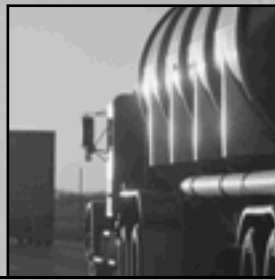




CENTER FOR  
TRANSPORTATION STUDIES

# Center for Transportation Studies

2004 ANNUAL REPORT





## Center for Transportation Studies

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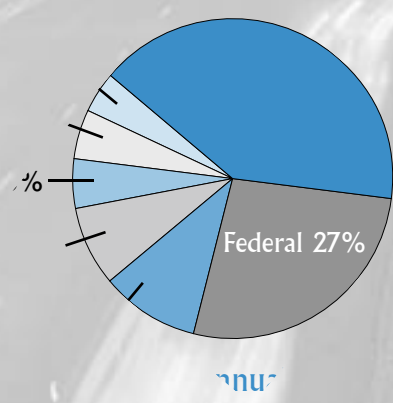
This publication is a report of transportation research, education, and outreach activities conducted by the Center for Transportation Studies and its affiliated programs for the period July 2003 through June 2004 (fiscal year 2004).

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*As a research and land-grant university, the University of Minnesota participates in the creation of new knowledge and insight, and in the dissemination of that knowledge and insight through teaching and service.*



## DIRECTOR'S MESSAGE



In Richard Florida's provocative book, *The Rise of the Creative Class* (Basic Books, 2002), he describes a transformation in progress that is bigger and more powerful than the transformation from the agricultural to the industrial age. The new creative age is based on human intelligence, knowledge, and creativity. Our economic productivity and living standards come from the new ideas and better ways of doing things that are developed by people paid to do creative work for a living—scientists, engineers, artists, musicians, designers, and knowledge-based professionals. In his view, the presence of a major research university is a basic infrastructure component of the creative economy—more important than canals, railroads, and freeway systems of past epochs.

Our Center is fortunate to be guided by an executive committee of Minnesota leaders (Appendix A) who understand the need for creativity in transportation and the important role of our research University. Through their strategic planning efforts, our Center is focused on excellence in five areas that are critical for creativity in transportation: *fostering ideas and knowledge development, championing formal education, promoting applied problem-solving, initiating public and stakeholder participation, and strengthening University expertise.*

This annual report is organized by these areas, showing the highlights of our accomplishments in each this past year. In an era when public financial support of our University and of other public research universities continues to decline—a direction that seems unwise if Richard Florida is correct—we are proud to continue to be successful in helping attract resources for research and education in transportation at the University of Minnesota, totaling approximately \$12.6 million last year. About three-quarters of these funds are for research by our CTS scholars (*see* page 31) and other researchers, largely in support of graduate students working in their academic departments on faculty-led research covering a variety of transportation-related topics.

Included in these resources is more than \$1.8 million of funding for an impressive set of projects that individual researchers were awarded as a result of their entrepreneurial efforts outside of CTS-coordinated efforts. Most of these projects are building on initial efforts that were seeded by CTS funds, or by the Minnesota Department of Transportation and other funding coordinated by CTS. This successful leveraging of funding is a tribute to the creative initiative of our talented faculty and research staff. Their funding sources include the National Science Foundation, the Federal Highway Administration, other state DOTs, foundations, and private companies.

These resources help us advance all five areas of excellence defined by our executive committee. During this time of funding uncertainty, we are grateful to both the enlightened Minnesota leaders who guide and support us and to the talented faculty and staff at the University of Minnesota. Our work with them is bringing new knowledge and human intelligence to the emerging creative age, an age where ideas and creativity are essential for our transportation systems, economy, and quality of life.

A handwritten signature in black ink that reads "Robert C. Johns".

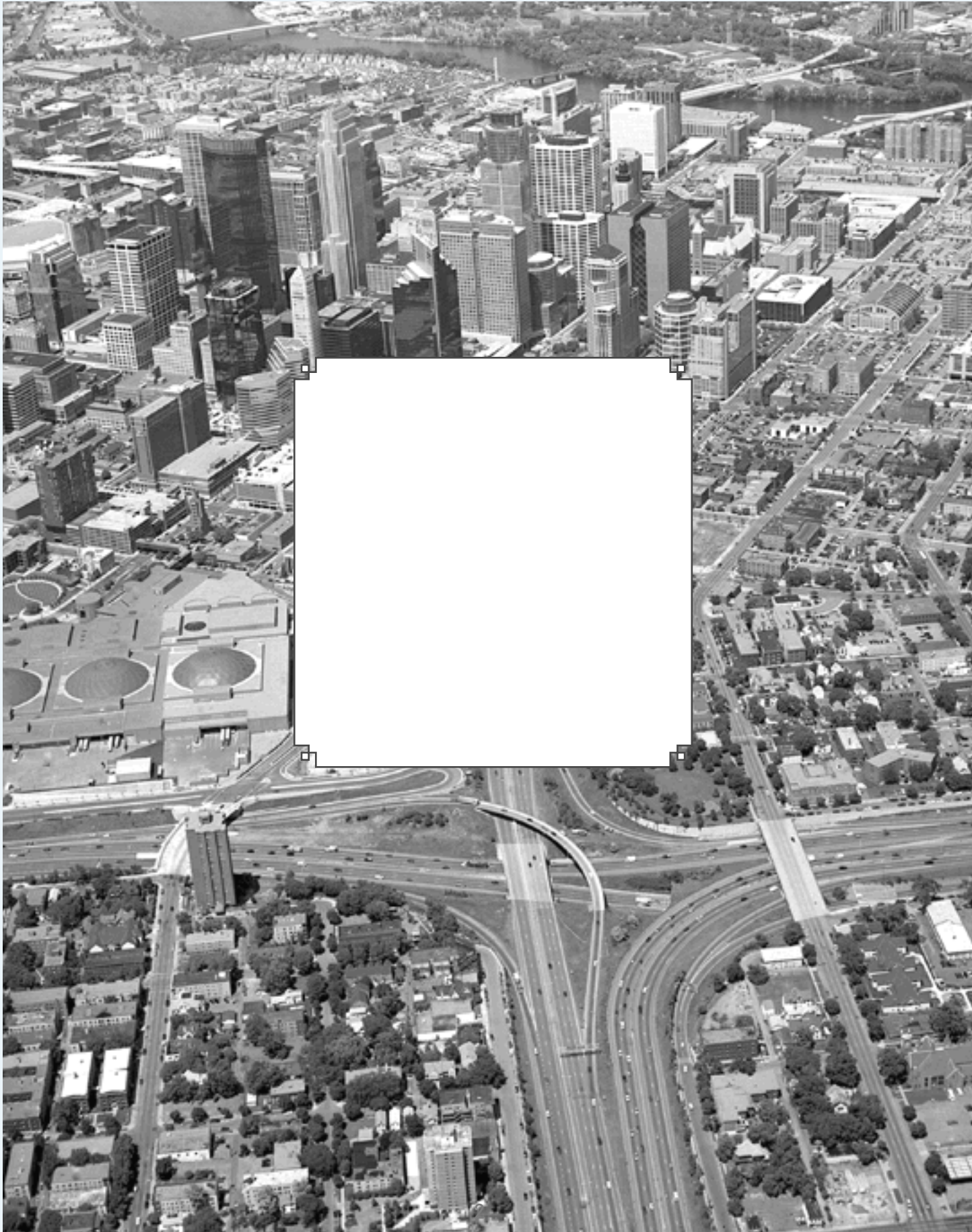
Robert C. Johns, Director  
Center for Transportation Studies



CTS AREA OF  
EXCELLENCE

IDEAS AND KNOWLEDGE DEVELOPMENT

*Foster the development of new ideas and knowledge through faculty-led research programs and interdisciplinary teams that the Center administers and supports*



### If they come, will you build it?

As freeway networks grow up around expanding metropolitan areas, transportation planners have discovered that constructing adequate infrastructure to meet the needs of urban and suburban drivers is no easy task. To manage highway network growth effectively, planners must respond to changing patterns of population growth and employment, while at the same time trying to influence how these patterns will evolve in the future. Every decision to add capacity, build new roads, or maintain the status quo is constrained by choices made in the past. Perhaps more important, today's decisions may cast a long shadow over future plans.

By studying the history of the Twin Cities' freeway network, civil engineering professor David Levinson and recent graduates Ramachandra Karamalaputi and Wei Chen have built a more complete understanding of transportation network growth, thus laying the foundation for more informed planning decisions. Their recently completed study, *If They Come, Will You Build It?* examines the growth of a highway network over time.

Levinson and his students modeled the Twin Cities' freeways as a network made up of discrete links, or highway segments. Using two decades of data on the physical characteristics of the network, construction, and traffic levels, they developed detailed models of link expansion and network growth. They reveal that most link expansions occur one lane at a time, and that the rate of expansion is continuing to decline.

The researchers also consider the development of the freeway network at the area level, dividing the region into interstate highways, divided highways, and secondary highways, using detailed GIS data from

### INSIDE TRANSPORTATION RESEARCH AT CTS

This page and the following eight describe selected research efforts that reached milestones this year. Projects are grouped according to the Center's four research emphases:

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1959 to 1990 and logit models (models that estimate the likelihood that a particular link will be expanded) to predict future network growth in the Twin Cities. Predictions using this data show that interstates are the least likely of all highways to achieve further growth. Divided highways are most likely to grow near employment zones while secondary highways are more likely to grow near residential areas.

In the final report on their research, the authors lend an intriguing perspective to the concept of transportation expansion in an urban setting. Throughout the analysis, they view the Twin Cities highway system as a dynamic force, capable of effecting and responding to change, as opposed to the more traditional view that network change occurs as the result of top-down decision making. The researchers hope that a better understanding of long-term network dynamics will enable planners to make even better decisions about how to invest scarce resources, and help policymakers understand the implications of public policy decisions.

More information about *If They Come, Will You Build It?* is available online at [www.lrrb.org/more.cfm?code=1893](http://www.lrrb.org/more.cfm?code=1893).



### Understanding road taxes

Minnesota state and local roads cost taxpayers \$2.6 billion a year, yet, according to applied economics researcher Barry Ryan, few understand how these tax dollars are raised or spent. Ryan's study, *Paying for Minnesota Roads*, addresses the problem with baseline information about Minnesota roads and road taxes from both the government and taxpayer perspectives.

State and local roads generate 52 billion vehicle-miles of travel (VMT) annually. This translates into a statewide average cost of just 5 cents per VMT for government road service. But simple statistics can be misleading, Ryan says, since the cost of service on low-volume local road networks can far exceed the statewide average. State road aid to counties and cities helps offset these local cost disparities, saving taxpayers in many communities from higher road-related property taxes or lower levels of local road service.

Derived from three statewide taxes—motor-fuels excise taxes, motor-vehicle registration taxes, and starting in 2003, a portion (32 percent) of the motor-vehicle sales tax—road aid accounts for nearly a third of the \$1.5 billion in total local-road spending annually. The remaining two-thirds comes from local government general funds, primarily property taxes and state property tax relief, also known as general-

purpose aid. State roads, on the other hand, cost more than \$1 billion annually, and are funded with the same three taxes that support local-road aid, along with additional federal highway grants. According to Ryan, these federal dollars result largely from the federal tax on motor fuels, and reflect the state's responsibility for federal interstate highways in Minnesota.

Lost in the intergovernmental transfers and funding distinctions are meaningful price signals or feedback to road users about the cost of service, Ryan says. For example, roads are only one public service bundled into business and homestead property taxes, and few appreciate that (averaging statewide) 20 percent of city budgets and 9 percent of county budgets are road-related expenditures. Motor-vehicle registration taxes are a more recognizable and easily understood road charge, especially since tax limits were instituted in 2001. Today, most of the state's 4 million passenger-vehicle owners pay no more than \$99 a year in registration tax. Unlike this fixed annual fee, the motor-fuels tax is a road charge that varies with system use—the more you drive, the more taxes you pay.

Even though the 20-cent-per-gallon tax rate on gasoline and diesel fuel has not changed since 1988, the motor-fuels tax is still the largest single source among the three statewide road taxes. With more



vehicles on the road each year, and the average vehicle being driven more miles, the motor-fuels tax has managed to keep its lead revenue-raising position. But, Ryan suggests, more efficient and alternative fuel vehicles may soon challenge this dominance.

Still, the motor-fuels tax accounts for less than a third of total revenues, when all state- and local-road funding is considered. This weak price signal provides the traveling public with no economic incentive to moderate driving habits or lend support to additional road spending, Ryan points out. The lesson is not that road tax policy should be based solely on pay-as-you-go taxes, but that policymakers need strategies that keep road users in touch with the true cost of service. This true cost, often referred to as full-cost pricing, would cover more than the explicit government costs, and include the price of congestion, pollution, and other negative externalities.

