

CTS Catalyst

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Accelerating the pace of transportation innovation

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Photo courtesy Carissa Schively Slotterback

New Complete Streets materials highlight best practices, assist practitioners

Complete Streets—roads that are designed and operated to enable safe access for all users—offer many benefits, including improved safety, mobility, accessibility, public health, and quality of life. However, much of the work surrounding Complete Streets to date has focused on creating policies and guidelines rather than investigating the processes and action steps needed to successfully implement projects.

In an effort to fill this knowledge gap, researchers from the Humphrey School of Public Affairs have conducted a study on the planning and implementation of successful Complete Streets

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Spurring private-sector development along transit corridors

Transit-oriented development (TOD) is in demand in the Twin Cities metropolitan region, but regulatory and cost barriers combined with the uncertainty of transit expansion inhibit the market from responding to this demand, according to new U of M research.

The study was conducted for the Metropolitan Council as part of the Corridors of Opportunity Initiative, a broad-based plan to accelerate the build-out of a Twin Cities regional transit system so that people of all incomes and backgrounds share in the resulting opportunities. Assistant Professor Yingling Fan and Research Fellow Andrew Guthrie, both with the Humphrey School of

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Students bring big-picture thinking to transit corridor planning

Graduate students from the Humphrey School of Public Affairs recently created strategy reports for projects along the proposed Gateway Corridor transitway as part of a spring 2013 capstone course.

The course, designed to give students hands-on experience working with clients on economic and community development projects, was taught by senior fellow Lee Munnich and adjunct instructor Lyssa Leitner, who is also an associate planner with Washington County.

The Gateway Corridor is a proposed transitway that will run along Hudson Road parallel to Interstate 94 from St. Paul to the Wisconsin border. Since 2010, the Gateway Corridor Commission has been leading a study to determine the best mode of transit, estimated ridership, potential routes, and estimated costs. The corridor could be operational by 2022.

As part of their capstone work, the Humphrey students gathered information and produced strategy reports that will help inform decisions about specific initiatives along the transitway: three proposed stations in St. Paul, Maplewood, and Oakdale and a corridor-wide approach for bicycle and pedestrian connections to the transitway.

Each project report included a diagnosis of opportunities and risks, a vision for the future, and an action plan.

"This project really was the jewel in the crown of my graduate school career," says Aaron Meyers, a student in the course. "It was an opportunity to do meaningful work with real implications for the community."



The proposed Gateway Corridor will begin in St. Paul and run east to the Wisconsin border.

The completed reports were presented to clients from the cities of St. Paul, Maplewood, and Oakdale; Washington County; and the Gateway Corridor Commission.

"It was a perfect way to get cities thinking about land-use planning while also getting that big-picture, out-of-the-box thinking from students," says Leitner. "A lot of these communities, especially suburban communities, haven't been thinking about transit-oriented development. It was a great way to get the conversation started."

Bob Streetar, Oakdale community development director, has participated in a number of student projects at the Humphrey School and found great value in the students' work on the Gateway Corridor. "It's very helpful for the city, because it is our first look at what some of the issues should be," Streetar says. "Once we do formal planning, I always use what the students did as a piece of the overall plan."

The Oakdale station project team, which included Meyers, also received academic honors for its work in the

More than
300,000
PEOPLE LIVE IN THE PROPOSED GATEWAY CORRIDOR,
and the population is expected to grow by nearly
30 PERCENT
BY 2030.

course. The group won the 2013 Lloyd B. Short award from the Humphrey School for the best group capstone project of the year.

"I think these capstone projects are wonderful opportunities for students to learn and gain experience, and also for organizations to tap into the deep pool of talent at the Humphrey School to help them achieve their goals, which helps advance communities all across our region," Meyers says. "It's a true win-win."

Economic and community effects of freight rail in Minnesota

To improve the understanding of freight transportation's value in Minnesota, researchers from the Humphrey School of Public Affairs are conducting a study on the economic and community effects of freight transportation.

The project, focused on freight rail, is investigating opportunities to give local officials and the general public a better understanding of freight benefits and to leverage private investment in rail infrastructure for a more competitive Minnesota economy.

Frank Douma, research fellow with the Humphrey School, described findings from the first 6 months of the 18-month study in a presentation at the CTS Research Conference on May 22. The project is funded by the BNSF Foundation.

Initial findings from the study suggest that freight rail is already of value to the Minnesota economy, and it continues to grow. The Minnesota rail system is first in the nation in the movement of iron ore, third in farm products, and fourth in food, Douma said.

