



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

February 2012

U of M startup uses mobile app to monitor and coach teen driving skills

Some 16.5 million drivers are involved in traffic crashes in the United States each year, and more than 12 percent of them are under the age of 20—despite the fact that teenage drivers constitute less than 5 percent of the total driving population, according to the U.S. Census Bureau. Using research from the University of Minnesota, Drive Power LLC aims to change those statistics by introducing DriveScribe, a mobile app that encourages safe driving habits and provides real-time coaching to novice drivers.

"For the first time, the same technology that has significantly increased the prevalence of distracted driving will be used to reduce



Alec Gorjestani

distractions and promote safe driving behaviors," said **William England**, founder and CEO of Drive Power. "DriveScribe provides a ... practical, engaging, and ultimately effective solution to combat distracted driving as well as provide assistance to novice drivers."

Developed by U of M mechanical engineering department researchers **Alec Gorjestani**, **Arvind Menon**, **Eddie Arpin**, **Craig Shankwitz**, **Janet Creaser**, **Michael Manser**, and **Max Donath**, the technology combines several functions to promote safe driving. It provides real-time feedback to the driver; blocks calls, e-mails, and text messages while the vehicle is in operation; notifies parents in real time when traffic violations occur; and logs driving activity to the DriveScribe web portal for later review.

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Freight and Logistics Symposium: The Impacts of Economic Change

The global economic downturn is radically and rapidly reshaping transportation priorities and needs. During the 15th Annual Freight and Logistics Symposium on December 2, representatives from the business, academic, and public sectors gathered to discuss the effects of economic change on freight and logistics providers.

Gina Baas (CTS assistant director), **Laurie McGinnis** (CTS director), **Brad Emch** (Council of Supply Chain Management Professionals president), and **Ron Have** (Minnesota Freight Advisory Committee president) provided the opening remarks.

In the symposium's first session, **Christopher Caplice**, executive director of the Center for Transportation and Logistics at



Christopher Caplice

the Massachusetts Institute of Technology, discussed his work on the Future Freight Flows (FFF) project. The initiative, launched as part of National Cooperative Highway Research Program Project 20-83(01), is primarily concerned with improving the way freight infrastructure investments are made.

The FFF project uses scenario planning to overcome the challenges associated with long-term planning of complex projects involving many stakeholders. Rather than trying to predict the state of the world 30 or more years in the future, scenario planning allows planners to prepare for a range of futures and compare strategies and investments across a variety of possible outcomes. "We can't solve for all possible futures, so we create a handful of plausible, alternative futures to work with that together contain the most relevant uncertainty dimensions," Caplice explained.

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MBUF task force publishes report

A task force charged with considering the implications of implementing a mileage-based user fee (MBUF) delivered its report to the Minnesota Department of Transportation (MnDOT) in December. The report says such a fee could be fair and flexible, but should not be implemented until concerns are satisfactorily addressed.

The report cites several issues for MnDOT to address, including privacy, administrative cost, complexity, phasing, and unfamiliarity with the concept among policymakers and the public.

The task force was appointed by MnDOT commissioner **Tom Sorel** in April 2011. The findings, along with information from technology research under way, "will provide policymakers with information needed to address future transportation funding issues," he said.

"We need a fair and flexible transportation funding system, and the current gas tax fails on both fronts," said **Bernie Lieder**, chair of the task force and former chair of the Minnesota House Transportation Finance and Policy Division. "The task force supports alternatively fueled vehicles, but feels all drivers should pay to support the transportation system they use."

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The scenarios themselves do not have to be accurate, he pointed out, since trying to predict actual events is not the goal. "We want to build the skill of preparing, not predicting. Many different events could have the same effect, so instead of forecasting each specific event, scenario planning prepares for effects...With regard to freight flows, this means planning for impacts to sourcing patterns, flow destination, routing, flow volume, and value density."

Overall, the FFF initiative is changing the way organizations think about long-term planning, Caplice reported. For more information on this initiative, visit <http://ctf.mit.edu/research/futurefreightflows>.

The symposium then turned to a discussion of issues such as technology and post-recession capacity—and implications for Minnesota—by four panelists:

- **Wil Kratz**, Vice President of Operations, Logistics Planning Service
- **Judy Mitchell**, Director, Passenger Rail Strategic Initiatives, Canadian Pacific Railway
- **Todd Feltes**, Transportation Manager, Malt-O-Meal
- **Chip Smith**, COO, Bay and Bay Transportation

"Whether they are shipping across town or globally," Kratz began, "shippers want to see where their products are and know they are safe. RFID (radio-frequency identification) tracking systems can facilitate this, but they cost money. As technology evolves and costs come down, I foresee RFID, and other related technologies, providing increased product visibility to shippers."

Automated warehousing is another example of changing technology, Feltes said. "What was once done by a person is now done by computerized equipment. This costs billions of dollars of investments over time. How we automate activities will keep evolving, as will consumer requirements."

Mitchell discussed some of the latest technology Canadian Pacific (CP)

Railroad is deploying, such as positive train control and automated track inspection.