Like any good tax strategy, road taxes can be measured against three policy goals, Ryan concludes. First, taxes should promote efficient resource allocation,

ensuring the best level of service at the lowest possible price. Second, tax burdens should be distributed fairly. Taxpayers need to be treated equitably not only across income strata, but also geographically, by mode of travel, and even across generations. Third, the tax system must have good management characteristics. It must be easily understood, balanced among potential sources, competitive with surrounding states, and capable of providing adequate revenues over the long run.

### ACCESS TO DESTINATIONS

CTS successfully competed for a grant from the University to plan and host a conference on “Access to Destinations: Rethinking the Transportation Future of Our Region” as part of the President’s 21<sup>st</sup> Century Interdisciplinary Conference Series. The conference initiates an interdisciplinary research and outreach program by University faculty and researchers for Mn/DOT and the Metropolitan Council.

More information about Ryan’s report, *Paying for Minnesota Roads: A Tax Policy Assessment*, is available online at [www.lrrb.org/more.cfm?code=1902](http://www.lrrb.org/more.cfm?code=1902).

### Automatic detection of accident-prone traffic conditions

Some stretches of highway are more hazardous than others. In the Twin Cities metro area, one of the most crash-prone areas is the “commons” where interstate highways 94 and 35W come together. To help prevent accidents there, traffic researchers have been studying why those crashes occur.

The Beholder system, created by the Intelligent Transportation Systems (ITS) Lab at CTS, is playing an integral role in helping two University researchers do just that. Civil engineering professor Panos Michalopoulos and research fellow John Hourdakakis are working to develop a crash avoidance/prevention system for crash-prone freeway locations. Their first step was to study the reasons for and mechanics of crashes by recording them and extracting raw traffic-detector measurements.

The Beholder system is providing the team with real-time video and traffic measurements, allowing them to observe and verify the incident represented in the recorded measurements. The advantage of using the Beholder system, Hourdakakis explains, “lies in the detail and resolution of the collected measurements. There is no other site in the world that [reliably and continuously] collects



such information.” For a stretch of highway that is more than a mile long, Beholder provides continuous individual vehicle speeds and headways around the clock.

So far, Michalopoulos and Hourdakakis have collected enough information to get an idea of the year-round traffic conditions in the area and the variety of crashes that occur there, including data on approximately 150 crashes and 300 near misses. What they have found is that crashes are not entirely random but rather depend on the traffic and geometric characteristics of each location. Specifically, the team has learned that crashes in this location are frequently related to two things: the congestion shockwaves that propagate backwards from the merge area at the entrance ramp and further downstream, and the vast difference in driving speeds between the right and middle lanes, which makes changing lanes difficult

and therefore dangerously distracting for drivers.

The current phase of research is reaching its conclusion, but the methods developed and lessons learned during the search for accident-prone conditions (APCs) on I-94 can be employed in research at other accident-prone locations. Along with the algorithms for APC detection, Michalopoulos and Hourdakakis hope to produce a methodology for tuning the system to another crash-prone site study and to produce specific models for the I-94 location.

The next phase involves implementing designs where different alternatives for traffic calming and/or raising driver attention will be evaluated and prepared for deployment.

#### ITS INSTITUTE ANNUAL REPORT

Learn more about ITS research at the University of Minnesota from the 2004 ITS Institute annual report, available online at [www.its.umn.edu](http://www.its.umn.edu).

### Changeable message signs and traffic

Millions of motorists across the country rely on intelligent transportation systems for timely, accurate, and useful information to improve their commute. Changeable message signs (CMS)—also known as variable message signs and dynamic message signs—have long been used as one such ITS tool to provide motorists with real-time travel information in a wide range of applications.

Originally, these highly visible signs were intended to warn motorists about traffic tie-ups and weather conditions. But the Minnesota Department of Transportation (Mn/DOT) is considering other possible uses, including the presentation of promotional, safety, law enforcement, and travel-quality messages. As part of the nationwide program, CMS messages are also used in the Amber Alert System to flash emergency alerts to motorists when a child is abducted.

All of these possible traffic-related and non-traffic-related uses of CMS messages have provoked a number of issues about their effectiveness and the safety impacts they may have on traffic. Research associates Kathleen Harder and John Bloomfield, of the University's College of Architecture and Landscape Architecture, are attempting to answer several key questions Mn/DOT has raised regarding these issues.

Harder and Bloomfield recently conducted two back-to-back experiments in which they examined how drivers responded to traffic-related and non-traffic-related messages. Based on their findings, Harder and Bloomfield came up with a series of recommendations they believe will help increase the effectiveness of CMS messages, including Amber Alerts. First, the team suggests that the Minnesota Department of Public Safety increase its efforts to make the public more aware of the Amber Alert system. The researchers also recommend changing the content of the

Amber Alert messages. Since the experiments show that it is particularly difficult for drivers to remember the license plate number flashed on a CMS, the Amber Alert messages should, instead, tell drivers to tune in to an appropriate radio station, whose call sign will be easier to remember. Then, when drivers tune in to

that station, the full Amber Alert message, including the license plate number, should be repeated frequently. According to Harder and Bloomfield, this will greatly increase the likelihood that if a driver encounters the vehicle mentioned on the Amber Alert,

he or she will be able to recognize it. This also will likely result in fewer slowdowns than occurred in the experiment.

More information about this research is available online at [www.research.dot.state.mn.us/detail.cfm?productID=1926](http://www.research.dot.state.mn.us/detail.cfm?productID=1926).



### NORTH TO ALASKA

Head-up display (HUD) systems and vibrating seats developed by the Intelligent Transportation Systems (ITS) Institute's Intelligent Vehicles Laboratory were installed on one snowplow and one snowblower by the Alaska Department of Transportation in Valdez, Alaska.





### Low-volume roads go high-tech

Design and construction of asphalt pavements has been central to retiring civil engineering researcher Eugene Skok's work since he was a graduate student at the University in the '60s. During his 40-years-plus career, he has contributed to pavement management research on national and international levels with the publication of numerous research reports. But Skok's commitment to promoting practical, local applications of pavement research is best reflected in *Best Practices for the Design and Construction of Low Volume Roads*, a pavement-design manual for cities and counties. Skok, along with David H. Timm, Marcus L. Brown, and Timothy R. Clyne, authored the pavement reference guide, which was published by the Minnesota Local Road Research Board (LRRB).

The *Best Practices* manual includes best practice information on all aspects of asphalt construction including density, thickness, strength, stiffness, and surface smoothness. Also reviewed are material evaluation, construction procedures and specifications, and various methods of subgrade soil stabilization and reinforcement that have been used successfully in the state.

*Best Practices* gives an overview of the three methods of asphalt pavement design used in Minnesota, including Soil Factor and R-value, the methods traditionally used. A new procedure for thickness design, using an innovative new software program called MnPAVE, is also introduced. MnPAVE takes into account variables that could not be considered previously. For instance, climate, traffic, and material properties can be entered into the system,



### Best Pavement Design Practices for City Streets and County Roads workshop

The Minnesota Local Technical Assistance Program (LTAP) offers a workshop for city and county transportation engineers to review the *Best Practices for the Design and Construction of Low Volume Roads* manual. The course is subsidized through funding by LRRB.

More information about the Best Pavement Design Practices for City Streets and County Roads workshop is available online at [www.mnltap.umn.edu/register/pavementdesign](http://www.mnltap.umn.edu/register/pavementdesign).

which then calibrates the strength and expected life span of designs at various traffic levels. Road designers can choose among three input levels of MnPAVE, based on the amount and quality of data available. The software allows various combinations of materials of different thicknesses to be considered, and recommends the most cost-efficient pavement structural design that will protect the subgrade and support expected traffic loads and environmental conditions.

Data from MnROAD, the world's largest outdoor pavement management laboratory, and from 40-year-old test sections from around the state were incorporated into the MnPAVE program. The creation of MnPAVE was made possible through the combined efforts of the Minnesota Department of Transportation (Mn/DOT), the University of Minnesota, and LRRB.

Researchers are advising city and county agencies to use MnPAVE in conjunction with traditional design procedures. Moreover, because MnPAVE requires ongoing calibration and validation, researchers also are encouraging local practitioners to provide feedback on their MnPAVE project results, thereby continuing to add real-world data to the program and further refine the software program's design recommendations.

As a result of the knowledge gained from decades of hard work by University researchers such as Skok, local transportation practitioners throughout the state have been able to build better, more cost-efficient low-volume roads in Minnesota.

### If retaining walls could talk ...

One retaining wall along Interstate 494 is definitely not like the others. While the walls can serve a number of functions, including controlling erosion and reducing noise, a specially equipped retaining wall in Bloomington, Minnesota, is collecting data on the effects of earth pressure on structures. Information is continuously sent from the concrete cantilever wall to the University of Minnesota as part of a current research project.

University civil engineering professor Joseph Labuz, a specialist in geomechanics and holder of the Minnesota Surveyors and Engineers Society/Miles Kersten Land Grant Chair in Civil Engineering, and graduate student Joseph Bentler worked with the Minnesota Department of Transportation and its contractors during construction of the wall to outfit it with monitoring instruments. Several divisions of Mn/DOT were involved in the project. Highly sensitive earth-pressure cells, tiltmeters, inclinometers, strain gages, and temperature probes were built into the wall to collect data. These electrical sensing devices measure the soil pressure on the wall and monitor the tiny movements caused by this pressure. The results of the project are documented in the report *Earth Pressure Behind a Retaining Wall*, co-authored by Bentler and civil engineering associate professor Arturo Schultz.

The amount of earth pressure on a retaining structure depends on the physical properties of the soil, and is defined in relation to wall movement as at-rest,

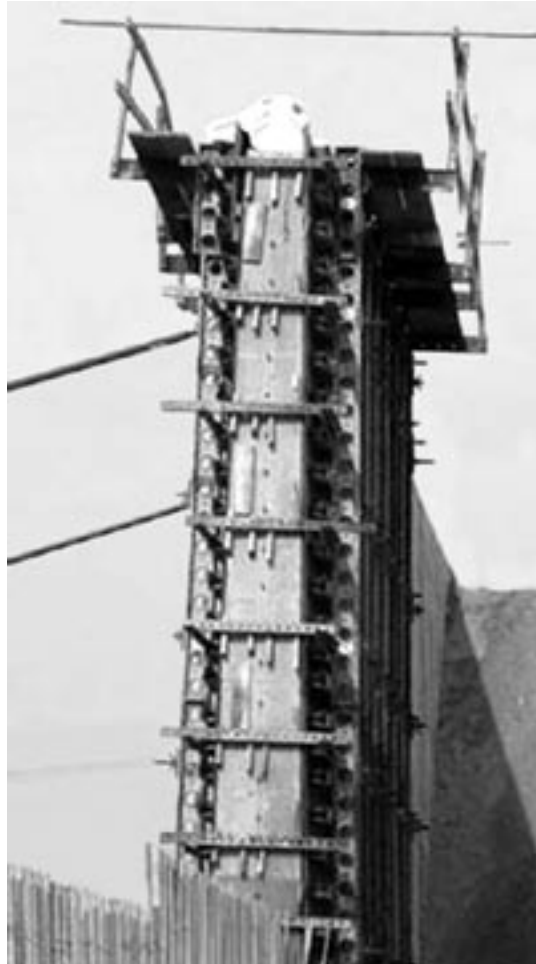
active, or passive. At-rest soil pressure implies no displacement between the soil and the wall. Active and passive pressures are caused by displacement between the soil and the wall, causing the soil to expand (active state) or contract (passive state).

One finding to date is sure to save Mn/DOT money by forestalling costly design changes that

had been under consideration. Retaining walls in Minnesota are currently built according to design specifications set by the American Association of State Highway and Transportation Officials (AASHTO) in 1992, which assume active soil pressure, and have traditionally performed well. A proposed revision to these standards would have changed requirements to meet an at-rest soil pressure state, which had the potential to significantly increase the cost of retaining wall construction while providing no real safety benefits. Results have confirmed that the state's current protocol for retaining-wall design is reasonable, and a change in the process is unwarranted.

Through the ongoing project, which will continue to collect data for another year or so, researchers are gaining a better understanding of soil pressure

against the wall and the wall's resistance mechanisms. Researchers hope to be able to make conclusions about seasonal changes in soil pressures with additional data. This will enable transportation researchers to look more closely at design assumptions and to refine construction specifications for the walls in highway settings.



**A specially equipped retaining wall along I-494 continuously sends earth pressure data to the University of Minnesota.**

### Storm water detention ponds

Lakes are complex ecosystems, extremely sensitive to their physical environments. Urban lakes are especially vulnerable to contamination from storm water runoff containing pollutants washed from roadways. It has been estimated that 30 percent of surface water quality impairment can be attributed to storm water discharge. Automobile brakes, tires, fuels/oils, and deicing salts are among the contributors to runoff pollution.

Storm water detention ponds are designed for use in urban watersheds to mitigate the damaging effects of highway drainage, holding runoff for a time and releasing it after sufficient water quality standards are met. The ponds control storm water quantity and quality, performing a vital function in reducing the amount of pollution eventually making its way into our lakes.