However, many economic benefits of freight rail—such as sustaining high-paying jobs—occur behind the scenes,

which means that these positive effects are less visible to the general public and local officials than other aspects of freight rail.

"Very few members of the general public are exposed to trains on a daily basis, and when they do encounter them, they don't see the dollar signs as the trains go by," Douma said.

Instead, the public often has negative responses to the associated noise or long wait times at crossings. "This can be a challenge for local officials, who hear these negative responses instead of the positive economic benefits freight rail may be providing to their area," Douma said.

To help build awareness of freight rail's benefits, Douma and the research team suggest conducting outreach to freight stakeholders, local officials, and the general public. Outreach efforts should take advantage of opportunities to demonstrate how freight rail contributes to and could potentially improve Minnesota's economic competitiveness.

The research team plans to help facilitate this outreach with a freight

In 2012,
RAIL TRANSPORTED
228
MILLION TONS
OF FREIGHT
in Minnesota.

Minnesota currently has the
8TH
LARGEST RAIL SYSTEM
in the nation, with nearly
4,500
ROUTE MILES
of track.

economy forum September 20 at the Humphrey School in Minneapolis. The event will convene state and local economic development officials, shippers, carriers, and elected officials to examine the current and future effects of freight rail in Minnesota. Details will be available at cts.umn.edu/Events.



Preparing a new generation of transportation professionals

Three U of M graduate students participated in prestigious events in Europe this summer with CTS sponsorship.

Steve Hankey and Jie Sun attended the Young Researchers Seminar in Lyon, France, on June 5-7. Hankey is a Ph.D. candidate in the Department of Civil Engineering (CE) and a research assistant in the Humphrey School of Public Affairs, advised by CE associate professor Julian Marshall and Humphrey School professor Greg Lindsey. Jie is a Ph.D. candidate advised by CE associate professor Henry Liu.

The seminar was jointly supported by the European Conference of Transport Research Institutes (ECTRI) and the Forum of European Road Safety Institutes. The recurring event strengthens cooperation and knowledge exchange among transport research institutes and universities and helps “raise the new generation of researchers,” says Caroline Alm eras, secretary general of ECTRI.

Thirty-seven young researchers—four from the U.S.—representing 16 institutes were invited. During the seminar, the young researchers presented the results of their research to senior researchers who, acting as tutors, made recommendations for their future presentations. The event thus aimed not only at scientific excellence, but also at presentation skills and the ability to put science into practice.

The three best papers and presentations were honored by the seminar steering committee—and Hankey won second



prize. He gave highlights from his study of air pollution risks for cyclists and pedestrians (see article in the July 2013 *Catalyst*). Jie’s topic was the stochastic shortest path problem for coordinated traffic signals.

“I’m so pleased that we could sponsor two students to attend,” says CTS director Laurie McGinnis. “Their participation elevates the visibility of U of M research globally.”

Hankey’s research is also being honored this month at the 23rd International Society of Exposure Science Annual Meeting in Basel, Switzerland. He will receive the Sally Liu Outstanding Doctoral Student in Air Pollution Exposure Science Award from the Swiss Tropical and Public Health Institute.

Xuan Di, another doctoral candidate advised by Liu, presented part of her Ph.D. work at the 20th International Symposium of Transportation and Traffic Theory (ISTTT) in the Netherlands. The paper, which looks at how drivers chose alternative routes after the collapse of the I-35W bridge in Minneapolis, has been accepted for publication by *Transportation Research Part B*. Xuan is the lead author.

“ISTTT is the most prestigious transportation science conference, and TR Part B is the journal that has the highest impact factor in transportation science,” Liu says.

CTS provided funding support for Xuan’s travel. “The conference played a critical role in my career, inspired more research ideas, and provided opportunities for me to know professionals all over the world,” Xuan says.

High school students learn about transportation careers

About 40 high school students from the Twin Cities metro area learned about transportation-related degrees and careers as part of the CSE Exploring Careers in Engineering and Physical Science Summer Camp, hosted by the University’s College of Science and Engineering in July.

The week-long camp gives students a taste of campus life as they hear lectures, view demonstrations, and get hands-on lab experience.

CTS arranged presentations about human factors and traffic engineering and tours of two transportation research facilities. Students also had time to play *Gridlock Buster*, an online educational game created by the Intelligent Transportation Systems Institute (a part of CTS).