Regarding capacity, Mitchell reported that throughout the recession, the freight railroad industry has continued making investments. She also predicted that "we'll see the fuel efficiency of railroads and [their] lower carbon footprint attracting more and more business to rail."

Kratz said the biggest capacity issue is driver recruitment. New regulations have narrowed the pool of available drivers, and other industries, like the booming oil business in western North Dakota, are attracting drivers. Smith agreed, adding that his company uses various recruitment methods including social networking avenues like Twitter and Facebook. "We've even gone to banging on cab doors at truck stops," he said.

The second panel focused on the intersection of transportation and economic development. Panelists were:

- **Steve Elmer**, Planning Analyst, Metropolitan Council
- **Dan Dorman**, Executive Director, Albert Lea Economic Development Agency

• **Vann Cunningham**, Assistant Vice President of Economic Development, Burlington Northern Santa Fe
Elmer described the work of the Metropolitan Area Freight Study, a joint effort between the Metropolitan Council and the Minnesota Department of Transportation (MnDOT). "Our goal is to better understand metro freight movements and how best to reflect that knowledge in future plans and programmed improvements," he said. "One of the main reasons we're conducting this study now is that the metro region is geographically in the center of the state and therefore at the center of many freight issues that have



Wil Kratz



Judy Mitchell



Todd Feltes



Chip Smith



Steve Elmer



Dan Dorman



Vann Cunningham

statewide significance."

Dorman said communities need to understand transportation's role to succeed in economic development. "It's one of the most important things companies look at when determining where to locate a plant or transportation hub," he explained.

Cunningham said the Twin Cities is an important hub for BNSF. "The Twin Cities is a major gateway for moving the increasing amounts of Bakken Shale crude oil coming out of North Dakota as well as moving taconite, paper, and corn," he said. "We completed 150 rail projects through the end of October 2011...In the past, 50 or 60 projects a year was typical. This tremendous growth is very quickly creating demand for the Twin Cities."

The event was sponsored by CTS in cooperation with MnDOT, the Minnesota Freight Advisory Committee, the Council of Supply Chain Management Professionals—Twin Cities Roundtable, the Metropolitan Council, and the Transportation Club.

Presentations are available online, and a proceedings will be published this month. To receive a copy, call CTS at 612-626-1077 or visit the CTS Publications page.

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Research reports available

The enclosed insert lists research reports written by University researchers and published by CTS, MnDOT, the Minnesota Local Road Research Board, and other sponsors from August through December 2011. **CTS**

University of Minnesota has strong presence at TRB annual meeting

University of Minnesota researchers presented papers and posters on topics ranging from public-private partnerships to pavement design at the annual meeting of the Transportation Research Board in Washington, D.C., in January. Participants included:

- Department of Civil Engineering:
Gary Davis, John Houdos, Mike Iacono, Lev Khazanovich, David Levinson, Chen-Fu Liao, Henry Liu, Mihai Marasteanu, Vaughan Voller
- Department of Civil Engineering, U of M Duluth (UMD): **Eil Kwon**
- Department of Electrical and Computer Engineering, UMD:
M. Imran Hayee
- Department of Forest Resources:
Ingrid Schneider
- Department of Mechanical Engineering: **Janet Creaser, Christopher Edwards**
- Hubert H. Humphrey School of Public Affairs: **Xinyu (Jason) Cao, Frank Douma, Yingling Fan, Andrew Guthrie, Adeel Lari, Greg Lindsey, Lee Munnich, Carissa Schively Slotterback, Kate Lang Yang, Cindy Zerger**

A complete list of University of Minnesota presenters is available at www.cts.umn.edu/News.

Also at the TRB meeting, CTS director **Laurie McGinnis** presided over the meeting of the Research and Education Section Executive Board as well as the National Research Frameworks, Part 2: Town Hall Meeting. She also gave an update on the EUTRAIN (European Transport Research Area International Cooperation) project at the Conduct of Research Committee. She is a participant in EUTRAIN, a two-year project funded by the European Commission to develop a framework for international collaboration in transportation research.

At a ceremony held in conjunction with the TRB meeting, USDOT officials presented a certificate to this year's Intelligent Transportation Systems (ITS) Institute outstanding student of the year: **Brian Davis**. Each year, the Institute selects one graduate student for the award, which is sponsored by the U.S. Department of Transportation's Research and Innovative Technology Administration.

Davis is a master's degree candidate in mechanical engineering (ME), advised by Institute director **Max Donath**. His thesis research—**Aggregating VMT Within Predefined Geographic Zones Using a Cellular Network**—is part of an ITS Institute-sponsored project investigating a system to charge drivers by miles rather than fuel use. Davis also served as a teaching assistant for an ME robotics class for two years.