A recent research project studied the mechanisms of sorption (pollutant removal by soils and sediments) and phytoremediation (pollutant removal by plants) at work in detention ponds. University civil engineering professor Miki Hondzo served as principal investigator for the project, which resulted in the recent publication of *Laboratory Measurements of Storm Water Quality Improvement in Detention Ponds*. Student Jeff Weiss focused his graduate work on the research. The researchers hoped to collect data to develop improved design and maintenance practices for water quality improvement in detention ponds.

Lead, zinc, copper, cadmium (heavy metals), phosphorus, and chloride are the storm water pollutants of primary concern in Minnesota. Lead, copper, and phosphorus largely settle to the bottom of the ponds through sedimentation, the primary pollutant removal mechanism of the ponds. Zinc, chloride, and cadmium in the runoff must be treated with chemical or biological means in the ponds for pollutant removal or reduction.

Detention ponds treat collected storm water with physical, biological, and chemical processes to remove contaminants. Runoff from each rain event is treated until it is displaced by the next storm.

The detention pond project laid the groundwork for a variety of field studies that could be performed to further refine the optimal design for the ponds. The removal rates of the phytoremediation and sorption processes were incorporated into a numerical model to determine required detention times and percentage of plant cover for the ponds. The model will be used to develop detention pond design parameters to best meet water quality requirements set by the Minnesota Pollution Control Agency.

While storm water runoff will continue to wash away oil, grease, chemicals, metals, and litter from Minnesota's highways, the water quality of our lakes will be better protected by the design of detention ponds.

More information about this research is available online at [www.lrrb.org/more.cfm?code=1928](http://www.lrrb.org/more.cfm?code=1928).





## Mapping Minnesota

Throughout Minnesota, local governments, counties, and other agencies need data about land ownership to assist with road engineering work, tax assessment, zoning, environmental inventories, and a variety of other tasks. Having this information in the form of digital parcel maps is particularly useful because it supports faster updating, allows other data

layers to be added, and facilitates GIS applications such as producing letters addressed to adjacent property owners.

Until recently, little was known about which counties and local governments in Minnesota had this digital parcel data, and even less was known about how accurate these maps were. However, a recent project led by William Craig of the University of Minnesota's Center for Urban and Regional Affairs (CURA) has virtually eliminated that problem.

The Statewide Digital Parcel Data Inventory Research Project is an ongoing effort to track which Minnesota counties maintain digital parcel data.

The project team systematically identified existing parcel systems statewide, organized that data in a database that is accessible to all, and developed a plan for keeping the information current.

The extensive data was gathered by surveying counties across Minnesota on the extent and method of parcel data development, the frequency of maintenance, data development standards and distribution practices, key contacts for acquiring data, and more. Of the 86 counties in the state that responded to the survey, 54 are creating digital parcel maps. In well over half of those counties, parcel work is nearing

completion. Most of the 32 non-digital counties are small and rural.

In addition to reducing redundant efforts in parcel data development among state agencies, the inventory is intended to foster increased knowledge exchange and improved working relationships. The research team also hopes that the project will facilitate increased uniformity of data, improved methods of data access and exchange, and the sharing of best practices. To achieve these goals, the inventory has

been promoted in various county, city, and other publications around the

state. To ensure the continued accuracy of the

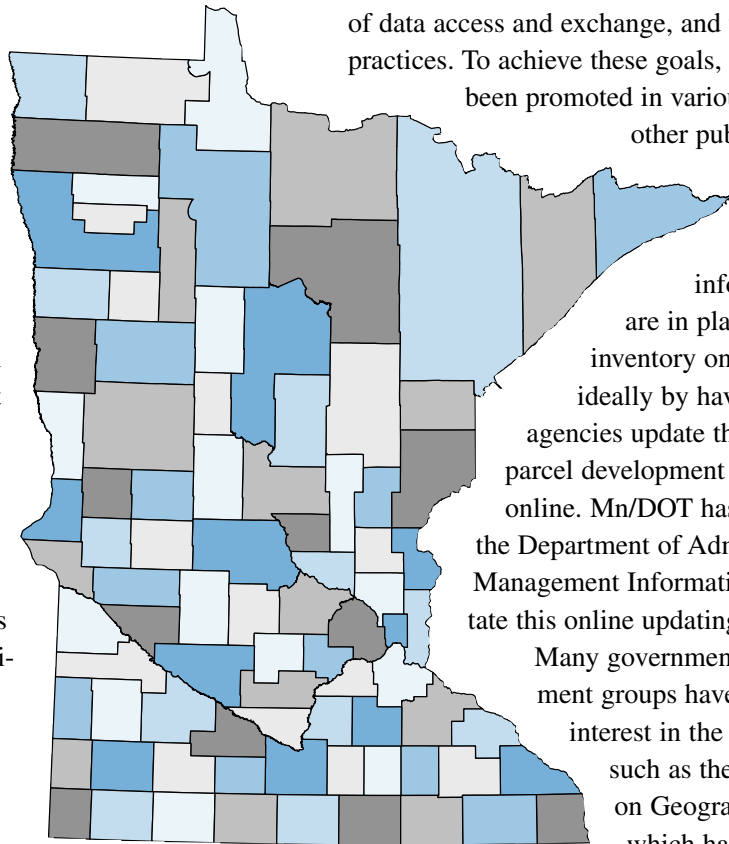
information, plans are in place to update the inventory on an annual basis, ideally by having government agencies update their own digital parcel development status information online. Mn/DOT has contracted with the Department of Administration Land Management Information Center to facilitate this online updating.

Many government and non-government groups have already expressed interest in the study's findings, such as the Governor's Council on Geographic Information, which has a keen interest in parcel activities across the state but until now had no comprehensive inventory of

current status. The inventory has helped them better understand the current situation, allowing them to direct their energies to other issues, such as standards.

CTS rewarded the project team with the 2004 CTS Research Partnership Award in April 2004 (see page 24). CURA acted as the lead research organization for the project, which was sponsored by Mn/DOT and assisted by Pro-West & Associates.

More information and detailed survey results, including maps with summary data, are available online at [rocky.dot.state.mn.us/SPMI/](http://rocky.dot.state.mn.us/SPMI/).



**Of Minnesota's 87 counties, 54 are creating digital parcel maps.**

CTS AREA OF  
EXCELLENCE

FORMAL EDUCATION

*Champion formal credentialed education initiatives by supporting the development of more  
University education programs in transportation-related areas*



### Graduate Certificate Program in Transportation Studies

Ten of the 22 students admitted into the Graduate Certificate Program in Transportation Studies have earned a certificate

since CTS and the University of Minnesota Graduate School launched the program.

In addition, semi-annual information sessions about the program consistently draw graduate students and professional

professionals, including transportation planners, civil engineers, and public policy consultants.

John Adams (Geography), Gary Davis (Civil Engineering), Karen Donohue (Operations and Management Sciences), David Levinson (Civil Engineering), Kevin Krizek (Humphrey Institute), and Gerard McCullough (Applied Economics) served as faculty advisors for the program. Davis also serves as the certificate director of graduate studies.

The certificate program is intended for

professionals in transportation-related fields as well as for students seeking a master's degree in a related discipline. By completing the flexible program requirements, participants will acquire advanced knowledge

of the complex issues in transportation and gain a recognized professional credential.

The certificate program is built around a core set of graduate-level courses in civil engineering, planning and public policy, and

supply-chain management. Participants are required to complete two core courses (six-credit minimum), as well as a seminar in transportation technology. Participants also must select additional credits from a broad range of courses offered in numerous academic departments to round out a program requirement of 16 graduate-level credits.

Application materials and additional information about the Graduate Certificate Program is available online at [www.cts.umn.edu/certificate](http://www.cts.umn.edu/certificate).



### Transportation Career Handbook

Even though the University does not offer a traditional degree in transportation, it does provide a number of opportunities for undergraduates, graduate students, and working professionals to obtain a multidisciplinary education in transportation.

To help students connect their studies at the University of Minnesota to possible careers in transportation, CTS has published the *Transportation Career Handbook*.

The *Transportation Career Handbook* describes educational opportunities at the University in six categories: traffic engineering and analysis, planning and policy, vehicle design and engineering, structural and pavement engineering, management and logistics,



and human and environmental factors. For those who have yet to decide on a career, the handbook includes a fun “roadmap” linking basic academic interests to possible transportation-related careers. An interactive version of this roadmap is available online.

Other features the handbook includes are listings of helpful CTS programs for students and professionals, details about the CTS Graduate Certificate in Transportation Studies, highlights of innovative transportation-related research programs at the University, and photographs of transportation from yesterday and today. Order a copy of the *Transportation Career Handbook* by contacting CTS or view it online at [www.cts.umn.edu/careers](http://www.cts.umn.edu/careers).



### CTS research seminars

During the 2003–2004 academic year, CTS continued to host research seminars to provide University researchers from a variety of disciplines an opportunity to share their findings. In a number of instances, research seminars were held in conjunction with meetings of the CTS Research Councils (Environment, Safety and Traffic Flow, Economy, and Infrastructure).

#### Fall semester presentations

“Building Our Way out of Congestion—Highway Capacity for the Twin Cities,” Gary Davis and Kate Sanderson, Civil Engineering

“Mechanistic-Empirical 2002 Guide for Design of Minnesota Low-Volume Roads: The Future of Pavement Design is Here! (almost here),” Lev Khazanovich, Civil Engineering

“Accident Prevention Based on Automatic Detection of Accident Prone Traffic Conditions,” John Hourdak, Civil Engineering

“Commuter Rail, Density, and EcoSprawl,” Lance Neckar, Landscape Architecture

“Attributes and Amenities of Highway Systems that are Important to Tourists,” William Gartner, Applied Economics

#### Spring semester presentations

“Economic and Environmental Impacts of Closing the Minneapolis Upper Harbor,” Jerry Fruin, Applied Economics

“Usage Patterns of Diesel and Fuel Oil in Minnesota: Considerations for Using Biodiesel to Reduce Emissions,” Doug Tiffany, Applied Economics

“Earth Pressure Behind a Retaining Wall,” Joe Labuz, Civil Engineering

### Advanced transportation technologies seminars

During the 2003–2004 academic year, the Intelligent Transportation Systems (ITS) Institute, housed within CTS, continued its multidisciplinary seminar series at the University. These advanced transportation technologies seminars included a diverse set of presentations by local and national researchers addressing different areas of ITS research, such as traffic management and modeling, human factors, sensing, and intelligent vehicles as they relate to road- and transit-based transportation. The seminars are offered for credit and required as a course in the Graduate Certificate Program in Transportation Studies at the University of Minnesota. Seminars are videotaped and available for loan.

#### Fall semester presentations

“Evaluating GPS for Assessing Road User Charges,” Pi-Ming Cheng, Mechanical Engineering

“ITS and Industry Clusters,” Lee Munnich, Humphrey Institute of Public Affairs

“The Origins, Status, and Future of GPS,” Bradford Parkinson, Stanford University, Aeronautics and Astronautics

“Inductive Loop Detector Signal Analysis,” Stan Burns, UMD Electrical and Computer Engineering

“Integrated Multi-Sensor Navigation Systems,” Demoz Gebre-Egziabher, Aerospace Engineering and Mechanics

“Adaptive Modulation for Bandwidth- and Power-Efficient Transmission Over Wireless Links,” Mohamed-Slim Alouini, Electrical Engineering and Computer Science

“The Effectiveness and Safety of Traffic- and Non-Traffic-Related Messages Presented on Changeable Message Signs,” Kathleen Harder, Architecture and Landscape Architecture

## FORMAL EDUCATION: Student Programs

### Transportation career expo

More than 100 students gathered at Coffman Memorial Union in March 2004 for the Ninth Annual Transportation Career Expo. The event provided students an opportunity to ask questions, receive seasoned advice, obtain feedback on their resumes, and network with employers. The 2004 expo was the largest to date, with 12 schools represented from three states, 22 exhibiting employers, and more students in more majors than ever before.

Employers promoted their organizations with booth displays, and transportation professionals

led informational sessions on transportation-related careers in areas such as engineering, policy and planning, intelligent transportation systems (ITS), and logistics and supply-chain management. An opening

interactive panel discussion covered the entire job-hunting process, from networking to resumes to interviews.

CTS offered the event in cooperation with the Minnesota Local Road Research Board, the Minnesota Local Technical Assistance Program, the Women's Transportation Seminar, and the ITS Institute.



### Interdisciplinary Transportation Student Organization

Nearly 50 students, faculty, and professionals attended the inaugural meeting of the Interdisciplinary Transportation Student Organization (ITSO), which was held September 2003 at the University's Humphrey Center. By the conclusion of its inaugural year, ITSO membership topped 80 students.

ITSO (pronounced "it-so") was created with support from CTS by

University of Minnesota students who are pursuing degrees in transportation-related fields. The group's main purpose is to connect with transportation professionals through monthly meetings and other



events and learn about careers in transportation.

