Introducing Roadway Safety Institute News

We’re excited to bring you the first issue of Roadway Safety Institute News. In this quarterly electronic publication, we’ll share our latest activities in research, education and workforce development, and technology transfer initiatives related to transportation safety. Tell us what you think! We welcome comments and questions about the Institute. E-mail roadway@umn.edu.

New Roadway Safety Institute focuses on user-centered safety solutions for multiple modes

The Roadway Safety Institute is a $10.4 million regional University Transportation Center (UTC) established in late 2013. Led by the University of Minnesota, the two-year consortium will develop and implement user-centered safety solutions across multiple modes. The Institute will be a focal point for safety-related work in the region, which includes Minnesota, Illinois, Indiana, Michigan, Ohio, and Wisconsin. Other consortium members are the University of Akron, University of Illinois at Urbana-Champaign, Southern Illinois University Edwardsville, and Western Michigan University.

In this article, director Max Donath, professor of mechanical engineering at the University of Minnesota, shares his vision for the new Institute.

What topics will the Institute’s research investigate?

The people using our region’s roadways aren’t as safe as they should be. It’s a tragedy that more than 4,800 people died on Region 5 roads in 2012, while thousands more suffered life-changing injuries. The Institute’s research will work to prevent the crashes that lead to these fatalities and injuries.

Specifically, we will focus on two key areas: high-risk road users and traffic safety system approaches. Within these areas, our projects will address issues related to rail grade crossings, roadway departures, vehicle automation technologies, signalized intersections, wrong-way crashes, automated speed enforcement, bicyclists, pedestrians, commercial truck drivers, and impaired drivers. Although this is a
broad range of topics, we hope to bring added attention to areas that have either not received much attention in the past or have significant unsolved issues.

**How will the Institute’s work address regional safety priorities?**

Most of our research topics resulted from conversations with state safety engineers in Region 5 departments of transportation. Their input, as well as insight gained from reviewing the state strategic highway safety plans, helped us determine priorities.

Although some issues were uniquely identified by individual states, they are all relevant across our region as well as nationally. For example, safety at rail grade crossings was a priority for Illinois, but this is becoming a more significant issue across our region and the United States, especially with the increased transportation of crude oil by rail.

**What educational initiatives will be conducted?**

We’ll focus on educating the public and attracting more professionals to the safety workforce. We want to communicate with students and get them excited about the things that are happening in this field and about the opportunities available to them.

One effort we’re planning is a safety-related museum exhibit that can help explain concepts and technologies to a younger audience. We’ll also work to connect students to employers and offer continuing education to professionals in the safety field.

**What makes the Institute unique?**

One distinctive thing we’ll be working on is transportation safety in American Indian lands, where there is an unusually high number of motor vehicle crash fatalities. Our research will work to better understand why this is happening and to develop more effective solutions. To my knowledge, no other UTCs are working on this issue.

Working with American Indian communities, we plan to gather information from a variety of stakeholders and use it to develop a more comprehensive foundation for understanding safety risks and deploying countermeasures. Secondly, we would like to work with tribal transportation leaders to support the implementation and evaluation of management and policy options that could help improve safety.

**How will members’ expertise help the Institute accomplish its goals?**

It is important for us to address significant traffic safety issues. We want the work we do to make a difference to the people using our roadways. I want to make sure we’re putting something out there that practitioners can use to make that happen.

In order to do that within our two-year timeframe, we’ll be drawing on the safety-related expertise of all our members. Each member has unique capabilities that help contribute to the overall strength of our team and our ability to address regional issues. We’ll take advantage of this extensive expertise to expand our reach and work on yet-unsolved safety problems.

**Study on automated speed enforcement to explore attitudes for and against it**

Excessive speed is a cause of traffic crashes and a leading factor in many of the most-severe crashes. Automated speed enforcement (ASE) could save lives and prevent injuries—especially in work zones and around schools—by ensuring violators are appropriately sanctioned, ultimately lowering speeds.

