

RESEARCH REVIEW

• UNIVERSITY OF MICHIGAN TRANSPORTATION RESEARCH INSTITUTE • APRIL-JUNE 2012 • VOLUME 43, NUMBER 2 •



Source: U.S.DOT

on page 1:

Defining the Future of Transportation

Inside:	The Power of Big Data	2
	Safety Pilot Model Deployment	4
	LATCH Usability Study	5
	Checkpoints™ Program for Teen Drivers.....	6
	Names & Faces	7
	Recent UMTRI Publications.....	8
	Conferences & Events	9

UMTRI RESEARCH REVIEW

• UNIVERSITY OF MICHIGAN TRANSPORTATION RESEARCH INSTITUTE • APRIL-JUNE 2012 • VOLUME 43, NUMBER 2 •

ISSN 0739 7100

UMTRI Director: Peter F. Sweatman

UMTRI Associate Directors: Jean T. Shope, Lawrence Schneider

UMTRI Business Administrator: Cathy Seay-Ostrowski

UMTRI Communications and Marketing Director: Francine Romine

UMTRI Library Head: Bob Sweet

Writer and Editor: Joyce Daniels

Cover Photography: Courtesy of U.S.DOT

Layout & Printing: U-M Printing Services

The UMTRI Research Review is published four times a year by the Research Information and Publications Center of the University of Michigan Transportation Research Institute, 2901 Baxter Road, Ann Arbor, Michigan 48109-2150 (umtri.umich.edu). To subscribe, see the subscription form on the inside back cover. For change of address or deletion, please send us your address label or email umtri@umich.edu.

Follow UMTRI



The University of Michigan, as an equal opportunity/affirmative action employer, complies with all applicable federal and state laws regarding nondiscrimination and affirmative action, including Title IX of the Education Amendments of 1972 and Section 504 of the Rehabilitation Act of 1973. The University of Michigan is committed to a policy of equal opportunity for all persons and does not discriminate on the basis of race, color, national origin, age, marital status, sex, sexual orientation, gender identity, gender expression, disability, religion, height, weight, or veteran status in employment, educational programs and activities, and admissions. Inquiries or complaints may be addressed to the Senior Director for Institutional Equity and Title IX/Section 504 Coordinator, Office of Institutional Equity, 2072 Administrative Services Building, Ann Arbor, Michigan 48109-1432, 734-763-0235, TTY 734-647-1388. For other University of Michigan information call 734-764-1817.

The Regents of the University

Julia Donovan Darlow, Ann Arbor
Laurence B. Deitch, Bingham Farms
Denise Ilitch, Ann Arbor
Olivia P. Maynard, Goodrich
Andrea Fischer Newman, Ann Arbor
Andrew C. Richner, Grosse Pointe Park
S. Martin Taylor, Grosse Pointe Farms
Katherine E. White, Ann Arbor
Mary Sue Coleman, *ex officio*

UMTRI's Strategic Intent

To be the leader in transportation systems research integrating vehicles, people, and infrastructure to achieve a highway transportation system where:

- Fatalities and injuries are eliminated
- People and goods flow efficiently
- Reliance on nonrenewable energy is reduced

Defining the Future of Transportation

Transportation as we know it is changing. The automotive industry, long synonymous with the state of Michigan, is transforming itself—reshaping its products to compete in an increasingly connected, environmentally conscious world. In this context, UMTRI too is evolving. In February 2012, UMTRI formally adopted a new, five-year strategic plan. In this innovative plan, UMTRI embraces a broad organizational vision, one that recognizes challenges and opportunities on a global scale.

UMTRI's strategic vision is to advance safe and sustainable transportation for a global society. This guiding principle recognizes that our current transportation system is burdened by traffic fatalities and injuries that equate to a major public-health problem, vehicle carbon emissions that contribute significantly to climate change, and uneven availability of mobility options and accessibility to services.

These complex challenges require creative solutions and partnerships. In the coming years, UMTRI will call upon its diverse knowledge base—more than fifty transportation researchers working in ten separate disciplines—to strengthen longstanding industry partnerships and work with key collaborators at the University of Michigan.