ITSO has affiliated itself with several professional organizations including the Minnesota Chapter of Women's Transportation Seminar (WTS Minnesota), the North Central Section of the Institute of Transportation Engineers (NCITE), and the Intelligent Transportation Society

of Minnesota (ITS Minnesota).

Membership in ITSO is free. Students interested in becoming involved in this organization may visit the ITSO Web site at [www.tc.umn.edu/~itso/](http://www.tc.umn.edu/~itso/).

### Summer transportation programs

In July 2003, the ITS Institute partnered for the fourth year with the Fond du Lac Tribal and Community College to host the National Summer Transportation Institute, a program that emphasizes outreach to students from Minnesota's Native American communities.

The Summer Transportation Institute brought 15 students from several high schools in the Duluth area to the Twin Cities to learn about ITS-related research and technologies. The day included a presentation on the topic of ITS, discussion with Institute staff about careers in transportation, and tours of the Minnesota Department of Transportation's Traffic Management Center and TAXI 2000, a personal rapid transport development company.

The Institute also hosted 20 students from the University of Minnesota's Summer Explorations in Science, Engineering, and Mathematics (SESEM) Program. The group was introduced to the topic of ITS and given a tour of the ITS Laboratory, where they learned about the lab's facilities and current research at the Institute, including computer simulations and traffic control strategies.

By introducing high school students to advanced transportation research projects funded by the University Transportation Centers (UTC) program, the Institute hopes to encourage students to choose transportation- and technology-related educational fields when they enter college.

### Web modules for high school students

Mark Tollefson, a local high school science teacher and the K-12 coordinator for the ITS Institute, continues to develop curriculum materials on ITS topics. Previously, he had developed a ramp metering Web module that gave high school students the opportunity to investigate ramp metering and its impact on travel. A CD-ROM containing the module and a poster explaining ITS were distributed to 160 high schools throughout Minnesota.

A Web module on Global Positioning Systems (GPS) has been completed and will also be distributed to area schools. Along with listing various Web sites about GPS, the curriculum includes quizzes that check students' learning progress. Tollefson is currently working on a new module on the topic of human factors.

Reaching students early with fun, hands-on activities is one way the Institute hopes to interest them in a career in transportation.

K-12 Web modules are available online at [www.its.umn.edu/education/modules.html](http://www.its.umn.edu/education/modules.html).



### CTS Richard P. Braun Chair

As of December 2004, \$335,000 of a target \$500,000 has been raised in the effort to fund the CTS Richard P. Braun Chair in transportation engineering. CTS is collaborating with the University's Department of Civil Engineering to establish the new faculty chair.

Each gift to the fund will be matched twice to reach the goal of \$1.5 million needed to permanently endow the chair. CTS will match dollar-for-dollar all private and industry contributions, using royalties from Autoscope, an invention in traffic detection technology developed by Professor

Panos Michalopoulos. The Department of Civil Engineering will match contributions through a permanent commitment of annual department funds to support the position.

The chair is a leadership position that will build on the legacy begun by Professor Matthew Huber and will foster innovation in the academic program in transportation engineering for the Department of Civil Engineering. The position will develop new educational programs, as well as oversee research and teaching activities in transportation engineering.



## FORMAL EDUCATION: Student Programs

### Awards, scholarships, and employment

#### **Matthew J. Huber Award for Excellence in Transportation Research and Education**

Named in honor of the late Professor Matthew J. Huber, in recognition of his contribution to the teaching and study of transportation at the University of Minnesota

**Yufeng Guo**, graduate student

*Area of study:* Master of Urban and Regional Planning (Humphrey Institute of Public Affairs)

*Faculty:* Richard Bolan

**Eray Baran**, Ph.D. student

*Area of study:* Civil Engineering

*Faculty:* Catherine French, Carol Shield, and Arturo Schultz

#### **ITS Institute 2003 Outstanding Student of the Year Award**

A U.S. Department of Transportation honor awarded to an outstanding student from each university transportation center at the annual Transportation Research Board meeting in Washington, D.C.

**Katherine (Kate) Sanderson**, Ph.D. student

*Area of study:* Civil Engineering

*Faculty:* Gary A. Davis

#### **ITS Minnesota 2004 Student Awards Competition**

Awards of \$1,250 to a graduate student and \$750 to an undergraduate based on ITS-related work, and may comprise a paper, project, or research work done by the student

**Xi Zou**, graduate student

*Area of study:* Civil Engineering

**Jeffrey Sharkey**, undergraduate student

*Area of study:* Computer Science (UMD)

### CTS HELPS FUND STUDENTS

The Center demonstrated its support of formal education in transportation by awarding ITS Institute and CTS scholarships totaling more than \$20,000 to University students for student honors and professional conference participation.

#### **Doctoral Dissertation Fellowship**

Given to outstanding final-year Ph.D. candidates at the University so they may complete their dissertation within the upcoming academic year by devoting full-time effort to research and writing

**Pavan Kumar Vitthaladevuni**, Ph.D. student

*Area of study:* Electrical Engineering

*Faculty:* Mohamed-Slim Alouini

#### **Council of Logistics Management Twin Cities Roundtable scholarship**

Award of a \$2,000 scholarship from the Council of Logistics Management (CLM) Twin Cities Roundtable

**Jeff Dickman**, undergraduate student

*Area of study:* Supply-Chain Management and Marketing

CTS also offers:

- Graduate assistantships and undergraduate scholarships to University transportation students
- Expense reimbursement scholarships for University student attendance at the annual TRB and ITS America conferences
- Help matching University students with possible job opportunities in transportation-related organizations (via newsletter, Web site, and events)
- Student internships in CTS research, education, and outreach programs



Richard Bolan with Yufeng Guo



Carol Shield with Eray Baran



Gary Davis with Kate Sanderson

CTS AREA OF  
EXCELLENCE

APPLIED PROBLEM-SOLVING

*Facilitate the implementation of research results and best practices*



## Minnesota Local Technical Assistance Program

The Minnesota Local Technical Assistance Program, housed at CTS, is part of a network of 58 centers nationwide funded by the Federal Highway Administration's Local Technical Assistance Program, better known as LTAP. Minnesota LTAP also receives funding from the Minnesota Local Road Research Board (LRRB) and the Minnesota Department of Transportation (Mn/DOT).

**Minnesota LTAP offers a statewide workshop program and partners with other organizations to cosponsor events. LTAP offered the following workshops in FY2004:**

- Gravel Road Maintenance and Design
- Bridge Maintenance
- Context-Sensitive Design for Local Governments
- Design, Construction, and Maintenance of Storm Water Basins and Erosion Control
- Asphalt Pavement Maintenance and Preservation
- Reducing Risk and Liability
- Design and Maintenance Considerations for Erosion Control on Local Roads
- Advanced Automotive Training in Electricity
- Hydraulic Testing and Troubleshooting
- Minnesota MUTCD Training
- Motor Grader Operator Training

**Minnesota LTAP cosponsored the following events:**

- Ninth Annual Transportation Career Expo
- Eighth Annual Minnesota Pavement Conference
- Spring and Fall State Maintenance expos
- Context-Sensitive Design (Mn/DOT) workshop
- APWA "Click, Listen, and Learn" online courses
- Work-Zone Traffic-Control workshop
- Traffic Engineering Fundamentals workshop
- Truck-Weight Compliance Training

In a new effort, Minnesota LTAP, in cooperation with Mn/DOT and Northland Community College, delivered an education program on truck-weight transportation issues. Minnesota Truck-Weight Compliance Training educated 750 industry freight shippers, carriers, and public agency personnel on the proper appli-

cation of Minnesota commercial-vehicle weight laws and enforcement policies. The objective of the training is to maximize hauling capacity within legal limits and to promote voluntary compliance in reducing damage to public roads and highways.

County engineers in Minnesota are adopting design practices from the University-generated manual, *Best Practices for Design and Construction of Low Volume Roads*, which documents findings from Eugene Skok's research on this topic (*for more, see page 8*). Minnesota LTAP is offering the Best Pavement Design Practices workshop, subsidized through LRRB funding, for city and county transportation engineers to review the manual.

More information about Minnesota LTAP is available online at: [www.mnltap.umn.edu](http://www.mnltap.umn.edu).

### Minnesota LTAP Hot Topics electronic newsletter

In February 2004, Minnesota LTAP launched a new electronic newsletter, *Hot Topics*. The periodic newsletter shares recent publications and resources from a variety of organizations, plus other announcements of interest to LTAP readers.

So far, approximately 1,300 copies of *Hot Topics* are distributed by e-mail. More information about *Hot Topics*, including a subscription order form and back issues, is available online at [www.mnltap.umn.edu](http://www.mnltap.umn.edu).





### Circuit Training and Assistance Program

CTAP, or the Circuit Training and Assistance Program, is a mobile outreach effort providing training, technical assistance, and technology transfer to city, county, state, and related personnel. Workshops may be scheduled for a range of topics upon request.

During FY04, CTAP instructor Kathy Schaefer, a former maintenance supervisor with Mn/DOT, con-



ducted training sessions for 2,857 employees from cities, townships, counties, and the state. During those presentations, she discussed the adverse environmental effects to our air, water, soil,

and vegetation by the different anti-deicing materials used including sand, salt, magnesium chloride, and calcium chloride.

CTAP is sponsored by Minnesota LTAP, Mn/DOT's Maintenance Research and Operations Office, and the Minnesota Local Road Research Board. More information about CTAP is available online at [www.mnltap.umn.edu/ctap](http://www.mnltap.umn.edu/ctap).

### Local Operational Research Assistance (OPERA) Program

In fall 2003, the Minnesota Local Road Research Board (LRRB) established a new program to promote and fund applied research. The Local Operational Research Assistance (OPERA) Program assists in developing innovations relating to methods, materials, and equipment used in the construction and maintenance operations of local government transportation organizations.

The Local OPERA Program encourages maintenance employees to get involved in research by promoting operational or "hands-on" research. The main goal of OPERA is to create a safer, easier, and more efficient environment for the maintenance operations worker and to provide a safe, efficient, and environmentally sound transportation network.

OPERA funds projects up to \$10,000. Selections are made by an LRRB-appointed committee monthly or as projects are submitted. An annual report describing funded projects will also be published.

Minnesota LTAP administers the Local OPERA Program for LRRB. More information is available online at [www.mnltap.umn.edu/opera](http://www.mnltap.umn.edu/opera).

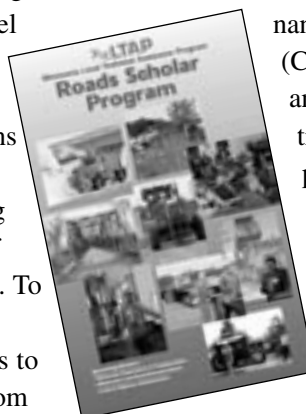
### Roads Scholar Program

Minnesota LTAP launched a new certificate program, the LTAP *Roads Scholar Program*, designed for local and state agency maintenance personnel who are committed to learning new skills and expanding their knowledge in the latest road and bridge innovations and best practices. The program combines Minnesota LTAP's many training options into a structured curriculum of half-day and one-day training sessions. To date, 150 students have enrolled.

Participants must earn eight credits to complete the program: three credits from

required LTAP workshops and five elective credits from a combination of LTAP workshops, maintenance expos, and Circuit Training and Assistance (CTAP) workshops. There is no enrollment fee, and students have five years to complete the certificate. Graduates will be recognized through a press release to their local newspapers and featured in the Minnesota LTAP *Exchange* newsletter and on the Minnesota LTAP Web site.

More information about the LTAP Roads Scholar Program is available online at [www.mnltap.umn.edu](http://www.mnltap.umn.edu).



### State maintenance expos

Minnesota LTAP partners with Mn/DOT, the Minnesota Local Road Research Board (LRRB), the Minnesota Public Works Association, and the

Minnesota Street Superintendents Association to hold annual spring and fall maintenance research expos. These events allow transportation professionals, especially those in the maintenance area, to exchange ideas and information; learn about new technologies, practices, and materials; and

improve communications within the workplace. Also included are half-day outdoor equipment demonstra-



tions and indoor equipment displays of exhibitors' technology.

The fall 2003 expo, held October 1–2 in St. Cloud, attracted approximately 1,300 attendees from

state, county, city, and township governments. The fall expo emphasized snowplow operation and heavy equipment operation, with much of it related to safety. The spring maintenance training expo drew more than 550 attendees April 27–28, 2004, also in St. Cloud. The spring expo included sessions about rural road

safety, the Twin Cities light-rail transit project, pesticide application, erosion control, and wildlife control.

### AirTAP

AirTAP—the Airport Technical Assistance Program—is a statewide assistance program for aviation personnel that offers practical instruction by knowledgeable, experienced trainers and also provides a range of helpful information, materials, and resources.

The program continued to publish *Briefings*, a quarterly one-page insert for the Minnesota Council of Airports (MCOA) newsletter, as well as workshop and training session highlights. Specifically, AirTAP developed and distributed summaries of two workshops: *Asphalt, Concrete, and Turf Maintenance and Preservation* and *Snow and Ice Control*.