Automated enforcement, however, is a politically contentious issue, despite studies that have shown its safety benefits and public opinion polls that have found support for its use in certain locations.

To date, little work has been done to examine the politics and other barriers that may affect whether and how ASE is deployed. To better understand this issue, researchers at the Roadway Safety Institute propose to identify the points of view and culture of different stakeholders—elected officials, law enforcement, and public safety and
transportation agencies, among others—as well as who and what influences those perspectives.

“We hope to better understand the reasons and motivations that provide the basis for political support or opposition to further [ASE] deployment,” says lead researcher Frank Douma, research fellow with the University of Minnesota’s Humphrey School of Public Affairs. The team also includes research associate Nichole Morris with the University of Minnesota’s HumanFIRST Laboratory and research assistant Christie Sullivan.

Referring to a Minnesota legislative hearing about automated enforcement held in 2013, Douma notes that some in law enforcement argue for it while others are opposed. “You get the feeling that there must be something else going on beyond what they’re stating,” he says. “We’re going to try to see if there are some core issues out there—and if they can be addressed.”

Nationwide, only 14 states use some type of automated speed enforcement, and in Region 5, only Illinois and Ohio allow it (on a limited basis). Minnesota would be a good test case, Douma explains, since the state’s Strategic Highway Safety Plan includes an extensive discussion of automated enforcement and earlier research in Minnesota has shown broad public support for deployment in work zones and school zones. However, ASE has not been deployed after an initial attempt was cancelled through a court challenge.

Previous research led by Douma found that one likely cause for that failure was a lack of consensus among stakeholders regarding how ASE might be deployed. The obstacles cited included logistical problems, legal issues, and privacy.

The researchers propose to review public statements and conduct interviews to more fully articulate and summarize various points of view. Because the team would be gathering information from stakeholders statewide, the research could also examine the differences in attitude between rural and urban areas.

Based on the results of the research in Minnesota, a follow-up project could replicate the process used for Minnesota in another Region 5 state, Douma says.

Exploring why teen drivers take risks

Young drivers are overrepresented in traffic-related crashes and fatalities worldwide. To target the root causes of this phenomenon, Marie Claude Ouimet, an assistant professor at the Faculty of Medicine and Health Sciences at the Université de Sherbrooke in Quebec, Canada, conducts research on the environmental, psychological and neurobiological factors that contribute to risky driving behavior in teens and impaired drivers.

Ouimet presented her recent findings and previewed her ongoing research on the topic at a seminar sponsored by the Roadway Safety Institute and the Center for Transportation Studies in February.

With degrees in both psychology and computer science, Ouimet brings a unique perspective to her work. “In psychology you’re trained to think that there are a lot of possibilities...In computer science you realized that there are concrete answers to questions,” she explained.

As a result, Ouimet attempts to adopt an interdisciplinary approach to her work, and she says she was drawn to traffic safety because it lends itself to this approach. She collaborates with researchers and professionals in multiple
fields—engineering, geography, computer science, psychiatry, neuroscience, and social science, among others—to gain a deeper understanding of risky behaviors and how to prevent them. Her training and collaborations also led her and her team to develop a driving simulator in her lab in Quebec.

Ouimet visited University of Minnesota researchers to see and discuss the Teen Driver Support System project, a smartphone application that gives new drivers real-time visual and audio feedback about their driving performance to help them build safe driving habits.

Currently, Ouimet is conducting research examining the impact of passenger characteristics—such as age, gender, and risk inclination—as well as alcohol use on driving behavior in young adults. In one study, participants aged 18–21 consume alcohol, and then drive in a simulator. Results will be examined to explore the contribution of individual high-risk characteristics to the alcohol-passenger risk interaction. Since Ouimet conducts this research in Quebec, where the legal drinking age is 18, she’s able to observe younger adults engaged in alcohol-related risky behavior than would be possible in the U.S. In addition, a driving simulator allows observation of behavior that for safety reasons couldn’t be possible on an actual road but that represent a good proxy for real-world driving.