In a follow-up survey, more than three-fourths of the students said the

activities increased their interest in studying science or engineering in college.

“It was interesting to hear about the thought and planning that goes into

roadways and traffic,” said one student. Added another: “I loved the human factors presentation because I will now notice things and look for things that that major is applied to.”



Students toured the HumanFIRST Program’s lab to learn about human factors research.

Interdisciplinary fellow to study spatial big data for 'eco-routing'

Meeting our transportation needs calls for thinking not just outside the box, but across academic disciplines, too. Viswanath Gunturi, a Ph.D. candidate in the Department of Computer Science and Engineering, will do just that as an Interdisciplinary Doctoral Fellow for the academic year 2013-2014.

The award comes from the U of M Graduate School on behalf of the Provost's Interdisciplinary Team. Support was available for approximately 25 percent of the applicants to this University-wide competition.

The fellowship awards outstanding Graduate School students who have interdisciplinary dissertation topics and who would benefit from interaction with faculty at one of the University's interdisciplinary research centers or institutes. CTS will be the host center for Gunturi and will facilitate collaboration with CTS Scholars.

"My research interest is broadly in the area of routing and navigational systems," Gunturi says. Success stories of some of these systems include Google maps and consumer Global Positioning System (GPS) devices.

Traditionally, GPS and web-based navigational systems used spatial computing technologies that in turn harnessed spatial datasets (such as digital road maps) to suggest routes. "With the advancement in sensor technology, however, spatial datasets collected by satellites, sensors, and so on now exceed the capacity of commonly used spatial computing technologies," Gunturi says. Such datasets, known as spatial big data (SBD), include traffic-signal data and temporally detailed roadmaps that provide travel speeds for every minute for every road segment as well as engine measurements of fuel consumption, greenhouse gas (GHG) emissions, and other data.

Using SBD has transformative potential. For example, Gunturi says, "a 2011 report from the McKinsey Global Institute estimates savings of about \$600 billion annually by 2020 by recommending 'eco-routes' that minimize fuel consumption and GHG emissions." Preliminary evidence for the transformative potential includes the experience of UPS, which saves millions of gallons of fuel by simply avoiding left turns and associated idling when selecting routes.

During his fellowship, Gunturi will collaborate with civil engineers and transportation scientists. His advisor, Professor Shashi Shekhar, has contributed significantly toward advancing spatial databases to address unique computational and data management challenges in the context of transportation. Gunturi's faculty mentor for the fellowship, civil engineering associate professor Henry Liu, is an expert in traffic light coordination on arterial highways and developer of the SMART Signal system.

Specifically, Gunturi will work with Liu to study traffic management systems and model traffic-signal timing information for routing techniques. "This research could help in suggesting routes that are more eco-friendly by minimizing idling at left turns," Gunturi says.



Eco-routes minimize idling at left turns.

Eco-routes that minimize fuel consumption could save

**\$600
BILLION
ANNUALLY
BY 2020.**

Source: McKinsey Global Institute



**READ CATALYST
ONLINE**

for links to research reports and other resources.

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projects. Associate professor Carissa Schively Slotterback and research fellow Cindy Zenger have examined projects from 11 locations across the nation, including efforts at the regional, community, corridor, and project level.

“The goal was to look at what it takes to move a community from Complete Streets concept to Complete Streets project,” Slotterback says. “We wanted to identify the critical factors that need to be addressed to advance implementation while also acknowledging diverse contexts, goals, and constraints.”

The study, sponsored by the Minnesota Department of Transportation (MnDOT) and the Minnesota Local Road Research Board, included an investigation of six specific areas of best practices related to Complete Streets: framing and positioning, institutionalizing, analysis and evaluation, project delivery and construction, promotion and education, and funding.

One of the most important overall findings, Slotterback says, is that thinking strategically about context is essential for success. “There’s really no silver bullet or perfect recipe that works in all communities or all organizations,” she says. “The unique characteristics of a place need to inform how we make decisions and implement Complete Streets.”

Other key findings resulted in the following recommendations:

- **Policy (if one exists) is just the start.** Institutional and cultural changes that facilitate implementation are also necessary.
- **Be rationally opportunistic.** Communities should know what they would most like to do but also be willing to take advantage of other opportunities that may arise.
- **Engage advocates.** They can be especially important in education and outreach efforts.
- **Make the most of project champions.** Whether they are elected officials, advocates, or staff, champions often push the hardest to get projects done.