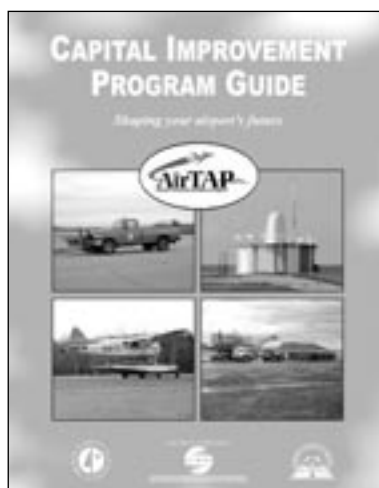
AirTAP recently published the *Capital Improvement Program (CIP) Guide* to help public airport personnel complete their CIP information in order to receive state and federal

funding for improvements. The guide can also help airport owners plan for the short- and long-term needs of their airports. The guide was delivered to airports around the state and is available on the AirTAP Web site.

A new addition to the AirTAP Web site is a collection of “current practices.” Culled from airport personnel throughout the state, these are methods, processes, or innovative uses of resources that save time, reduce costs, or improve performance in airport operations.

AirTAP is sponsored by the Mn/DOT Office of Aeronautics, in partnership with CTS and the Minnesota Council of Airports.

Electronic versions of all AirTAP publications may be downloaded from the AirTAP Web site along with other useful information and resources at [www.airtap.umn.edu](http://www.airtap.umn.edu).







## 2004 Annual Transportation Research Conference

In May 2004, CTS held the 15th Annual Transportation Research Conference in St. Paul. The event focused on cutting-edge alternatives in the areas of mobility, finance, and technology. Highlights include:

- Professor John B. Heywood, director of the Sloan Automotive Laboratory at the Massachusetts Institute of Technology, said that the global demand for petroleum is projected to grow rapidly in coming years while production of the finite resource begins an inevitable decline. But he proposed that new technologies—combined with regulatory and behavioral changes—offer promise if action is taken now. He presented his ideas in the opening session of the conference in a speech titled “On the Road in 2030: Technologies for More Sustainable Transportation.”
- Professor Alfred Marcus of the U’s Carlson School of Management and Eivind Stenersen of Donaldson

Company joined Heywood in a panel discussion about the future of oil.

- A luncheon presentation titled “An Unseen (or Quiet) Revolution in Transportation Finance,” by Professor Martin Wachs of the University of California at Berkeley, described shifting finance options from fuel taxes to local measures and tolls. *(For more about Wach’s presentation, see page 25.)*
- Nearly two dozen concurrent sessions included such topics as intersection safety, Minnesota road taxes, telework and e-shopping, pavement design, transit-oriented development, air quality and alternative fuels, freight, corridor development, transportation needs of diverse populations, and futuristic transit options.

More about the 2004 Transportation Research Conference is available online at [www.cts.umn.edu/news/report/2004/06](http://www.cts.umn.edu/news/report/2004/06).



**John B. Heywood**



**Alfred Marcus**



**Eivind Stenersen**



### CTS annual meeting and awards luncheon

CTS staff and committee members presented annual awards to recognize significant contributions to the field of transportation.

*CTS Research Partnership Award: “GIS Parcel Map Inventory”*

In the project, University researchers joined practitioners from several agencies to systematically collect information about parcel data statewide and put it into a database accessible to all. As a result, Mn/DOT and other state agencies can easily determine whom to contact for critical parcel information. *(For more about the project, see page 11.)*



*(From left) Project partners Jim Aamot (Mn/DOT), Will Craig (CURA), Annette Theroux (ProWest and Assoc.), and Jim Krafthefer (Mn/DOT), with CTS associate director Laurie McGinnis. Not pictured: Rick Morey (Mn/DOT)*



*Richard P. Braun Distinguished Service Award:* John S. Adams, professor and chair of the Department of Geography and a faculty member at the Humphrey Institute of Public Affairs



*Ray L. Lappegaard Distinguished Service Award:* Natalio Diaz, director of Metropolitan Transportation Services, a division of the Metropolitan Council



*William K. Smith Distinguished Service Award:* Howard Gochberg, faculty member in logistics and supply chain management at Metropolitan State University



*Distinguished Public Leadership Award:* Bernie L. Lieder, a 20-year member of the Minnesota House of Representatives and retired county engineer

### Oberstar Forum for Transportation Policy and Technology



**James L. Oberstar**

Regional and national transportation officials, policymakers, and professionals joined U.S. Rep. James L. Oberstar on March 14–15 to discuss the challenges and opportunities facing transportation in rural America. This was the third meeting of the transportation policy and technology forum named after Oberstar, and the first held at the University of Minnesota Duluth campus. This year’s forum was co-hosted by the Northland Advanced Transportation Systems Research Laboratory and CTS.

Oberstar headlined the two-day event, which featured USDOT assistant secretary for transportation



**Emil Frankel**

policy Emil Frankel. USDOT deputy administrator Sam Bonasso (Research and Special Programs Administration) and associate administrators Rose McMurray (Federal Motor Carrier Safety Administration) and A. George Ostensen (Federal Highway Administration) also participated along with many other state and national leaders. A panel of top transportation executives shared industry insights and took questions from the audience.

More information about this and previous Oberstar forums is available online at [www.cts.umn.edu/oberstarforum](http://www.cts.umn.edu/oberstarforum).

## CTS luncheon presentations

The Center's luncheon presentations provide a setting for transportation professionals, faculty, and students to interact as they listen to presentations of national issues. The spring luncheon is held in conjunction with the annual CTS transportation research conference.

### Fall luncheon

At the CTS fall luncheon in October 2003, Brian Taylor, an associate professor and vice chair of



**Brian Taylor**

urban planning at the University of California Los Angeles, proposed that a congested road system isn't a sign of failure—it's simply an inevitable byproduct of vibrant, successful cities. Taylor challenged what he called conventional planning wisdom with a number of propositions. Taylor also

examined the reasons for so much hostility toward long-term solutions of congestion.

### Winter luncheon

At the CTS winter luncheon in February 2004, Allan F. Williams, chief scientist at the Insurance Institute for Highway Safety (IIHS), described a widening gap between the motor-vehicle fatality rate in the United States and other countries in his speech titled "A National Perspective on Current Highway Safety Issues."



**Allan F. Williams**

### Spring luncheon

At the spring luncheon in May 2004, University of California at Berkeley professor Martin Wachs told attendees that the nature of transportation finance is changing fundamentally and on a large scale, but the change is happening gradually and without much notice or broad discussion.



**Martin Wachs**

In his speech titled "An Unseen (or Quiet) Revolution in Transportation Finance," Wachs explained that there has been shifting away from a historical reliance on user taxes toward a new dependence on a variety of local taxes.

## Freight and Logistics Symposium

Freight and logistics professionals, researchers, and policymakers discussed conflicts between freight-oriented industries and communities over land use, jobs, and traffic, as well as the latest news on national transportation funding reauthorization efforts, at the Seventh Annual Freight and Logistics Symposium, hosted by CTS in December 2003.

The symposium's three main sessions included a panel discussion on leading-edge trends, a panel discussion on the implications of community-integrated logistics for Minnesota, and an update on federal initiatives and legislation.

CTS sponsored the event in cooperation with the Minnesota Department of Transportation (Mn/DOT), the Minnesota Freight Advisory Committee, the Council of Logistics Management, and the Twin Cities Metropolitan Council.

A summary report detailing the entire event is available online at [www.cts.umn.edu/publications/proceedings](http://www.cts.umn.edu/publications/proceedings).



## POLICY LEADERS SEMINAR

An inaugural Transportation Seminar for Policy Leaders was cosponsored by CTS and the Humphrey Institute's State and Local Policy Program. Approximately 30 local, regional, and state decision makers participated in the seminar that featured presentations by University faculty and researchers and moderated discussions.

### Transportation seminar for policy leaders

State legislators, county commissioners, and other elected and appointed officials attended a one-day transportation seminar for policy leaders in January 2004. The seminar, sponsored by CTS and the Humphrey Institute's State and Local Policy Program, provided an overview of transportation trends and an opportunity to discuss policy implications with University and industry experts.

Topics discussed at the seminar's four sessions included transportation systems and trends, technological developments, transportation finance, and transportation governance. Geography professor John Adams, ITS Institute director and mechanical engineering professor Max Donath, Humphrey Institute State and Local Policy Program director Lee Munnich, Center for Urban and Regional Affairs director Tom Scott, and CTS director Robert Johns led the sessions. Barbara Lukermann, a senior fellow with the Humphrey Institute, moderated the event.



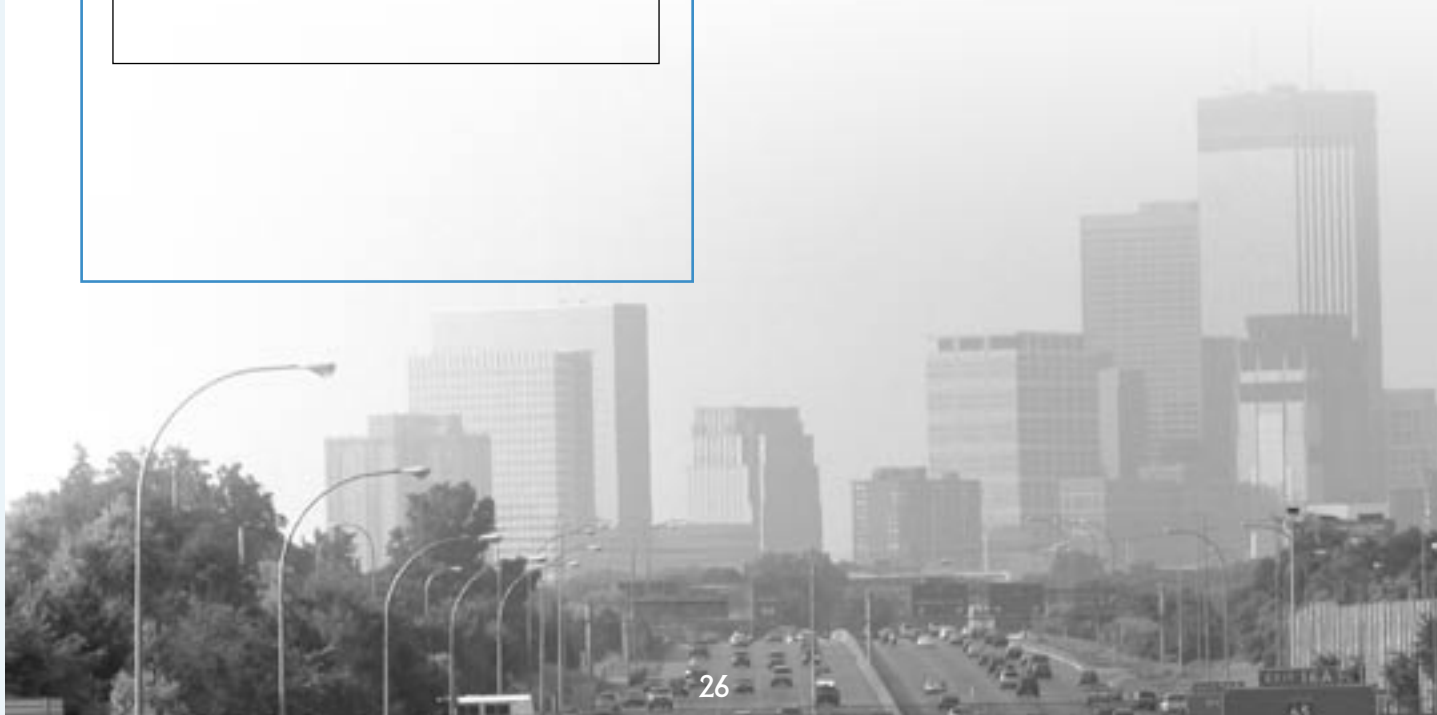
### Transportation finance roundtables

CTS and the Humphrey Institute of Public Affairs held three roundtables during the year to discuss transportation finance. The roundtable series is intended to stimulate open discussion among transportation leaders about a wide variety of transportation viewpoints.

#### Funding transportation

U.S. Rep. James Oberstar, the ranking Democrat on the House Committee on Transportation and Infrastructure, shared his views at a November 2003 event about how transportation should be funded. Oberstar believes highway and transit needs far exceed current proposals by the Bush administration. To come up with additional funds, Oberstar proposed drawing down on the balance in the Highway Trust Fund, restoring interest to the Highway Trust Fund, eliminating user fee (gas tax) evasion by tightening up collection procedures, directing all revenues from existing gasohol user fees to the trust fund, and indexing motor-fuel taxes to inflation. Oberstar also stressed the need to "look over the horizon" to find sustainable finance mechanisms for the future.