The study aims to provide more insight into how both peer influence and the effects of alcohol combine to increase risky driving behavior. Ouimet also hopes to learn more about how peers play a role as a function of amount of alcohol consumed, which in turn affects driving behavior. In addition, she has explored the possibility of utilizing in-vehicle feedback devices—such as g-force events and in-vehicle blood alcohol tests—to combat risky driving behavior.

Her research also hopes to answer the question of why some young adults exhibit risky driving behavior, and then develop effective interventions. Legislation can mitigate risky behavior for the general population, Ouimet said, as seen with the primary seat belt law. But two groups are still more at risk: young drivers and drunk drivers. Ouimet explained that it’s often difficult for those two groups to regulate their behavior.

“I see our research program as a way to try to help those who have difficulty regulating their behavior,“ she said. “What is it that can make them safer, for themselves and for the population?”

Researcher Spotlight: William Schneider

William Schneider is an associate professor of civil engineering at the University of Akron in Akron, Ohio.

Schneider’s research interests revolve predominantly around transportation safety. He conducts research analyzing the contributing factors associated with alcohol-related crashes and driver injury-severity outcomes.

Schneider says he hopes his research will make the roads a safer place. “We all use the roads and…unfortunately a lot of people pass away as the result of a crash,” Schneider says. “Anything I can do to make the roads safer for the public has always been a motivating factor for me.”

Prior to joining the faculty at the University of Akron, Schneider worked at the Texas Transportation Institute, where his research involved developing predictive models for estimating speeds of vehicles traveling in urban right-turn lanes, incorporating safety in the highway design process, and examining work-zone speed compliance and safety, among others.

Schneider says he’s always been interested in the problem-solving aspect of the field of civil engineering. He will work with the Roadway Safety Institute on projects helping law enforcement identify problem areas by mapping alcohol-related crashes—something he believes is one of the biggest transportation-related issues in the United States.

“I still think there’s a big paradigm change that needs to happen with the perception of drinking and driving and wearing seatbelts,” he says.

Schneider is currently affiliated with the American Society of Civil Engineers (ASCE) and the Institute of Transportation Engineers, and he is a friend of the Transportation Research Board Highway Safety Manual Task Force. Schneider received his B.S., M.S., and Ph.D. in civil engineering from Purdue University.
Researcher Spotlight: Rajesh Rajamani

Rajesh Rajamani is a professor of mechanical engineering and a senior affiliate faculty in the Department of Biomedical Engineering at the University of Minnesota Twin Cities campus in Minneapolis, Minnesota.

Rajamani has been at the University of Minnesota since 1998, where he conducts research in developing sensing and estimation systems for automotive and biomedical applications. Rajamani is the Director of the University’s Laboratory for Innovations in Sensing, Estimation and Control (LISEC).

“I think there’s a great need for [sensing and estimation systems] in many modern systems and there’s a good potential for commercializing those kinds of technologies,” Rajamani says. At the Roadway Safety Institute, Rajamani will help develop collision warning systems for bicyclists.

Rajamani says he gets the most satisfaction working with his “extremely dedicated and hardworking” students and colleagues who are willing to partner with him on interesting projects.

“I have the freedom to decide what projects to work on and which projects can have a large impact, which is exciting,” he says.

Rajamani has received numerous awards for his research and publications, including the O. Hugo Schuck Award from the American Automatic Control Council, the Ralph R. Teetor Award from the Society of Automotive Engineers, and the CTS Research Partnership Award for a project with MnDOT on improving transportation safety in the state.

He received his B.S. in mechanical engineering from the Indian Institute of Technology in Madras, India, and his M.S. and Ph.D. in mechanical engineering from the University of California at Berkeley.

Seminar Series

The Roadway Safety Institute will sponsor a seminar series featuring the work of Institute researchers beginning in September 2014. If you can’t attend in person on the University of Minnesota campus, seminars will be streamed live on the web. Dates and other details will be posted on our website (www.roadwaysafety.umn.edu) as they are available and sent as electronic announcements to subscribers.