

CTS Catalyst

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Accelerating the pace of transportation innovation

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Photo © Metro Transit

Maximizing the benefits of transitways for economic competitiveness

By 2030, the Minneapolis–St. Paul region could have a network of 14 transitways. How can the region maximize the return on this investment to improve job accessibility and strengthen the region's economic future? University of Minnesota researchers set out to find the answer. Assistant Professor Yingling Fan of the Humphrey School of Public Affairs, the principal investigator for the research, gave the first public presentation of the findings at the 23rd Annual CTS Transportation Research Conference on May 23.

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Hello Catalyst, goodbye CTS Report

Notice anything different in this CTS publication?

- A new name—*Catalyst*—to capture the role CTS and our partners play in accelerating transportation innovation.
- A new look, to make it easier for busy readers to quickly browse and find the latest developments in transportation innovation.
- A new choice, for you to receive this publication electronically and/or on paper, whatever works best for you in your rapidly changing world.

We heard your feedback, and we're excited about these changes.

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Catalyst



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Author sheds light on ‘untold story’ of interstate system

The creation of the U.S. interstate system transformed America in a single generation, bringing not only tremendous progress but also unintended—and sometimes undesirable—consequences. At the CTS research conference luncheon presentation, author and journalist Earl Swift shared highlights from his book, *The Big Roads: The Untold Story of the Engineers, Visionaries, and Trailblazers Who Created the American Superhighways*.

The story of the interstates is fascinating because of the people who made it happen, Swift said, not because of its 47,000 miles of concrete. The visionaries ranged from a car-racing entrepreneur who spurred the push for good roads to the engineers who conceived of the roads and how they would work. One conspicuous name missing from the list of principal players, however, is Dwight D. Eisenhower—the man for whom the system is named.

“We’ve come over the past half-century to view the interstate...as a brainchild really of Ike and his lieutenants and one of the great achievements of his presidency,” Swift said. “But it ain’t true.”

Although Eisenhower did make highways one of his priorities, the interstate system was conceived, designed, routed, and authorized by Congress long before he became president, Swift said.



A common misperception is that the interstate system was designed to connect rural areas.

Swift also debunked the common misconception that interstates were designed to connect rural areas. “They were designed first and foremost to alleviate urban congestion and anything else was just an afterthought,” he said.

The interstates provide safe, fast, and reliable travel, Swift concluded, but they also have a dark side: the “uninspired sameness of the travel experience that they foster—an interchange glut of motels and fast-food joints.”

Catalyst from page 1

Our aim with *Catalyst*—which replaces the *CTS Report* and the *CTS Research E-News*—is to keep you current on the latest in transportation-related research and activities coming from the University of Minnesota.

If you have suggestions or other ideas for how we can better serve you, please let us know. You are critical players in accelerating transportation innovation. And this publication is your *Catalyst*.

A screenshot of the CTS website. The main heading reads "CTS WEBSITE is redesigned to increase visual appeal with our new, colorful graphic identity: CTS.UMN.EDU". The website layout features a dark background with white and green text. The top navigation bar includes "Home", "Events", "Research", and "Get Involved". The main content area is divided into several sections, including "News", "Events", "Research", and "Get Involved". The "News" section features a large image of a person working on a road. The "Events" section lists the "2014 Annual Transportation Research Conference". The "Research" section highlights "IGRA Innovation Series". The "Get Involved" section includes a call to action for "CTS 2014 Summer Internship Program". The website also features social media icons for Facebook, Twitter, and LinkedIn.

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Mileage-based user fees for Minnesota?

As part of a larger project examining the feasibility of a mileage-based user fee (MBUF) system in Minnesota—which would charge drivers based on the number of miles they drive rather than the gallons of fuel they use—the Minnesota Department of Transportation (MnDOT) commissioned a policy task force to provide MBUF recommendations.

In a session focusing on future transportation funding at the CTS research conference, Lee Munnich of the Humphrey School of Public Affairs shared highlights from the task force process and final report. The Humphrey School helped facilitate the process and provided technical advice to the task force.

Munnich explained that the task force began by identifying potential system benefits—such as improved fairness, flexibility, and sustainability—as well as possible challenges, including privacy concerns, high administrative and operating costs, and jurisdictional issues. Task force members also had lengthy discussions about the objectives of an MBUF system, including the idea of equity, he said.