#### Highway construction







**Mark Dayton**

pace with increased project costs and increasing needs for repairs, upgrades, and expansions. Without making significant changes very soon, conditions are guaranteed to worsen, Dayton pointed out. He called for more highway construction projects—two or possibly three times more than at present—over the next 10 to 20 years. To achieve those goals, Dayton proposed a five-point financing plan, which includes increasing federal funding significantly, decoupling the funding level from the Highway Trust Fund, increasing state spending for highway construction projects, aggressively using highway construction bonds in Minnesota, and establishing a Minnesota highway construction authority.

### **Congestion pricing**

Last, experts from three high-occupancy toll (HOT) lane sites gathered in Minneapolis in April 2004 to share their evaluation findings and help inform Minnesota's approach to I-394. John Berg, former team leader with the Federal Highway Administration's Congestion Pricing Pilot Program and Value Pricing Pilot Program, set the framework for the event, noting that officials here and in other cities will be following what is done in Minnesota. Berg was followed by presentations from three evaluators of existing HOT lanes: SR 91 in Orange County, California, I-15 in San Diego, and I-10 and US-290 in Houston.

### **NASTRL annual research event**

In November 2003, the Northland Advanced Transportation Systems Research Laboratories (NASTRL) held its second annual research day at Mn/DOT District 1 Headquarters in Duluth. A large crowd of faculty, students, transportation engineers, and others attended the day-long event. NASTRL, located at the University of Minnesota Duluth, is a program of UMD and the Intelligent Transportation Systems (ITS) Institute at CTS.

Project teams presented detailed updates on their research efforts, including:

- Martha Wilson (UMD Mechanical and Industrial Engineering): snowplow modeling
- Taek Kwon (UMD Electrical and Computer Engineering): archiving data from Mn/DOT's road sensors and developing programs to efficiently access and share the data
- Brian Brashaw (UMD's Natural Resources Research Institute (NRRI)): non-intrusive means of performing inspections on timber bridges, in use across rural areas in both Minnesota and Wisconsin
- Mohammed Hasan and Fernando Rios-Gutierrez (UMD Electrical and Computer Engineering): analysis of a sensor in surveying and detecting pavement conditions when ice/snow is present
- Ryan Rosandich (UMD Mechanical and Industrial Engineering): a model to evaluate and quantify the risk in transportation construction project schedules
- David Hopstock (NRRI): using taconite as a potential source for a road aggregate material to use for deicing and pothole patching applications

More information about NASTRL is available online at [www.its.umn.edu/labs/natsrl.html](http://www.its.umn.edu/labs/natsrl.html).

### Community-based transportation conference

In October 2003, CTS hosted the second Conference on Community-Based Transportation, an event that brought together participants from regional human



service agencies, government, private industry, and the University of Minnesota to discuss issues related to community-based transportation (CBT) and to share ideas for improving

CBT options. CBT typically refers to transportation that is provided by means other than mainline buses or private vehicles, for people who cannot drive or do not have access to vehicles.

The CBT conference was sponsored by CTS, the State and Local Policy Program at the Humphrey Institute, and Hennepin County Transit and Community Works.

A summary report detailing the entire event is available online at [www.cts.umn.edu/publications/proceedings](http://www.cts.umn.edu/publications/proceedings).

### Minnesota Pavement Conference

In February 2004, participants of the Eighth Annual Minnesota Pavement Conference received the latest news in pavement research and technology from variety of practitioners and researchers. Nearly 200 conference participants attended concurrent session presentations. Presentation topics ranged from multimedia pavement tools and GPS-guided dozers and graders to European pavement methods, Superpave asphalt mix, transverse thermal cracking, and improved concrete pavements.

CTS hosted the event, which was sponsored by Mn/DOT, Minnesota LTAP, and a number of other organizations, and facilitated by the University's College of Continuing Education.

More about the conference is available in the spring 2004 issue of Minnesota LTAP's *Technology Exchange* newsletter, or online at [www.mnltap.umn.edu/publications](http://www.mnltap.umn.edu/publications).

### TRB annual meeting presentations

University of Minnesota researchers from a range of departments presented more than 35 papers and posters about such topics as freeway bottlenecks, warping pavements, and driver simulator sickness at the annual Transportation Research Board (TRB) meeting in Washington, D.C., in January 2004.

Several projects completed as part of the Transportation and Regional Growth (TRG) Study were presented at a session about traffic congestion. Geography professor John S. Adams, former University landscape design researcher Carol Swenson, Humphrey Institute researcher Gary Barnes, and landscape architecture professor Lance M. Neckar made presentations. The TRG Study, which concluded in 2003, was a multiyear initiative coordinated by CTS at the request of the Minnesota Department of Transportation and the Metropolitan Council, with



support from the Minnesota Local Road Research Board.

Another session presented the results of the May 2003 CEO Leadership Forum and the follow-up activities being planned to support CEOs and their organizations in addressing the issues heard at the forum. CTS hosted the forum, which was sponsored by the American Association of State Highway and Transportation Officials (AASHTO), TRB, and the Federal Highway Administration.

### CTS Publications Catalog

CTS published its first publications catalog in spring 2004. The 28-page *CTS Publications Catalog* lists transportation-related research reports produced by University of Minnesota faculty and researchers and published by CTS or Mn/DOT since 1998. The catalog also features publications, videos, and other materials produced by CTS and its affiliated programs.



CTS publications may be requested from CTS using the order form in the back of the *CTS Publications Catalog*, by contacting CTS, or via the publications Web page at [www.cts.umn.edu/publications](http://www.cts.umn.edu/publications).

### Midwest Transportation Knowledge Network

CTS is one of the founding members of the Midwest Transportation Knowledge Network (MTKN), a nine-state network of transportation libraries in the Midwest. The National Transportation Library funded the development of the MTKN in December 2001 as a pilot project. Its main purpose is to improve access to transportation research and information by transportation professionals in the region.

A major initiative the MTKN has been instrumental in developing is the *Transportation Libraries Catalog*—or *TL Cat*—which became available in March 2004. *TL Cat* is an online database of the holdings of 20 of the leading transportation libraries in the United States.

More information about the Midwest Transportation Knowledge Network and the *Transportation Libraries Catalog* is available online at [www.mtkn.org](http://www.mtkn.org). You may also contact Arlene Mathison, CTS librarian and MTKN executive committee chair, at [amathison@cts.umn.edu](mailto:amathison@cts.umn.edu).

### CTS Newsletters

#### *CTS Report*

A monthly publication on transportation research, education, and outreach activities at the University of Minnesota

#### *The Sensor*

A periodic newsletter featuring research and technology news from the Center's Intelligent Transportation Systems (ITS) Institute

#### *Technology Exchange*

A quarterly newsletter from the Minnesota Local Technical Assistance Program (LTAP) featuring training and technical assistance news for local agency transportation professionals

#### *AirTAP Briefings*

A quarterly newsletter from the Airport Technical Assistance Program (AirTAP) featuring news and tools for personnel operating, maintaining, and administering Minnesota's public-use airports

To obtain these and other resources, please visit us online at [www.cts.umn.edu/publications](http://www.cts.umn.edu/publications) or contact the CTS Library at 612-626-1077.

### You've got mail!

CTS expanded its use of electronic communications this year. Approximately 4,600 people receive CTS electronic publications. In addition to the *CTS Research E-News* and *Freight & Logistics E-News* launched last year, CTS and its programs produced several new e-newsletters, including *LTAP Hot Topics*, and *Intersection Decision Support E-News*.

CTS also continues to send electronic announcements of all upcoming events and workshops.

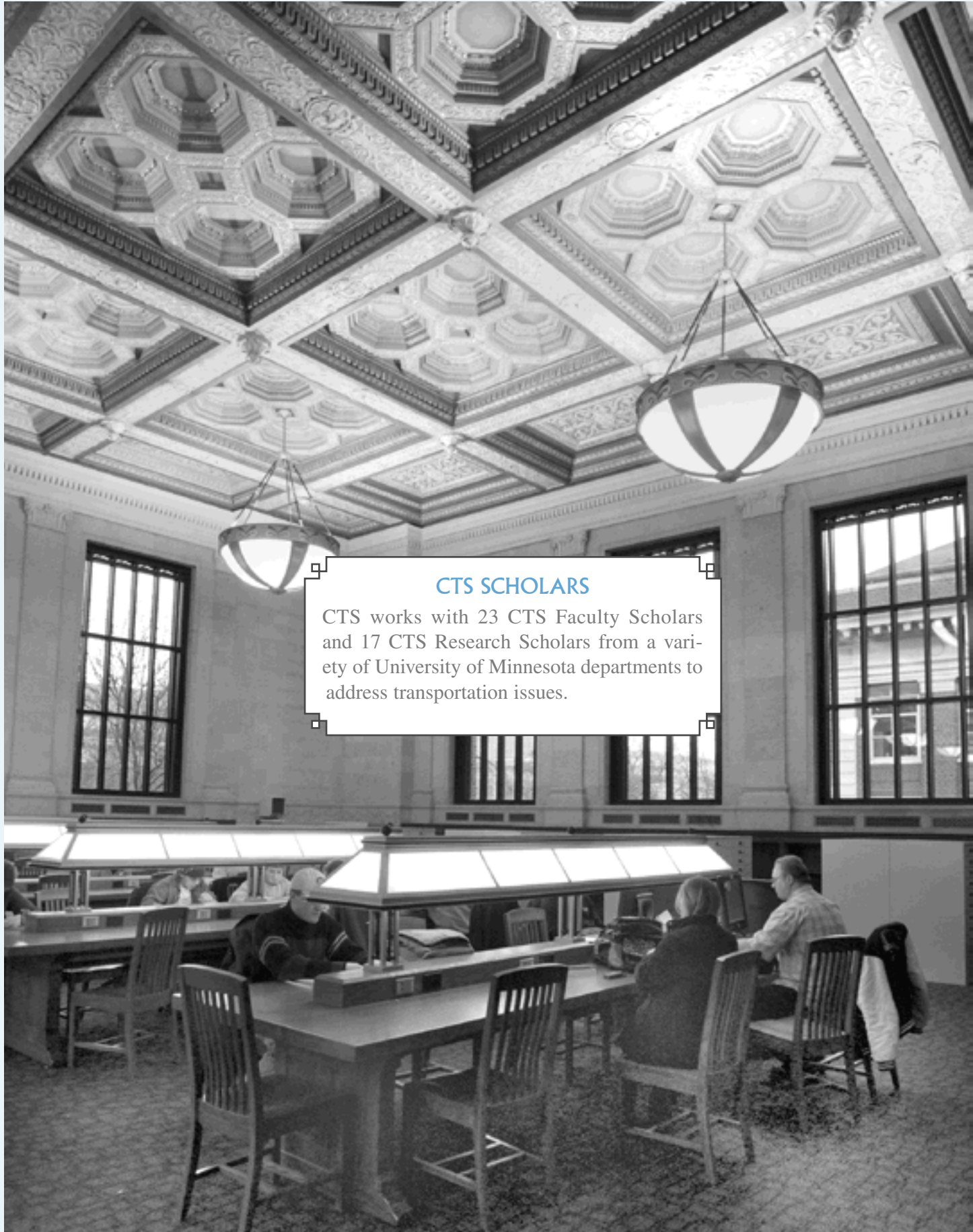
More information about *CTS Research E-News* and other CTS electronic publications, including a subscription order form, is available online at [www.cts.umn.edu/publications](http://www.cts.umn.edu/publications).



CTS AREA OF  
EXCELLENCE

UNIVERSITY EXPERTISE

*Strengthen the research and education expertise in transportation-related fields among the faculty and staff within the University*



**CTS SCHOLARS**

CTS works with 23 CTS Faculty Scholars and 17 CTS Research Scholars from a variety of University of Minnesota departments to address transportation issues.



## CTS Faculty and Research Scholars Program

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 two-year appointments may be renewed or rotated to other candidates.

Learn more about Faculty and Research Scholars at [www.cts.umn.edu/scholars](http://www.cts.umn.edu/scholars).

