings recognize those who have contributed their valuable time and service to CTS and transportation-related research at the University of Minnesota during the past year.

CTS awards

CTS presented the following awards at its Annual Meeting and Awards Luncheon on March 27 in Minneapolis:

Richard P. Braun Distinguished Service Award: Max Donath, director of the Intelligent Transportation Systems (ITS) Institute and mechanical engineering professor

Ray L. Lappegaard Distinguished Service Award: Donna Allan, director of Mn/DOT's Office of Transit, various leadership positions for the WTS Minnesota Chapter, and the driving force behind the establishment of the Interagency Committee on Transit Coordination

William K. Smith Distinguished Service Award: John Hausladen, president of the Minnesota Trucking Association (MTA)

Distinguished Public Leadership Award: Curt Johnson, a long-time public and civic leader and adviser who has served as executive director of the Citizen's League, chief of staff to former Gov. Arne Carlson, chair of the Metropolitan Council, and now president of the Citistates Group, a communications company

Robert Johns, Curt Johnson

Robert Johns, Max Donath, Richard P. Braun

Robert Johns, Donna Allan, Charles Zelle

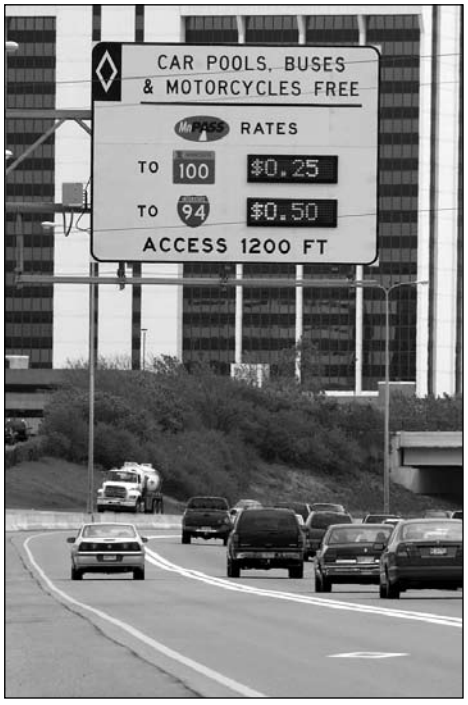
Robert Johns, John Hausladen, Richard Murphy Jr.

CTS Research Partnership Award: "Minnesota I-394 MnPASS Project"

The MnPASS express lane on I-394 west of Minneapolis opened in May 2005 as the first test-bed for value pricing in Minnesota. The team's project involved education, outreach, and evaluation efforts, including surveys of area residents. The work has led to an increased awareness among transportation, political, business, environmental, and other community leaders that value pricing may be an important long-term tool for managing congestion in the Twin Cities. To learn more about MnPASS, see **www.mnpass.org**.

Project partners included:

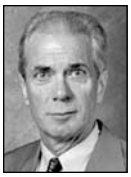
- Minnesota Department of Transportation
- State and Local Policy Program, Humphrey Institute of Public Affairs, University of Minnesota
- Federal Highway Administration
- Metropolitan Council
- Hennepin County
- Wilbur Smith and Associates
- SRF Consulting Group
- Cofiroute USA
- Frank Wilson and Associates
- Tanaka Advertising
- Raytheon
- Loveland Communications
- Cambridge Systematics
- Short Elliott Hendrickson (SEH)
- NuStats
- Center for Changing Landscapes, College of Design, University of Minnesota



CTS Executive Committee

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

Lisa Freese
Deputy Commissioner, Mn/DOT



Robert Kudrle
Professor, Humphrey Institute of Public Affairs, University of Minnesota

Richard Murphy Jr.
Murphy Warehouse Company

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Transportation Program Manager, HDR Engineering, Inc.

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Linda Koblick,
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Vice President for Research, University of Minnesota

Charles Zelle
CEO/President, Jefferson Lines

Tom Fisher
Professor, College of Design, University of Minnesota

Rick Krueger
Executive Director, Minnesota Transportation Alliance

Completed term during the year:

John Anderson, Associate Dean, Carlson School of Management
Anne Beers, Assistant Commissioner, Department of Public Safety
John Hausladen, President and CEO, Minnesota Trucking Association
Roberta Humphreys, Professor and Associate Dean, Institute of Technology, University of Minnesota
Sharon Marko, Minnesota Senate
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Charleen Zimmer, President, ZAN Associates

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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:

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Department Director

Catherine Flannery
Program Director

Gene Anderson
Program Director

Teresa Washington
Program Associate

Julie Grazier
Program Associate

Heather Dorr
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Shirley Mueffelman
Program Administrative Specialist

Carrie Alkins
Program Administrative Specialist

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

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(*From left, front row*) Robert C. Johns, Dawn Spanhake, Arlene Mathison, Laurie McGinnis, Mary Snyder, Stephanie Malinoff, Linda Preisen. (*Middle row*) Penny Harris, Tom Helms, Amy Friebe, Gina Baas, Mindy Carlson, Keith Carlson, Shawn Haag. (*Back row*) Chad Rathmann, Michael McCarthy, Jim Grothaus, Charlie Grussing-Neitzel, Cadie Wright Adhikary, Jan Lucke, Peter Park Nelson

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Left CTS in 2007

Cheri Marti
Liang Zhu

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