A new book by Professor David Levinson, RP Braun/CTS Chair in the U of M’s Department of Civil, Environmental, and Geo-Engineering, is now available on Amazon.

In *The End of Traffic and the Future of Transport*, Levinson and co-author Kevin J. Krizek at the University of Colorado Boulder propose that traffic—as most people have come to know it—is ending and explain why.

“In this book we unfold a framework to think more broadly about concepts of transport and accessibility,” Levinson says. “In this framework, transport systems are being augmented with a range of information technologies; it invokes fresh flows of goods and information. We
Being able to accurately and reliably estimate traffic conditions during snow events is critical to transportation agencies. Typically, state DOTs use measurements such as “time to bare pavement”—based on the visual inspection of plow drivers—to gauge the progress of snow operations. These estimates are limited, however, by the subjectivity and inconsistency of human-based measurements.

Now, new research sponsored by the Minnesota Department of Transportation (MnDOT) and led by University of Minnesota Duluth civil engineering professor Eil Kwon aims to take the guesswork out of assessing traffic conditions during winter weather events.

“Dr. Kwon’s research on a new approach to snow and ice performance reporting is exciting,” says Steve Lund, state maintenance engineer and director of the Office of Maintenance at MnDOT. “For quite a few years, MnDOT snowfighters have been reporting their performance through a visual review of the roadway conditions. Our snowfighters have a tough job—automating the performance reporting will remove that task from their duties. Also, looking at traffic returning to a ‘normal’ condition is truly the ultimate goal or outcome measure, and where we want to go.”

In the first phase of this project, researchers developed a prototype process that uses data on traffic speed, flow, and density collected by loop detectors in the Twin Cities metro area to estimate the point at which traffic patterns return to normal—an indicator that the roadway surface has “recovered.”

In the newly published second phase, researchers further analyzed the traffic flow patterns during snow events under normal and snow conditions and refined the earlier prototype into a traffic-data-based measurement process for snow operations.

“We found that by comparing the variation patterns in traffic flow during a snow event with those during normal weather conditions, we could successfully identify the recovery status of the traffic flow at a given location,” Kwon says.

Based on their findings, the researchers developed a new process to identify the Normal Condition Regain Time (NCRT)—as an alternative to the traditional “time to bare pavement” measurement used to gauge the progress of maintenance operations during a winter weather event.

One advantage of the new process is that it can reflect how road surface conditions affect traffic flow differently during day and night periods. “Nighttime traffic flow patterns are substantially different from those during daytime periods,” Kwon says. “We identified normal traffic patterns separately for daytime and nighttime conditions to account for these differences in estimating the recovery status.”

Future research plans include the development of an operational version of the NCRT estimation system that can be used on a daily basis to analyze and improve snow operations, and the creation of an online version that can be used for coordinating snow operations in real time.

“There is a lot of potential to use these findings to make snow operations even more effective and efficient,” Kwon says. “For example, the analysis of the relationship between the NCRT measures and operational strategies such as plowing start time and methods could help further refine MnDOT’s winter maintenance strategies.”
Program puts students to work finding transportation solutions

Hundreds of U of M students will gain real-world experience while helping Carver County meet its sustainability goals under this year’s Resilient Communities Project (RCP).

RCP is an initiative supported by the U’s Center for Urban and Regional Affairs (CURA) that organizes yearlong partnerships between the University and Minnesota communities, matching graduate and undergraduate students to sustainability-related projects identified by the chosen community.

“Carver County and its partners are very pleased to be selected for this partnership with the University of Minnesota,” says Carver County board chair Randy Maluchnik. “The county’s proposal leverages long-standing relationships between partner agencies and communities in Carver County to address diverse challenges that result from the growth we are experiencing. The results University of Minnesota students will produce through this partnership will benefit our community for years to come.”

Each academic year, RCP chooses a city or county partner through a competitive request-for-proposal process. The program’s goal is to provide the community with efficient access to the resources and expertise of the University, offer students a professional opportunity to apply their knowledge and skills to a real-world project, and provide faculty with ready-made applied-learning opportunities for the classroom.

This year’s partnership with Carver County will include participation by three cities, the county community development agency, the school district, and the regional transit provider. More than 30 community-identified projects will be matched with dozens of courses and about 450 students across a range of academic disciplines, from architecture, planning, and engineering to business, environmental sciences, and the humanities.

Transportation-related projects will include enhancing bike and pedestrian facilities near park-and-ride locations, developing a bicycle and pedestrian traffic count program, and creating safe routes to schools. Several CTS Scholars are involved: Carissa Slotterback (Humphrey School of Public Affairs) is the RCP faculty advisor, and David Levinson (Department of Civil, Environmental, and Geo-Engineering) and Greg Lindsey (Humphrey School) are incorporating the program and the projects into their courses.