“It’s not just about having enough money,” Munnich said. “When everyone was driving the same vehicles, the gas tax was a very fair way of paying for the road. Now that we have different types of vehicles, like hybrids and electric, the gas tax isn’t as reliable for determining user fees.”

General task force recommendations include ensuring equity in any future transportation funding method by including all drivers, regardless of vehicle or fuel type. The report also suggests that individual states or groups of states may need to take the lead on an MBUF system, rather than waiting for something to be implemented on a national level.

The conference session also featured a presentation by Dan Murray of the American Transportation Research Institute. Murray highlighted some of the major challenges of an MBUF system, including the logistics and costs associated with implementation, fee collection, and enforcement.

“We will put billions into implementation, design, and installation before one dollar gets to the roads,” Murray said.

Following the presentations, a panel of policy task force members offered thoughts on MBUF in Minnesota. The panel discussed the need to identify the goals of a possible MBUF system and evaluate its strengths and weaknesses. Specific areas of concern included collection costs, data privacy, and public acceptance.



Volunteers in an ongoing MnDOT pilot study of mileage-based user fees get real-time information about the cost of their driving in an on-board display.



**THE AVERAGE AMERICAN
DRIVER DRIVES
13,476
MILES EVERY YEAR**

THE FUTURE OF TRANSPORTATION FINANCE **FORUM**

convened state and national leaders in May to look at funding, finance, and collection options. The Humphrey School and CTS were co-hosts. The video is online.

11 NEW RESEARCH REPORTS

have recently been published on transportation-related research at the University of Minnesota. Topics include:

- Validating an in-vehicle interface design (CTS 12-09)
- Performance measurement system for roundabouts (CTS 12-10)
- Smartphone-based travel experience sampling (CTS 12-11)
- Improving safety at roadside traffic stops (CTS 12-13)
- Demonstrating a work-zone traffic information system (CTS 12-18)

Research reports are available at cts.umn.edu/Publications/ResearchReports.

Device invented at U of M is cleaning stormwater and cutting costs

The SAFL Baffle is a low-cost device invented at the University's St. Anthony Falls Laboratory to boost the performance of sump manholes for cleaning stormwater.

With more than 3.2 million sump manholes in the country—perhaps 25,000 in the Twin Cities metro alone—there is a “huge opportunity for engineers to install the SAFL Baffle and improve water quality,” said Kurt McIntire, sales engineer with Upstream Technologies, at the CTS research conference.

“Many cities are really excited about it,” McIntire said. The SAFL Baffle has been installed in nearly 20 Minnesota cities, including Minneapolis and St. Paul, as well as in private installations by Cargill, Walmart, Goodwill, and Affinity Plus Federal Credit Union. Future installations are expected nationwide this construction season, he said.

The device slows down water rushing into sumps during heavy storms and prevents it from picking up sediment that has settled there during low-flow periods.

“At high flow rates, some sump manholes do a terrible job of keeping the sediment they had previously collected,”

Device continued on page 7



Photo © Upstream Technologies

The SAFL Baffle helps keeps sediment and pollutants out of our lakes and rivers.

Maintenance workers refresh skills

Keeping roadways safe and navigable requires a skilled and knowledgeable workforce, including the maintenance and operations workers on the front lines. A new training opportunity—the Minnesota Roadway Maintenance Training and Demo Day—debuted April 10 on the St. Paul campus to help fill this crucial educational need.

The new event included classroom sessions and outdoor demonstrations. Presentations focused on pavement rehabilitation and maintenance, load securement, and tree maintenance and chipper use and safety.

The training was organized by CTS's Minnesota Local Technical Assistance Program (LTAP); sponsored by the Minnesota Local Road Research Board, Minnesota Department of Transportation, and CTS; and held in partnership with the American Public Works Association—Minnesota Chapter and the Minnesota Street Superintendents Association.

Also at the event, the latest batch of Minnesota LTAP Roads Scholars received their certificates. The Roads Scholar program, in its seventh year, awards certificates to maintenance workers who complete a variety of training workshops and programs.



Securing loads was one topic at the new event.



TELL US WHAT YOU THINK

So how do you like the new publication?
We welcome your feedback and ideas.
Please share at cts.umn.edu/Catalyst.