## 2004 Faculty and Research Scholars

### Transportation Planning & Policy



**John Adams**  
Professor and Chair,  
Geography



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



**Gary Barnes**  
Research Associate,  
Humphrey Institute of  
Public Affairs



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



**Frank Douma**  
Research Fellow,  
Humphrey Institute of  
Public Affairs



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



**Ann Forsyth**  
Professor and Director,  
Metropolitan Design  
Center



**Barbara VanDrasek**  
Research Associate,  
Geography



**Kevin Krizek**  
Assistant Professor,  
Humphrey Institute of  
Public Affairs



**Mary Vogel**  
Co-Director, Center for  
Changing Landscapes

### Traffic Engineering & Management



**Gary A. Davis**  
Associate Professor, Civil  
Engineering



**John Hourdakis**  
Research Fellow, Civil  
Engineering



**David Levinson**  
Assistant Professor, Civil  
Engineering



**Panos Michalopoulos**  
Professor, Civil  
Engineering

### Vehicle Design & Fuels



**Max Donath**  
Professor and Director,  
Intelligent Transportation  
Systems Institute



**David Kittelson**  
Frank B. Rowley  
Distinguished Professor of  
Mechanical Engineering



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

### Economics & Management



**Jerry E. Fruin**  
Associate Professor,  
Applied Economics

# UNIVERSITY EXPERTISE: Faculty and Research Scholars



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



**Alfred A. Marcus**  
Professor, Strategic  
Management and  
Organization, Carlson  
School of Management



**Gerard McCullough**  
Associate Professor,  
Applied Economics



**Barry Ryan**  
Research Fellow, Applied  
Economics

## Pavement Engineering



**Andrew Drescher**  
Shimizu Professor, Civil  
Engineering



**Lev Khazanovich**  
Associate Professor, Civil  
Engineering



**Erland Lukanen**  
Director, Pavement  
Research Institute



**Mihai Marasteanu**  
Assistant Professor, Civil  
Engineering

## Bridge Engineering



**Catherine French**  
Professor, Civil  
Engineering



**Jerome Hajjar**  
Associate Professor, Civil  
Engineering



**Steven A. Olson**  
Director, Multi-Axial  
Subassembly  
Testing System (MAST)  
Laboratory



**Carol Shield**  
Associate Professor, Civil  
Engineering

## Human Factors



**John Bloomfield**  
Research Associate,  
Architecture and  
Landscape Architecture



**Kathleen A. Harder**  
Research Associate,  
Architecture and  
Landscape Architecture



**Michael Manser**  
Research Associate,  
HumanFIRST Program,  
ITS Institute



**Nicholas Ward**  
Director, HumanFIRST  
Program, ITS Institute

## Data Systems



**Taek Kwon**  
Professor and Director,  
UMD Transportation Data  
Research Laboratory



**Osama Masoud**  
Research Associate,  
Computer Science and  
Engineering



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



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

## Environmental Impacts



**David Biesboer**  
Professor, Plant Biology



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

## UNIVERSITY EXPERTISE: Affiliated Researchers and Departments

### **Agronomy and Plant Genetics**

Nancy Ehlke  
Donald Wyse

### **Applied Economics**

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

### **Architecture and Landscape**

#### **Architecture**

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

### **Biosystems and Agricultural Engineering**

Jonathan Chaplin  
John Nieber  
Bruce Wilson\*

### **Carlson School of Management**

Fred Beier  
Alfred Marcus\*  
Mahmood Zaidi

### **Child Development**

Herbert Pick  
Albert Yonas

### **Civil Engineering**

Paul Bergson  
Gary Davis\*  
Robert Dexter  
Andrew Drescher\*  
Cathy French\*  
Ted Galambos  
John Gulliver  
Bojan Guzina  
Jerome Hajjar\*  
Miki Hondzo  
John Hourdakis\*  
Lev Khazanovich\*  
Joseph Labuz  
David Levinson\*  
Mihai Marasteanu\*  
Panos Michalopoulos\*  
Steve Olson\*  
Arturo Schultz  
Carol Shield\*  
Gene Skok  
Karl Smith

Henryk Stolarski  
Vaughan Voller

### **Computer Science and Engineering**

Vladimir Cherkassky  
Mats Heimadahl  
Ravi Janardan  
Osama Masoud\*  
Nikos Papanikolopoulos\*  
Shashi Shekhar\*  
Jim Slagle

### **Electrical and Computer Engineering**

Mohamed-Slim Alouini

### **Geography**

John Adams\*  
Francis Harvey  
Barbara VanDrasek\*

### **Horticultural Science**

Susan Galatowitsch

### **Humphrey Institute of Public Affairs**

Gary Barnes\*  
Richard Bolan  
Frank Douma\*  
Kevin Krizek\*  
Barbara Lukermann\*  
Lee Munnich\*

### **Kinesiology**

Thomas Smith  
Michael Wade

### **Law School**

Stephen Simon

### **Mechanical Engineering**

Lee Alexander  
Saifallah Benjaafar  
Pi-Ming Chen  
Janet Creaser  
Max Donath\*  
William Durfee  
Alec Gorjestani  
David Kittelson\*  
Michael Manser\*  
Rajesh Rajamani  
Mick Rakauskas  
Craig Shankwitz\*  
Patrick Starr  
Nic Ward\*

### **Metropolitan Design Center**

Ann Forsyth\*

### **Pavement Research Institute**

Erland Lukanen\*

### **Plant Biology**

David Biesboer\*  
Iris Charvat

### **Public Health**

Judith Garrard

### **St. Anthony Falls Library**

Jeff Marr  
Omid Mohseni

### **Soil, Water, and Climate**

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

### **Urban and Regional Affairs**

William Craig  
Thomas Scott\*

### **Wood and Paper Science**

Bob Seavey

### **University of Minnesota - Duluth**

#### **Computer Science**

Carolyn Crouch  
Richard Maclin

#### **Electrical and Computer Engineering**

Stan Burns  
Donald Crouch  
Mohammed Hasan  
Taek Kwon\*  
Jiann-Shiou Yang

#### **Industrial Engineering**

Ryan Rosandich  
David Wyrick

#### **Mathematics and Statistics**

Zhuangyi Liu  
Harlan Stech

#### **NRRI**

Brian Brashaw  
Lawrence Zanko

\* denotes CTS Faculty and Research Scholars

**Research reports published in FY04**

Many of these reports are available online at [www.cts.umn.edu/publications/reports](http://www.cts.umn.edu/publications/reports).

**Transportation and the Economy research**

Anderson, D. and McCullough, G., *On the Value of Minnesota's Road Network*, Mn/DOT 2004-16

Barnes, G., *Transportation-Related Impacts of Different Regional Land-Use Scenarios*, Mn/DOT 2004-03

Barnes, G. and Langworthy, P., *Increasing the Value of Public Involvement in Transportation Project Planning*, Mn/DOT 2004-20

Barnes, G. and Langworthy, P., *The Per-Mile Costs of Operating Automobiles and Trucks*, Mn/DOT 2003-19

Fruin, J., *Modal Shifts from the Mississippi River and Duluth/Superior to Land Transportation*, Mn/DOT 2004-28

Gartner, W., Limback, L., and Erkkila, D., *Transportation Barriers Affecting International Visitors to Minnesota*, Mn/DOT 2003-21

Gartner, W., Love, L., and Erkkila, D., *Attributes and Amenities of Minnesota's Highway System That Are Important to Tourists*, Mn/DOT 2003-22

Levinson, D., *If They Come, Will You Build It?* Mn/DOT 2003-37

Marcus, A., *ISO 9000's Effects on Accident Reduction in the U.S. Motor Carrier Industry*, Mn/DOT 2003-29

Munnich, L. and Barnes, G., *Minnesota Value Pricing Project*, Mn/DOT 2003-31

Munnich, L. and Douma, F., *Transportation Technologies for Sustainable Communities*, Mn/DOT 2002-26

Rose, D., *Power Plant Siting Decisions and Transport Implications*, CTS 03-09

Stinson, T. and Ryan, B., *Paying for Minnesota Low Volume Roads: A Tax Policy Assessment*, Mn/DOT 2004-04

**Transportation Safety and Traffic Flow research**

Carmody, J. and Harder, K., *The Effect of Centerline Treatments on Driving Performance*, Mn/DOT 2002-35

Davis, G., *Building Our Way Out of Congestion? Highway Capacity for Twin Cities*, Mn/DOT 2002-01

Donath, M., Shekhar, S., Cheng, P., and Ma, X., *A New Approach to Assessing Road User Charges: Evaluation of Core Technologies*, Mn/DOT 2003-38

Douma, F., Bolan, R., and Horan, T., *Telecommunications for Sustainable Transportation*, Mn/DOT 2004-10

Harder, K., *Evaluation Report Volume 1: System Performance and Human Factors Intelligent Vehicle Initiative Specialty Vehicle Field Operational Test*, Mn/DOT 2004-07

Harder, K., *Evaluation Report Volume 2: Benefit Analysis Intelligent Vehicle Initiative Specialty Vehicle Field Operational Test*, Mn/DOT 2004-08

Harder, K. and Bloomfield, J., *The Effectiveness and Safety of Traffic- and Non-Traffic-Related Messages Presented on Changeable Message Signs (CMS)*, Mn/DOT 2004-27

Harder, K. and Bloomfield, J., *The Effectiveness of Auditory Side- and Forward-Collision Avoidance Warnings on Snow Covered Roads in Conditions of Poor Visibility*, Mn/DOT 2003-14

Harder, K., Bloomfield, J., and Chihak, B., *Reducing Crashes at Controlled Rural Intersections*, Mn/DOT 2003-15

Kwon, E., *Development of Dynamic Route Clearance Strategies for Emergency Vehicle Operations, Phase I*, Mn/DOT 2003-27

Kwon, E., *Dynamic Estimation of Freeway Weaving Capacity for Traffic Management and Operations, Phase II*, Mn/DOT 2003-32

Papanikolopoulos, N., Masoud, O., and Wahlstrom, E., *Sensor-Based Ramp Monitoring*, Mn/DOT 2003-34

Shankwitz, C. and Donath, M., *Driver Assistive Systems for Snowplows*, Mn/DOT 2003-13

**Noteworthy accomplishments**

University computer science and engineering professor Nikos Papanikolopoulos was notified of a large grant award from the Department of Homeland Security to research monitoring of human activity in public spaces. Seed funding for the first phase of this research effort was provided by the ITS Institute.

CTS faculty scholar Barbara Lukermann received the prestigious 2004 American Planning Association award for distinguished leadership by a professional planner. Lukermann, a long-time researcher and instructor of planning and land-use policies at the Humphrey Institute, is now a fellow emeritus at the University's Center for Urban and Regional Affairs.



## UNIVERSITY EXPERTISE: Published Research Reports

Shankwitz, C., Donath, M., Preston, H., and Storm, R., *Review of Minnesota's Rural Intersection Crashes: Methodology for Identifying Intersections for Intersection Decision Support (IDS)*, Mn/DOT 2004-31

Shankwitz, C., Donath, M., Ward, N., and Rakauskas, M., *System Performance and Human Factors Evaluation of the Driving Assistive System (DAS)*, Mn/DOT 2004-09

Shankwitz, C., Donath, M., Ward, N., and Rakauskas, M., *System Performance and Human Factors Evaluation of the Driving Assistive System (DAS): Supplement Track Test Evaluation-IVI*, Mn/DOT 2004-12

Smith, T., *Effects of Vision Enhancement Systems (VES) on Older Drivers' Ability to Drive Safely at Night and in Inclement Weather*, Mn/DOT 2002-27

Wade, M., Hammond, C., and Kim, G., *Accident Analysis of Significant Crash Rates for Low to Very Low Volume Roadways in 10 Statewide Minnesota Counties*, Mn/DOT 2004-22

### Transportation Infrastructure research

Altay, A., Arabbo, D., Corwin, E., Dexter, R., and French, C., *Effects of Increasing Truck Weight on Steel and Prestressed Bridges*, Mn/DOT 2003-16

Marasteanu, M. and Clyne, T., *Evaluation of Asphalt Binders Used for Emulsions*, Mn/DOT 2003-24

Marasteanu, M. and Clyne, T., *Validation of Superpave Fine Aggregate Angularity Values*, Mn/DOT 2004-30

Marasteanu, M., Li, X., Clyne, T., Voller, V., Timm, D., Newcomb, D., and Chadbourne, B., *Low Temperature Cracking of Asphalt Concrete Pavement*, Mn/DOT 2004-23

Shield, C. and Hajjar, J., *Repair of Fatigued Steel Bridge Girders with Carbon Fiber Strips*, Mn/DOT 2004-02

Shield, C., French, C., and Baran, E., *Effects of Vertical Pre-Release Cracks on Prestressed Concrete Bridge Girders*, Mn/DOT 2003-33

Skok, E., *INV 772: Special Practices for Design and Construction of Subgrades in Poor, Wet, and/or Saturated Soil Conditions*, Mn/DOT 2003-36

Snyder, M. and Embacher, R., *Refinement and Validation of the Hydraulic Fracture Test*, Mn/DOT 2003-28

Voller, V., *Designing Pavement Drainage Systems: The MnDRAIN Software*, Mn/DOT 2003-17

Youngberg, C., Dexter, R., and Bergson, P., *Fatigue Evaluation of Bridge 69832*, Mn/DOT 2003-18

Zanko, L., Niles, H., and Oreskovich, J., *Properties and Aggregate Potential of Coarse Taconite Tailings: an Evaluation of Five Minnesota Taconite Operations*, Mn/DOT 2004-06

### Transportation Planning and the Environment research

Baker, J. and Wang, L., *Mn/ROAD TDR Evaluation and Data Analysis*, Mn/DOT 2004-15

Biesboer, D., *Improving the Design of Roadside Ditches to Decrease Transportation Related Surface Water Pollution*, Mn/DOT 2004-11

Charvat, I. and Heberger, J., *The Effects of Fire Versus Mowing on Prairie Plant Communities*, Mn/DOT 2003-20

Hondzo, M., *Laboratory Measurements of Stormwater Quality Improvement in Detention Ponds*, Mn/DOT 2004-21

Neckar, L., *Station Urban Design Issues: Red Rock Commuter Rail*, CTS 03-07

Neckar, L., Pettinari, J., and Vogel, M., *St. Paul Central Corridor Study: Pierce Butler Industrial Redevelopment Parkway*, CTS 03-08

### Pavement Research Institute



In 2004, CTS established the Pavement Research Institute (PRI) steering committee to define the Institute's vision

and mission, develop and implement a strategic plan, and help set directions for the Institute.