“All of the work is happening in close collaboration with our community partner staff and often engages other community stakeholders,” says Mike Greco, RCP director. “This engagement helps ensure that work produced is relevant and has the potential to inform community decisions in the future. For example, one of the projects we did with our first partner, the City of Minnetonka, was about stormwater management. The students’ work influenced the city to reexamine its street sweeping program to improve water quality.”

The program previously has partnered with Minnetonka, North St. Paul, and Rosemount (see article in the December 2013 Catalyst).

For more information about the RCP–Carver County partnership, visit rcp.umn.edu or follow RCP on Twitter (@RCPumn) or Facebook.

Architecture students on a field trip to Minnetonka with Peter MacDonagh, adjunct faculty in Architecture

Civil engineering students meeting with Tim Sundby, water quality technician for Carver County
New faculty member adds expertise in network modeling

Alireza Khani joined the faculty of the Department of Civil, Environmental, and Geo-Engineering (CEGE) this semester. Khani completed his Ph.D. at the University of Arizona in 2013 and has most recently been conducting research at the Network Modeling Center of the Center for Transportation Research, University of Texas at Austin. His research interests include the study and modeling of transportation networks and user behavior, intelligent transportation data analysis, public transit, and non-motorized travel. He shares his thoughts and interests below.

What sparked your interest in transportation?
My home city, Tehran, has grown rapidly in recent decades and developed modern transportation systems. When I was an undergraduate student, I realized that transportation engineering incorporates many of my interests: advanced mathematical modeling, urban planning, and modeling user behavior. I see many opportunities, both in academic research and real-world applications, in engineering areas related to transportation.

What are your chief research areas?
I am especially interested in modeling complex transportation systems. My studies have looked at green and sustainable transportation, specifically public transit and nonmotorized transportation. I developed a transit assignment model for evaluating transit systems in large urban areas and making informed decisions on transit improvement projects. Assignment models help agencies and researchers analyze the routing of passengers in a transit network and simulate their movements. The model has been tested in a few cities so far—among them San Francisco, Austin, and Portland—and I am going to apply it next to the Twin Cities transit network.

What else excites you about your new role?
I look forward to teaching the smart students at the U of M. Teaching allows me to reevaluate my existing knowledge and move forward to new understandings. I chose to work in academia not only to teach students what I have learned, but also for the opportunities to learn new things in working with talented young people. (Adapted from the CEGE Summer 2015 Update.)

Freight and Logistics Symposium scheduled for December 4

The annual Freight and Logistics Symposium resumes this year on Friday, December 4, at the Ramada Plaza Minneapolis. Adie Tomer, a fellow at the Brookings Institution Metropolitan Policy Program and a member of the Metropolitan Infrastructure Initiative, will give the keynote presentation on economic competitiveness and freight’s metropolitan future. Tomer will use economic trends across the local and global scale to raise important questions that statewide and metropolitan leaders should be thinking about as they map their freight-related future.

Following Tomer’s presentation, a panel discussion with representatives from the business community and the public sector will offer local perspectives on major global economic changes. The second portion of the symposium will feature a presentation and panel discussion about the implementation of Minnesota’s new statewide freight plan and action agenda.

More information is available at cts.umn.edu/events/freight.

READ CATALYST ONLINE
for links to research reports and other resources.
CTS shares transportation research, trivia at summer events

CTS recently showcased transportation-related attractions at two events in the Twin Cities: the 2015 Minnesota State Fair and Open Streets Minneapolis.

On August 28, CTS brought U of M bicycle and pedestrian traffic counting research, an online game, and several rounds of Transportation Jeopardy! to the Great Minnesota Get-Together.

Visitors to the CTS booth learned how the U of M is partnering with the Minnesota Department of Transportation to test technologies for monitoring bicyclist and pedestrian traffic. The exhibit included a map showing annual bike traffic in each Minnesota county as well as an infrared counter that researchers are using to measure bike and pedestrian traffic. The booth also featured Gridlock Buster, an online game that shows players what it’s like to manage traffic flow at intersections controlled by traffic lights.

Meanwhile, fairgoers tested their knowledge of transportation trivia in rounds of Transportation Jeopardy! on the U of M stage. With the help of special guest Goldy Gopher, CTS staff challenged competitors with questions in categories ranging from Need for Speed to Transportation at the Movies.

On September 12, CTS took to the streets of the U of M east bank campus as part of Open Streets Minneapolis. The event, cosponsored by CTS, closed area streets to cars and invited residents and visitors to walk, bike, play, and browse a variety of exhibits focused on healthy living, local businesses, and sustainable transportation.