Nice Ride spurs spending near stations

As the number of Nice Ride bike-sharing stations in the Twin Cities has grown, so has the economic activity in the areas surrounding them, according to findings from a recent study by the University's Humphrey School of Public Affairs.

Nice Ride Minnesota is a bike-sharing program offering short-term bike rental and subscription service options that cater to a range of users. Bikes are available at 146 stations, 24 hours a day, throughout Minneapolis and St. Paul.

Since a Nice Ride station selectively increases accessibility around it, researcher Jessica Schoner explained, "Our theory was that people are going to take additional trips to that destination or they're going to switch destinations and go to [one] near a Nice Ride station, because they can bike there conveniently...and then they're going to spend money near these stations."

To measure economic activity, the researchers examined the stations and surrounding land use, business owner perceptions of bicyclists and Nice Riders, and subscriber self-reported spending patterns.

The types of business with favorable opinions of Nice Ride were much more likely to be food-related. Fittingly, preliminary results from the team's survey of Nice Ride subscribers show their top destinations were sit-down restaurants, coffee shops, bars or nightclubs, and grocery stores.

Nice Ride continued on page 7



\$150,000

is the estimated extra money that cyclists spend at restaurants and other businesses near Twin Cities Nice Ride stations over a season.



READ CATALYST ONLINE

for links to research reports and other resources.



Effects of heavy farm equipment on paved roadways

Over the past few decades, farm size has increased significantly and farm equipment has become larger and heavier. In 2008, the Transportation Engineering and Road Research Alliance (TERRA) initiated a pooled-fund study to evaluate the effects of this heavy agricultural equipment on paved roadways.

Researchers from the University of Minnesota and Iowa State University studied pavement structural response, such as stresses and strains, under heavy farm equipment and a typical five-axle semi-trailer truck. The study included two asphalt roadway sections—representative of a typical 10-ton and 7-ton roadway—and two concrete pavement sections at the MnROAD research facility near Albertville, Minnesota. The sections were instrumented with electronic sensors to measure pavement responses.

Study results found that the farm vehicles caused high pavement stresses and resulted in more damage to the roadway than the standard semi. Results also indicated that traffic wander (lateral movements of vehicles in a lane), seasonal effects, axle weights, and pavement structure greatly affect pavement response. Pavement thickness, for example, is extremely important for resisting one-time failure.

The study found that pavement damage could be reduced by avoiding travel after heavy rain, during the spring thaw, and on hot afternoons when pavement surface temperatures rise. The presence of a paved shoulder also reduced damage,

Pavement continued on page 7

The research team developed and analyzed several different scenarios based on the Metropolitan Council's 2030 population and land-use forecasts. Key findings:

- The planned future transitway network will improve accessibility to jobs in “competitive clusters” (interconnected businesses and organizations that drive regional employment) and to all other jobs in many locations.
- Locating future housing and job development within the I-494/I-694 loop will create additional regional accessibility to jobs.
- An even more targeted concentration of development near transitway stations leads to even greater gains in job accessibility.
- Low-income populations benefit the most from these gains.
- Locating jobs near transitway stations leads to larger increases in accessibility than locating housing near transitway stations.

Fan noted two key implications from the study: First, integrated policies that support jobs and housing in and near the metro core will increase the return on investment in transitways.



Second, additional policy efforts should be considered to increase transit accessibility for lower-income families and individuals.

“Though these residents generally have high levels of transit accessibility,” Fan explained, “this is largely due to residential concentration near downtowns.” The 2030 network would significantly increase job accessibility for north Minneapolis, for example, but “many suburban areas would not have transit access to jobs,” Fan said.

Research sponsors were the McKnight Foundation, the Surdna Foundation, and the Jay and Rose Phillips Family Foundation of Minnesota.

“Locating new jobs near transitways is especially important for maximizing the positive impact of current and future Twin Cities transitways.”

—Yingling Fan

LEARN MORE ABOUT THE STUDY

by downloading a research brief or the full research report.

Transitway research: implications for regional competitiveness

Following the opening research conference presentation by Yingling Fan, a panel of experts discussed the implications of the research for the region and beyond.

What surprised you about the findings?

“First is the fact that they are considered groundbreaking,” said Lee Sheehy, program director with the McKnight Foundation. “Wrapping economic impact around [transitway development] should seem to be fundamental.” Second is that locating new jobs near transitways produces larger increases in accessibility. “It’s a good reminder that we tend to skew some of our thinking toward housing,” he said. “It’s not either/or.”