UMTRI's strategy recognizes that the future of transportation draws upon a broadening field of expertise, one that encompasses engineering, urban planning, behavioral science, emergency medicine, public policy, and business, among others. With key partners,

UMTRI will work to reduce fatalities and injuries from motor vehicle crashes of all types; reduce greenhouse gas emissions from ground vehicles of all types; and remove impediments to safe and efficient mobility for individuals in all parts of society and for productive freight vehicles.

To accomplish these societal objectives, UMTRI will focus on five overarching research goals, two of which are addressed in this issue of the *UMTRI Research Review*. The first strategic goal is to develop the Center for the Management of Information for Safe and Sustainable Transportation (CMISST). This exciting undertaking builds upon UMTRI expertise in data integration and fusion of transportation datasets to generate new knowledge. The center will serve as a valuable resource to industry stakeholders, university researchers, and government partners.

A second research goal is to advance the sciences of crash protection and occupant protection. Within this goal, we profile the Safety Pilot Model Deployment program—the largest on-road test of connected-vehicle technology. Undertaken in partnership with USDOT, this large-scale program will yield valuable safety data that will facilitate the next step in intelligent transportation systems.

UMTRI's three remaining research goals, to be presented in subsequent issues of the *UMTRI Research Review*, are to promote the public-health research model to reduce transportation-related injuries; to

elevate sustainability as a priority in transportation research; and to conduct system-solution research for safe and efficient heavy vehicle movement. Collectively, UMTRI's strategic initiatives will advance scientific knowledge and will play a key role in defining the future of transportation. **RR**



Peter Sweatman, Director
U-M Transportation Research Institute

The Power of Big Data

New UMTRI center specializes in integration and analysis of complex datasets to enhance transportation safety and sustainability

Data lies at the heart of all transportation research. It forms the basic ingredients from which new knowledge is synthesized. Increasingly, researchers are developing new methods to link, or fuse, data. Everything from vehicle data to statistical crash data, naturalistic driving data, and geographic data can be combined and analyzed to reveal a wealth of new information.

The challenge lies in identifying, accessing, and using the often complex datasets, sometimes referred to as “big data.” UMTRI faculty members Carol Flannagan and Jonathan Rupp are addressing that challenge. They’re leading one of UMTRI’s newest strategic endeavors—the Center for the Management of Information for Safe and Sustainable Transportation (CMISST).

CMISST is a data center that gathers, combines, and analyzes all types of transportation datasets to answer major questions in safety and sustainability. Datasets include a rich trove of transportation-systems data gathered by UMTRI over the past decade.

“As technology improves, the trend now is to share and link data to enhance scientific knowledge,” said Flannagan. “CMISST builds on this momentum by creating a world-class repository of broad-ranging, managed datasets.”

Transportation Safety through Data Integration

A major focus of CMISST research is on those analyses that require linking transportation datasets. One example, explains Rupp, is to link geolocated state crash datasets to EMS and hospital data to enable the use of highway-performance metrics based on serious injury.

“Currently, highway-safety performance is assessed using metrics that are based on fatality. These metrics need to be extended to include serious injury,” said Rupp. “Linking crash, EMS, and hospital data is pivotal to obtaining the injury information needs for these metrics. In addition, linking crash to EMS and hospital data has the potential to improve triage and treatment of people injured in road-traffic crashes.”

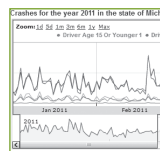


Center for the Management of Information for Safe and Sustainable Transportation

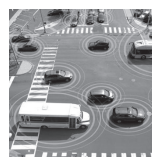
Other examples of CMISST research topics include:

- estimating the field performance of safety technologies by linking crash data to vehicle-safety content information
- estimating the effects of occupant characteristics on injury risk and frequency
- characterizing distributions of crash causation scenarios using exposure-weighted naturalistic driving data
- quantifying driving and traveling behavior
- using geo-located crash data linked with roadway data to study the effects of road characteristics on crash occurrence and outcome
- * geospatial linking of crash and enforcement activities to study enforcement effectiveness

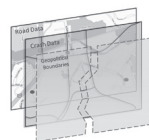
To study these and other topics, CMISST draws from the following data types:



Crash Data. Multistate and national crash databases that provide information on all aspects of vehicle crashes and crash-induced injuries.