1,779,738
PEOPLE ATTENDED
this year’s Minnesota State Fair.

A transportation trivia wheel (inset) was one of the attractions at the CTS Open Streets exhibit.

U of M students and residents from surrounding neighborhoods visited the CTS booth throughout the day. The booth once again featured bicycle and pedestrian traffic counting research and technology as well as a transportation trivia wheel.

Fairgoers tested their transportation knowledge in Transportation Jeopardy!
discuss large-scale trends that are revolutionizing the transport landscape: electrification, automation, the sharing economy, and big data. Based on all of this, the final chapters offer strategies to shape the future of infrastructure needs and priorities.”

The authors aim for a quick read—and encourage readers to think outside their immediate realm. “By the end of this book, you will appreciate the changing times we live in,” Levinson says. “You will hopefully appreciate what is new about transport discussions and how definitions of accessibility are being reframed. You will be provided with new ways of thinking about the planning of transport infrastructure that coincide with this changing landscape.”

The book is available on Kindle Editions (including Kindle for iPad, Macs, PCs, Android, and so on) for $4.99.

Levinson and Krizek, a former assistant professor in the U of M’s Humphrey School of Public Affairs, were the lead researchers in the multi-project Access to Destinations Study and editors of Access to Destinations, a book published in 2005 summarizing research papers from a 2004 academic conference. More recently, they launched the Journal of Transport and Land Use, an open-source journal published by CTS. Levinson also serves as managing director of the U’s Accessibility Observatory.

Man vs. machine...or Man + machine?

**CTS FALL LUNCHEON**

**November 9, McNamara Alumni Center, Minneapolis campus**

Details and registration: cts.umn.edu/Events

Associate Professor Mary (Missy) Cummings of Duke University will explore where we are in terms of the state of automation and autonomy in our everyday lives, what the future likely holds, and how to conceptualize the balance between humans and robots.

**Correction:** A photo credit was omitted from an article in the September 2015 issue. The photos for the “Permeable pavements could improve safety, benefit environment” article were courtesy of Wenck and Associates. The full citation is available with the online version of the article. Our apologies for the oversight.
“We found that the significant transit service expansions undertaken in the region have yielded a return of increased transit use,” says Yingling Fan, associate professor with the Humphrey School of Public Affairs. “Within the transit-served area of the region, residents were significantly more likely to use transit in 2010 as compared with 2000—either for a particular trip or at any point during the day.”

Researchers came to this conclusion after analyzing the relationship between transit service and transit use at both the trip and person level. At the trip level, researchers estimated the probability of a one-way trip including a transit leg. At the person level, they estimated the probability of a person using transit at least once during a travel day. In both cases, they measured transit service in terms of accessibility to jobs within 30 minutes of travel time.

“This approach considers how many destinations can be reached through a certain amount of transit travel rather than simply how much distance can be covered by transit in a certain amount of time,” Fan explains. “Both the person- and trip-level models confirm that transit-based job accessibility has been a significant and positive predictor of transit use in the Twin Cities region over time.”

Researchers made additional important findings on personal characteristics and transit use. For example, they found a changing relationship between vehicle access and transit use. While access to a car did make an individual less likely to use transit for a trip in both 2000 and 2010, the effect was less pronounced in 2010—meaning transit is successfully attracting more choice riders.

Also, researchers discovered that in 2010 the presence of children in a household no longer made a person less likely to use transit for a trip.

“Overall, these findings seem to indicate a broadening of transit’s appeal,” says Andrew Guthrie, research fellow on the project.

“This study shows the importance of having regional transit facilities and services that provide improved access to opportunities and services—key goals of the region’s guiding development framework and transportation system plan,” says Scott McBride, MnDOT Metro district engineer.

This research is part of an extensive five-part report sponsored by the Metropolitan Council and the Minnesota Department of Transportation based on the rich set of data produced by the council’s Travel Behavior Inventory household travel survey. David Levinson, RP Braun/CTS Chair in the Department of Civil, Environmental, and Geo-Engineering, is the study’s principal investigator. Additional components of the report examine changes in walking and biking, transportation system changes, the effects of telecommuting on travel behavior, and how changing accessibility of destinations has affected travel behavior.
New book: THE END OF TRAFFIC AND THE FUTURE OF TRANSPORT. page 1

Research takes the guesswork out of MEASURING WINTER OPERATIONS. page 2

Program puts STUDENTS TO WORK finding SUSTAINABLE TRANSPORTATION solutions. page 3

Twin Cities transit service improvements are helping to increase transit’s appeal. page 1