In addition, CTS and the ITS Institute funded the following students to attend the TRB meeting: **Carlos Carrion, Indrajit Chatterjee, Qian Chen, Xuan Di, Augusto Cannone Falchetto, Kyle Hoegh, Heng Hu, Arthur Huang, Umair Ibrahim, Saif Jabbari, Rita Lederle, Matt Schmidt, Panagiotis Stanitsas, Jie Sun, Derek Tompkins, Mary Vancura, Xize Wang, Hui Xiong, Jianfeng Zheng**. **CTS**



Brian Davis

CTS Faculty Scholars receive recognition

The Office of the Vice President for Research announced that **Yingling Fan**, a CTS Faculty Scholar, is one of six recipients of this year's McKnight Land-Grant Professorships. Through this program, the University of Minnesota recognizes and rewards its most promising junior faculty. Recipients are honored with the title McKnight Land-Grant Professor, which they hold for two years. The award consists of a research grant in each of two years and a research leave in the second year (or a supplementary grant).

The winners were chosen for their potential for important contribution to their field; the degree to which their achievements and ideas demonstrate



Yingling Fan

originality, imagination, and innovation; the significance of their research; and the potential for attracting outstanding students.

Fan is an assistant professor in the Hubert H. Humphrey School of Public Affairs. Her research focuses on social and health aspects of land use and transportation planning. In one of her current projects, Fan is leading a team that is exploring the potential of transitways for promoting regional competitiveness, social equity, and integrated land-use and transit planning. (The project is funded by the Surdna Foundation, McKnight Foundation, and Jay and Rose Phillips Family Foundation of Minnesota.)

Another CTS Faculty Scholar—**Saif Benjaafar**, a 2011 Distinguished McKnight University Professor—was

profiled on the University's "Research People, Process, Practice" website this month. Benjaafar is an internationally renowned leader in the field of supply chain management. A mechanical engineering professor until recently, Benjaafar spent the past decade establishing the Industrial and Systems Engineering program. Since its launch three years ago, the program has attracted a growing population of students and faculty. His McKnight grant helps him support more students, offer multiyear research positions, and pursue longer-term projects. **CTS**



Saif Benjaafar

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"We're trying to help teens become better drivers, sooner," said Gorjestani, who also serves as Drive Power's vice president for technology. "The crash rate for new drivers is very high, especially in the first six months of driving, so we decided to do something about it."

Social comparisons, points, and rewards for safe driving and a sophisticated scoring system to quantify the attributes of safe driving (referred to as the Safe Driver Score) are the major features Drive Power is incorporating into DriveScribe on top of what was built at the University in preparation for the application's public release in the spring of this year. DriveScribe is not only for teen drivers and their parents, but eventually for senior drivers, commercial vehicle fleets, and insurance companies.

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All of the 25-member task force endorsed the report, which included a minority opinion to express viewpoints not shared by the majority of members. The task force report with minority opinion is online at www.dot.state.mn.us/mileagebaseduserfee/index.html.

The technology behind DriveScribe was licensed exclusively to Drive Power by the University of Minnesota's Office for Technology Commercialization. The research was funded by the Minnesota Department of Transportation and the Intelligent Transportation Systems (ITS) Institute, which is part of CTS.

More information:

- DriveScribe Mobile App: www.drivescribe.com
- Drive Power corporate: www.drvpwr.com
- Intelligent Vehicles Laboratory: www.ivlab.umn.edu
- HumanFIRST program: www.humanfirst.umn.edu **CTS**

Reminder: CTS continues job posting services

CTS continues to be a resource for employers and job hunters. Employers may submit job opportunities using an online form at www.cts.umn.edu

/Education/Careers/JobPostings or e-mail their ads to cts@umn.edu. There is no charge for the service.

Jobs are posted on the CTS website and to the CTS LinkedIn group at www.linkedin.com/groups?gid=2316997&trk=hbside_g. **CTS**

Save the date: 23rd annual research conference May 23–24

This year's CTS Transportation Research Conference returns to the Saint Paul RiverCentre. The March *CTS Report* will include details about the opening plenary session and the luncheon presentation. Also look for the conference brochure in your mailboxes in March. **CTS**

Upcoming events *To see other events or publicize yours, visit www.cts.umn.edu/Events.*

Feb. 24	University of Minnesota 60th Annual Geotechnical Engineering Conference, St. Paul, Minn. See www.mngeotechnicalsociety.com .	March 14	ITS Minnesota 18th Annual Meeting & Information Exchange, St. Paul. See www.itsmn.org .
Feb. 28	Transportation Career Expo, Minneapolis, Minn. See www.cts.umn.edu/Events/CareerExpo .	Apr. 10	Minnesota Roadway Maintenance Training and Demo Day (formerly the Spring Maintenance Training Expo), St. Paul. See www.mnltap.umn.edu/training/roadway .
March 6	56th Annual Asphalt Contractors' Workshop/Quality Initiative Workshop, Brooklyn Center, Minn. See info@mnapa.org .	Apr. 25–27	38th Annual Minnesota Alcohol Traffic Safety Association Conference, St. Cloud, Minn. See www.matsa.us .
March 8–9	Concrete Paving Association of Minnesota 51st Annual Concrete Paving Workshop, Mankato, Minn. See www.concreteisbetter.com .	May 23–24	23rd Annual CTS Transportation Research Conference, Saint Paul RiverCentre. See www.cts.umn.edu/Events .
		Sept. 6–7	Mid-Continent Transportation Research Forum, Madison, Wis. See www.wistrans.org/mrutc/events/2012-midcon . CTS