Driving Data. Data on driver behavior collected from instrumented vehicles. These include UMTRI data from the Integrated Vehicle Based Safety System (IVBSS) project and the Safety Pilot Model Deployment.



GIS Data. Geographic Information Systems (GIS) are a collection of hardware, software, and spatial data sets that represent and store geographic information for analysis, integration, and display within a geographically referenced construct.



Supplemental Data. CMISST uses extensive State of Michigan exposure data, as well as national data including the National Household Travel Survey (NHTS), and licensing data.

Flannagan and Rupp and the CMISST staff have many decades of combined experience in data collection and analysis at UMTRI. Much of this experience comes from working with the Michigan State Police through the Office of Highway Safety Planning to make motor-vehicle-crash data available via the award-winning Michigan Traffic Crash Facts website.

CMISST builds upon this success. Flannagan and Rupp are working to develop new techniques for automatically combining and statistically analyzing information from multiple transportation datasets. Acquiring, generating, and combining these datasets is often too costly and time consuming for an individual researcher or company.

Working with CMISST

Depending on the nature of the research project, CMISST researchers may conduct data analysis for a project sponsor. In contract research, CMISST researchers will gather, standardize, integrate, and analyze the datasets, providing sponsors with the results.

Alternatively, research sponsors may wish to become a CMISST member to receive access to data that CMISST curates. CMISST offers data query tools, dataset access, and methods for dataset integration that allow researchers to quickly find answers to their transportation questions.

Finally, CMISST offers expert data services (simple analyses and training), as well as data curation and dissemination services.

For more information on CMISST resources and how to work with CMISST, visit the center website at

www.cmisst.org 

CMISST Strategic Goals

By providing access to and performing cutting-edge analyses of transportation datasets, CMISST works to reduce transportation injuries, advance crash avoidance, develop solutions for efficient heavy vehicle movement, and elevate sustainability as a transportation priority.

Advancing Safety

CMISST supports UMTRI's strategic goal of reducing fatalities and injuries from motor vehicle crashes by an order of magnitude. The center provides access to a rich array of crash datasets and other relevant, linkable datasets that can be used to show which crash and injury countermeasures have the greatest benefit in reductions in injuries and fatalities.

Promoting Sustainability

CMISST supports UMTRI's efforts to reduce greenhouse gas emissions from the operation of motor vehicles by an order of magnitude. CMISST provides access to data on fuel use, driving behavior, transit use, and heavy-truck transport, all of which can be used to better understand how to improve fuel efficiency across the fleet through driver behavior intervention and improvements in routing and load efficiency for heavy trucks. Many of these same data can be used to study the most cost-effective ways to encourage vehicle electrification.

Enhancing Mobility

CMISST supports UMTRI's goal of removing impediments to safe and efficient mobility for individuals in all parts of society and for productive freight vehicles. CMISST provides data related to travel behavior and heavy-truck travel. Analyses of these data help us understand what changes have the greatest impact on mobility and heavy-truck capacity.

Safety Pilot Model Deployment

Connected-vehicle project shifts into high gear

UMTRI is embarking on the next step in a \$22 million motor-vehicle safety research project by equipping vehicles with connected-vehicle technologies—devices that enable vehicles to send and receive wireless messages that may someday prevent crashes.

The UMTRI-led effort, called Safety Pilot Model Deployment, is the largest connected-vehicle, street-level pilot project in the western hemisphere. UMTRI and the U.S. Department of Transportation have partnered to examine connected-vehicle technology in real world use by actual drivers.

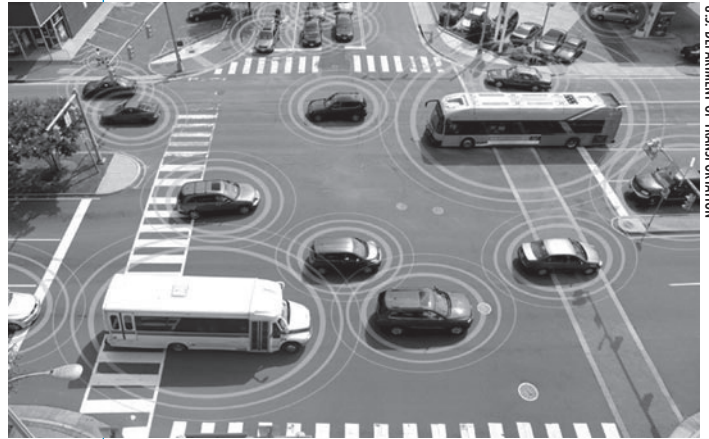
Wireless technology enables vehicles to communicate with each other and the infrastructure to privately and securely transmit and receive data such as vehicle position and speed. The systems can alert drivers to a potential crash situation—such as a nearby vehicle unexpectedly braking, a sudden lane change, merging traffic, etc.