“What jumped out to me,” said Matt Kramer, president of the St. Paul Area Chamber of Commerce, “was the concept of spatial economic incentives.” Companies’ decisions to locate

within the inner metro are not as “intuitive as we would love them to be,” he said. “Spatial economic development incentives need to be looked at in a very strong way.”

Patrick Born, regional administrator with the Metropolitan Council, said Fan’s work confirms the links between transit investment and housing, jobs, and economic development. “How do we persuade employers that it is in their interest and the community’s interest to locate close to transitways? That’s a big challenge to think about, to work on, and engage with employers, large and small,” he said.

What are other regions doing to compete economically and attract employers?

The business community is coming together from an economic competitive perspective in cities such as Memphis, Denver, Pittsburgh, and Roanoke, Virginia,

Device from page 4

explained McIntire, a 2011 U of M graduate.

The stainless steel device helps keep sediment in place so it can be collected and removed by maintenance crews. Without the baffle, sediment escapes to ponds and wetlands, which need periodic dredging to comply with stormwater regulations. Using the SAFL Baffle, a city's costs for managing sediment could be reduced up to 90 percent compared to dredging.

Upstream Technologies is the Minnesota company founded last year to manufacture, market, and sell the SAFL Baffle. A portion of sales is paid to the University in exchange for the use of its patent—providing funding for more research and innovation. The Minnesota Department of Transportation funded the initial development of the device.

23RD ANNUAL RESEARCH CONFERENCE

presentation slides
and video are online.

said Mariia Zimmerman, deputy director for sustainable communities with the U.S. Department of Housing and Urban Development. Businesses recognize that time lost in congestion is a problem, and they also see it as a quality-of-life issue. Minneapolis–St. Paul “has a fantastic quality of life,” she said. “How do we keep that, and articulate that? What role does transportation have? This research is one part of the puzzle.”

How will the research affect the Metropolitan Council's regional plan?

“It's important that transportation decisions and plans always have the lens of development and housing attached to them very, very closely,” Born said. “Fan's research is very important to this work.”

Nice Ride from page 5

The researchers also found that Nice Ride users spent, on average, an extra \$1.29 per week on new trips because of Nice Ride. Projecting that out for the overall survey sample amounted to more than \$900 per week in new economic activity, or about \$29,000 over the Nice Ride season (April through November), Schoner said. And extrapolating that for the entire population of Twin Cities Nice Ride subscribers would generate an additional \$150,000 over the season.

The findings, Schoner concluded, could potentially drive the way bike-share agencies structure their sponsorship and business partnerships. “They'll have tangible numbers to go to businesses and say ‘This is what having a station near you does’ and maybe [it will] change their ideas about trading a parking space for a station.”

In addition to Schoner, the research team included Greg Lindsey, Andrew Harrison, and Xize Wang of the Humphrey School. Assistance and funding for the study were provided by Nice Ride, Transit for Livable Communities, Bike Walk Twin Cities, and Bikes Belong.

Pavement from page 5

as did operating vehicles at least 16 inches away from the pavement edge. The researchers also confirmed that axle weight is more important than gross vehicle weight, suggesting that adding more axles to a vehicle could be beneficial as long as there is even load distribution.

In the project's final report, *Effects of Implements of Husbandry (Farm Equipment) on Pavement Performance*, the researchers say that the study provides a better understanding of the interaction of farm equipment with pavement structures. Study results could facilitate the regulation of spring load restrictions and help agencies design roads that are more capable of resisting damage related to heavy loading.

The project included funding and other contributions from MnDOT, Iowa DOT, Illinois DOT, Wisconsin DOT, the Minnesota Local Road Research Board, and the Professional Nutrient Applicators Association of Wisconsin. Many industry partners, including equipment and tire manufacturers and farm applicators, also participated in the project and contributed labor and equipment.

EVENTS CALENDAR

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MINNESOTA

is studying mileage-based user fees to determine if they could collect enough revenue to maintain our state's roads and bridges.

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CITIES

are using a device
INVENTED
AT THE U OF M
 to clean stormwater.

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BIKE-SHARING STATIONS

spur economic activity in the areas surrounding them.

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Photo © Metro Transit

TRANSITWAY IMPLICATIONS

Maximizing economic competitiveness

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