Slotterback and Zenger are creating 11 case studies and a practitioner-oriented guidebook based on the study’s findings. The case studies provide detailed information on context, documentation, tools, timelines, and examples from each project community.



Photo courtesy Carissa Schively Slotterback

One case study will feature a Complete Streets project from Charlotte, North Carolina.

Case studies will highlight projects in
**MINNESOTA, VIRGINIA, COLORADO,
NORTH CAROLINA, OHIO, IOWA,
NORTH DAKOTA, WISCONSIN, AND
CONNECTICUT.**

The guidebook, a *Guide to Complete Streets Planning and Implementation*, is slated for completion in early fall. It will highlight policies, practices, designs, and community engagement strategies from the case studies and include suggestions for tailoring Complete Streets implementation to a particular context. These materials are designed to help practitioners in Minnesota apply best practices and lessons learned from other communities to their own projects.

Scott Bradley, director of context sensitive solutions at MnDOT, says the materials will help with planning and implementation at a variety of scales in Minnesota. “Much of the [other available] Complete Streets guidance material remains too general to suit the challenges we face,” Bradley says. “Information from this study, including the case studies from around the country, will help us better evaluate and inform multimodal concerns, opportunities, and trade-offs specific to a project’s context.”

Information from the study’s findings will also be integrated into MnDOT’s Complete Streets guidance, training, tools, and best practices as MnDOT continues its Complete Streets implementation efforts around the state, Bradley says.

CTS RESEARCH SEMINARS

will kick off September 26 in Minneapolis, with four additional seminars to be held throughout the fall. The seminars are open to anyone interested in learning more about transportation research at the University of Minnesota.

Stay tuned to cts.umn.edu/Events for details.

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Public Affairs, led the research.

“This study affirms that there is interest in and demand for development that incorporates transit and for transit that incorporates development,” says Metropolitan Council Chair Susan Haigh.

By 2030, a network of 14 connected transit corridors is planned for the Minneapolis–St. Paul metropolitan region. The success of this network will hinge on ridership from nearby housing and businesses. To find out what policymakers can do to help spur transit-oriented development, the U of M team interviewed key players in the private sector. They asked central-city and suburban developers, real estate brokers, and business leaders whether and to what degree transit factored into their current and future site-location decisions. Some key findings:

- Developers view transportation access as highly important when selecting sites but will sacrifice transit access if a transit-oriented site is more expensive or presents more complex regulatory hurdles than traditional auto-oriented design.
- Multifamily residential developers, large corporate office tenants, and redevelopment specialists have a strong interest in transit-accessible sites, but single-use zoning, low maximum-density regulations, and high minimum-parking ratios are significant obstacles to TOD.
- Employers say that providing a desirable location is critical to recruiting highly skilled

young professionals who are likely to desire or demand walkable living and access to transit.

- Multiple participants identified efforts to make transit-accessible housing affordable by design rather than by subsidy as crucial to the promotion of mixed-income neighborhoods in station areas.

To encourage a balance of living-wage jobs and mixed-income housing at transit-accessible sites, the researchers recommend that policymakers focus on making site selection decisions for developers and employers less challenging by:

- Fostering communication and collaboration between the public sector and groups in the private sector that already have shown an interest in transit-accessible locations.
- Promoting vibrant, walkable neighborhoods through flexible

design and regulatory reform.

- Helping affordable-housing specialists pursue cost-effective designs that reduce parking ratios and increase density by raising height restrictions.
- Promoting diverse transit options—including high-frequency bus routes and high-quality rail—and accelerating system development.

The study was funded under an award from the U.S. Department of Housing and Urban Development.

More information about this study can be found at cts.umn.edu/Research.

“What’s the best way to build affordable housing?...You don’t have to subsidize the unit or do anything—just put it on transit.”

—Developer



New development along the future Green Line (Central Corridor) on the U of M campus in Minneapolis

EVENTS CALENDAR

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TRANSIT-ORIENTED DEVELOPMENT

is in demand in the Twin Cities metro, but

REGULATORY AND COST BARRIERS

inhibit the market, according to U of M
research.

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Students at the Humphrey School bring

BIG-PICTURE THINKING

to Gateway Corridor planning.

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Researchers aim to

IMPROVE AWARENESS

about the benefits of

FREIGHT RAIL IN MINNESOTA.

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Photo courtesy Carissa Schively Slotterback

New Complete Streets materials
focus on implementation and best practices.

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