Motor vehicle crashes are the leading cause of death for people 4 to 35 years old. Crashes are associated with 34,000 fatalities a year, 2.3 million patient emergency room visits, and a cost of \$240 billion in terms of medical expenses and work loss. The National Highway Traffic Safety Administration (NHTSA) estimates that connected-vehicle technology has the potential to address more than 80 percent of unimpaired driver crashes.

The Safety Pilot Model Deployment project is emblematic of the work being done at UMTRI today and in the future. It is an example of UMTRI's leadership in the areas of motor vehicle safety and sustainability, its multidisciplinary approach to research, and expertise in embedding research into deployment. The unique partnerships UMTRI has cultivated throughout the

transportation industry—as well as with state and local governments—are vital to its success.

Nearly 3,000 cars, trucks, and buses will be equipped with the wireless communication, connected-vehicle technology. In addition, similar devices will be located at intersections, curve locations, and freeway sites throughout the model deployment test area.



U.S. DEPARTMENT OF TRANSPORTATION

“We are equipping vehicles that spend time driving in the 48105 zip code—northeast Ann Arbor and the surrounding area. The pilot area is defined by M-14/US-23 to our north, US-23 to our east, as far south as Washtenaw Avenue, and west as far as Main Street,” said program manager Jim Sayer, an associate research scientist at UMTRI. “We are working closely with the university community, but also with the Ann Arbor Public Schools, to identify individuals who want to know more about this technology and might consider having it installed on their personal vehicle.”

For more information about the Safety Pilot study, visit <http://safetypilot.umtri.umich.edu/>

RR

LATCH Study Provides Vehicle Design Guidelines

Installing child restraints can frustrate even the most capable parents. A system called Lower Anchors and Tethers for Children is supposed to make things easier by standardizing attachment hardware, but a new study conducted jointly by UMTRI and the Insurance Institute for Highway Safety (IIHS) shows that many automakers aren't paying attention to the key factors that make LATCH work. Only 21 of the 98 top-selling 2010-11 model passenger vehicles evaluated have LATCH designs that are easy to use.

The researchers scrutinized LATCH hardware and rear-seat designs in a range of passenger vehicles to determine the key vehicle characteristics that would help LATCH live up to its billing. They also conducted tests with volunteers installing child restraints to identify which features made it easier to do installations with LATCH.

"Our results provide design guidelines for vehicle manufacturers on how to make LATCH easier for parents to use," said UMTRI assistant research scientist Kathy Klinich, lead author of the study. "We were happy to see that most manufacturers tested have some vehicles that meet the new criteria."

The goal of LATCH is to increase the number of children who ride properly restrained by making child restraints easier to install. Consumers who drive 2003 and later model vehicles likely have encountered the system. LATCH has two distinct components: lower attachments on child restraints that connect to anchors at the vehicle seat bight (where the bottom cushion meets the seat back) and top tethers on forward-facing restraints that attach to anchors on the vehicle's rear shelf, seat back, floor, cargo area, or ceiling. Tethers help prevent child restraints from moving too far forward during crashes, which would put children at risk of head or neck injuries.

Researchers identified three factors associated with correct lower anchor use: depth, clearance, and force.

- Depth. Lower anchors should be located no more than 3/4 inch deep in the seat bight and should be easy to see.
- Clearance. Nothing should obstruct access to the anchors.
- Force. Parents should be able to install child restraints using less than 40 pounds of force.

All three factors are related and are good predictors of how well people are able to correctly install child restraints. Vehicles meeting the criteria were 19 times as likely to have lower anchors used correctly by volunteers compared with vehicles that don't meet any of the criteria.