CTS associate director Laurie McGinnis serves as PRI steering committee chair (*for a complete list of members, see page 38*). PRI will develop and coordinate pavement research activities with

the University, the Minnesota Department of Transportation (Mn/DOT), and other funding organizations.

In December 2003, Erland O. Lukanen, P.E., was selected to direct the new institute. CTS and the University of Minnesota's Department of Civil Engineering, along with Mn/DOT and the Minnesota Local Road Research Board (LRRB), established PRI in early 2003.

## CTS Executive Committee



Chair: **Richard T. Murphy Jr.**,  
President, Murphy  
Warehouse Company



**Duane Crandall**,  
Consultant (ret. CEO  
of AAA Minnesota/  
Iowa)



**Mary Hill Smith**,  
District #3 Member,  
Metropolitan Council



Lt. Gov. **Carol Molnau**, Mn/DOT  
Commissioner



**John Anderson**,  
Associate Dean,  
Carlson School of  
Management



**Steve Crouch**,  
Associate Dean,  
Institute of  
Technology, University  
of Minnesota



**Dean Johnson**,  
Minnesota State  
Senator



**Al Steger**,  
Minneapolis Division  
Administrator,  
Federal Highway  
Administration\*



**Terri Barreiro**, Vice  
President, Greater  
Twin Cities United  
Way\*



**Douglas Differt**,  
Mn/DOT Deputy  
Commissioner



**Robert Jones**,  
Senior Vice President,  
System Administration,  
University of  
Minnesota



**Richard Thomas**,  
Director of  
Government  
Relations, Ames  
Construction



**Anne Beers**, Chief  
of Minnesota State  
Patrol, Department of  
Public Safety



**Ron Erhardt**,  
Minnesota House of  
Representatives



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



**Tom Weaver**,  
Regional  
Administrator,  
Metropolitan Council



**Tom Chaffin**, Vice  
President, Traffic  
Control Division, 3M



**Jeff Hamiel**,  
Executive Director,  
Metropolitan Airports  
Commission



**Colleen Landkamer**,  
Blue Earth County  
Commissioner



**Donn Wiski**, Chair,  
Metropolitan Council  
Transportation  
Advisory Board



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



**John Hausladen**,  
President and CEO,  
Minnesota Trucking  
Association



**Keith Langseth**,  
Minnesota State  
Senator



**Charleen Zimmer**,  
President, ZAN  
Associates

\* Completed service in 2004

## CTS Board of Advisors

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Partnership Inc.

**John Brandl**, Humphrey Institute of Public  
Affairs, University of Minnesota

**Richard Braun**, Former CTS Director

**Gerry Brown**, Cargo Carriers Inc.

**Carol Bufton**, Minnesota Safety Council Inc.

**Lyndon Carlson**, Minnesota House of  
Representatives

**Ed Cohoon**

**Jim Denn**, Former Mn/DOT Commissioner

**Natalio Diaz**, Metropolitan Council

**Gary Eikaas**, Dedicated Logistics, Inc.

**Peter Fausch**, SRF Consulting Group, Inc.

**Carol Flynn**, Former Minnesota State  
Senator

**David Fricke**, Minnesota Association of  
Townships

**Bill Goins**, Federal Express

**John Gulliver**, Department of Civil  
Engineering, University of Minnesota

**Curt Johnson**, Citistates

**Pat Kumar**, Institute of Technology,  
University of Minnesota

**Brian Lamb**, Metro Transit

**Ronald Lifson**, LDI Fibres Inc.

**Barbara Lukermann**, Humphrey Institute of  
Public Affairs, University of Minnesota

**Vince Magnuson**, University of Minnesota  
Duluth

**Jim Newland**

**Elliot Perovich**, Anoka County

**John Rodeberg**, City of Hutchinson

**Bob Sands**, Edwards and Kelsey

**G. Edward Schuh**, Humphrey Institute of  
Public Affairs, University of Minnesota

**Thomas Scott**, Center for Urban and  
Regional Affairs, University of Minnesota

**Michael Sheehan**, Olmsted County

**Chuck Siggerud**, SEH

**Jim Solem**

**Elwyn Tinklenberg**, The Tinklenberg Group

**Sandra Vargas**, Hennepin County

**Douglas Weiszhaar**, WSB & Associates Inc.

**Phil Wheeler**, Rochester/Olmsted Planning

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

*Note: Listings are current as of September 2004.*

## CTS Councils and Advisory Committees

### Council Coordinating Committee

Chair: Charleen Zimmer, ZAN Associates  
 Bernard Arseneau, Mn/DOT  
 Ken Buckeye, Mn/DOT  
 George Cochran, Mn/DOT (ret.)  
 Ann Johnson, Professional Engineering Services  
 Connie Kozlak, Metropolitan Council

### Transportation and the Economy Council

Chair: Ken Buckeye, Mn/DOT  
 John Adams, Geography, University of Minnesota  
 Stephen Alderson, HNTB  
 Rabinder Bains, Mn/DOT  
 Gary Barnes, Humphrey Institute of Public Affairs, University of Minnesota  
 Robert Benke, Community Resource Partnership Inc.  
 Mark Berndt, Wilbur Smith Associates  
 David Braslau, David Braslau Associates  
 Dave Christianson, Metropolitan Council  
 William Craig, Center for Urban and Regional Affairs, University of Minnesota  
 Norman Foster, Minnesota Department of Finance  
 Jerry Fruin, Applied Economics, University of Minnesota  
 Robert Gale, Mn/DOT  
 William Gardner, Mn/DOT  
 Kate Garwood, Anoka County Highway Department  
 Donald V. Harper, Carlson School of Management, University of Minnesota (ret.)  
 Jody Hauer, Office of Legislative Auditor\*  
 David Levinson, Civil Engineering, University of Minnesota  
 Carol Lovro, Association of Minnesota Counties  
 Jerry Nagel, Northern Great Plains Inc.  
 Betsy Parker, Mn/DOT  
 Perry Plank (ret.)  
 Raymond Rought, Mn/DOT  
 Charles Sanft, Mn/DOT  
 Eric Willette, League of Minnesota Cities  
 \* Completed term as chair in 2004

### Transportation Safety and Traffic Flow Council

Chair: Bernard Arseneau, Mn/DOT  
 Dharam Bobra, Hennepin County  
 David Burns, 3M  
 Gary Davis, Civil Engineering, University of Minnesota  
 Max Donath, ITS Institute  
 Rob Ege, Mn/DOT  
 Dave Kopacz, FHWA  
 Richard Larson, Mille Lacs County  
 James McCarthy, Federal Highway Administration  
 Panos Michalopoulos, Civil Engineering, University of Minnesota  
 Durga Panda, Image Sensing Systems, Inc  
 Nikos Papanikolopoulos, Computer Science and Engineering, University of Minnesota  
 Howard Preston, CH2M Hill  
 Steve Ruegg, PB Consult Inc.  
 Robert Sands, Edwards and Kelsey  
 Brian Scott, SRF  
 Shashi Shekhar, Computer Science and Engineering, University of Minnesota  
 Al Smith, Minnesota State Patrol  
 Kathryn Swanson, Minnesota Department of Public Safety/Traffic  
 Linda Taylor, Mn/DOT  
 Michael Wade, Kinesiology, University of Minnesota  
 Nic Ward, HumanFIRST Program, University of Minnesota

### Transportation Infrastructure Council

Chair: George Cochran, Mn/DOT (ret.)  
 Ron Bray, WSB & Associates  
 Robert Dexter, Civil Engineering, University of Minnesota  
 Dan Dorgan, Mn/DOT  
 Andrew Drescher, Civil Engineering, University of Minnesota  
 Glenn Engstrom, Mn/DOT  
 Donald Flemming, URS/BRW Inc.  
 Alan Forsberg, Blue Earth County  
 Catherine French, Civil Engineering, University of Minnesota  
 Theodore Galambos, Civil Engineering, University of Minnesota  
 Jim Grube, Hennepin County  
 Bojan Guzina, Civil Engineering, University of Minnesota  
 Jerome Hajjar, Civil Engineering, University of Minnesota  
 Patrick Hughes, Mn/DOT  
 Dave Johnson, Mn/DOT  
 Joe Labuz, Civil Engineering, University of Minnesota  
 Sue Lodahl, Mn/DOT  
 Mihai Marasteanu, Civil Engineering, University of Minnesota  
 Mike Marti, SRF Consulting  
 Linda Pieper, Things With a Twist, Inc.  
 Robin Schroeder, FHWA  
 Arturo Schultz, Civil Engineering, University of Minnesota  
 Keith Shannon, Mn/DOT  
 Michael Sheehan, Olmsted County  
 Carol Shield, Civil Engineering, University of Minnesota  
 Gene Skok, Civil Engineering, University of Minnesota  
 Mark Snyder, Concrete Paving Association of Minnesota  
 Curt Turgeon, Mn/DOT  
 Vaughan Voller, Civil Engineering, University of Minnesota  
 Richard Wolters, Minnesota Asphalt Pavement Association

### Transportation Planning and the Environment Council

Chair: Connie Kozlak, Metropolitan Council  
 John S. Adams, Geography, University of Minnesota  
 Darryl Anderson, Mn/DOT  
 David Biesboer, Plant Biology, University of Minnesota  
 John Carmody, Architecture and Landscape Architecture, University of Minnesota  
 Fred Dock, Meyer, Mohaddes Associates, Inc.  
 Dick Elasky, Mn/DOT  
 John Gulliver, Civil Engineering, University of Minnesota  
 Chris Hiniker, SEH  
 David Kittelson, Mechanical Engineering, University of Minnesota  
 Kevin Krizek, Humphrey Institute of Public Affairs, University of Minnesota  
 Susan Moe, Federal Highway Administration  
 Steve Morris, Ramsey County Regional Railroad Authority  
 Lance Neckar, Landscape Architecture, University of Minnesota  
 Ann Perry, Resource Strategies Corporation  
 Peter Raynor, Environmental Health and Safety, University of Minnesota  
 Peggy Reichert, Mn/DOT  
 Robert Sykes, Landscape Architecture, University of Minnesota  
 Mary Vogel, Landscape Architecture, University of Minnesota

### Education/Outreach Council

Chair: Ann Johnson, Professional Engineering Services, Ltd.  
 Jerry Baldwin, Mn/DOT  
 James Benshoof, Benshoof and Associates  
 Trisha Collopy, Civil Engineering, University of Minnesota  
 Dave Daubert, Search Engineering, Inc.  
 Gary Davis, Civil Engineering, University of Minnesota  
 Jan Ekern, Mn/DOT  
 John Gulliver, Civil Engineering, University of Minnesota  
 Maria Hagen, City of St. Louis Park

Mike Marti, SRF Consulting  
 Sandy McCully, Mn/DOT  
 Clark Moe, Mn/DOT  
 Catherine Ploetz, College of Continuing Education, University of Minnesota  
 Micky Ruiz, Mn/DOT (ret.)  
 Daniel Wegman, Koch Materials Company

### ITS Institute Board

Chair: Robert Johns, CTS  
 Mike Asleson, Minnesota State Patrol  
 Rebecca Brewster, American Transportation Research Institute  
 Ted Davis, IT Administration, University of Minnesota  
 Randy Halvorson, Mn/DOT  
 Mark Hoisser, DARTS  
 Dave Johnson, Mn/DOT\*  
 Anthony Kane, AASHTO  
 Vince Magnuson, University of Minnesota Duluth  
 Marthand Nookala, Mn/DOT  
 Richard Rovang, Metro Transit  
 Rich Sanders, Polk County  
 Barbara Sisson, Federal Transit Administration  
 Al Steger, Federal Highway Administration  
 Anthony Strauss, University of Minnesota  
 Kathryn Swanson, Minnesota Department of Public Safety  
 Don Theisen, Washington County  
 Toni Wilbur, Federal Highway Administration  
 Bob Winter, Mn/DOT  
 \* Completed service during 2004

### Pavement Research Institute Steering Committee

Chair: Laurie McGinnis, CTS  
 John Gulliver, Civil Engineering, University of Minnesota  
 Maria Hagen, City of St. Louis Park  
 Robert Johns, CTS  
 Dave Johnson, Mn/DOT

*Note: Listings are current as of September 2004.*

## College of Continuing Education staff partners

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

Lori Graven  
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 twashing@cce.umn.edu

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 Principal Administrative Specialist  
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 smueffel@cce.umn.edu

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 Joe Labuz, Civil Engineering, University of Minnesota  
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