"These are things that automakers can do to improve child-restraint installations, and most of them aren't hard," said Anne McCartt, IIHS senior vice president for research and one of the report's authors. "Lower anchors can be designed so they are easy to use."

Download the full report at

<http://deepblue.lib.umich.edu/bitstream/2027.42/90856/1/102854.pdf>

UMTRI is now offering services to assess LATCH usability in vehicles and assessment of vehicle child restraint fit. For more information, see <http://umtri.umich.edu/pdf/facilities/LATCHUsabilityVehicleCRSFit.pdf>

RR



Interactive Website Helps Parents Keep Teen Drivers Safe

Nearly 30,000 parents around the state are using a free, interactive web resource that provides information and tools to help parents protect their teens while they gain experience driving without adult supervision.

The online Checkpoints™ program, located at www.saferdrivingforteens.org, is presented by UMTRI and the Michigan Department of Community Health through a grant from the National Center for Injury Prevention and Control, part of the Centers for Disease Control and Prevention.

“Prom season and the end of the school year are an exciting time of year for teens, but it is also a time when they are likely to be driving more often and to a larger variety of destinations. The special celebrations and year-end activities offered by many schools and communities create more pressure for teens to drive at night and to give other teens rides,” said Ray Bingham, a research professor at UMTRI, as well as the U-M schools of medicine and public health.



UMTRI YOUNG DRIVER BEHAVIOR AND INJURY PREVENTION GROUP

“Teen drivers are at greater risk in these situations compared to adults, due to their young age and inexperienced driving. The excitement and increased likelihood of exposure to alcohol and drugs that may accompany some celebrations add to teens’ risk. Many parents find that this is a good time to make extra effort to help their teen drivers stay safe.”

The website features an easy-to-use, interactive parent-teen driving agreement called Checkpoints™ that helps clearly establish where and when teens can drive without adult supervision, and how teens can earn increased driving privileges. Because the agreement is interactive, parents can use it now to establish driving privileges for prom and graduation season and revisit it as their teen gains driving experience. The website also includes information about Michigan’s driving laws for teens, and videos about using the agreement and talking with teens about driving.

The Checkpoints™ parent-teen driving agreement was created by Bruce Simons-Morton of the National Institutes of Health and has been tested multiple times in several states, including Michigan. Teens whose parents use the agreement receive fewer tickets and report less risky driving behaviors (e.g., speeding, tailgating, turning fast, unsafe lane changes, cutting in front of other vehicles, going through red or yellow lights).

--Bernie DeGroat, U-M News Service

RR

Aging, Mobility, and Quality of Life Conference

The International Conference on Aging, Mobility, and Quality of Life will take place June 24-26 at the University of Michigan in Ann Arbor. Elsevier Publishing is sponsoring the conference in partnership with UMTRI’s Michigan Center for Advancing Safe Transportation throughout the Lifespan (M-CASTL).

The event will focus on the particular requirements of older people for transportation and mobility that give them access to various activities and services that maintain their health and well-being and enhance their quality of life.

The conference will feature speakers from twenty-four countries who will address a wide variety of topics including exercise and health, tourism and leisure, transportation safety, urban planning and environmental design, and assistive technologies, among others.

For conference details and registration, see <http://agingmobilityconference.com/> RR

Sweatman Named Chair of ITS America Board of Directors

COURTESY OF ITS INTERNATIONAL DAILY NEWS



UMTRI director Peter Sweatman has been named chair of the board of directors for the Intelligent Transportation Society of America.

ITS America's board of directors represents all segments of the transporta-

tion industry and guides the strategic goals and activities of the association. Sweatman has been a member of the board of directors since 2008 and had previously served as vice-chair.

Dr. Sweatman is a national leader in intelligent transportation systems. He has previously served as a member of the USDOT ITS Program Advisory Committee (appointed by the Secretary of Transportation), chair of the ITS America Coordinating Council, and chair of the ITS America Safety Forum. He is currently a member of the board of directors for ITS Michigan.

"ITS America does important work in promoting research and deployment of ITS technologies, with a prime focus on safety, but also with wide benefits for mobility and sustainability," said Sweatman. "I'm honored to take the chair at a challenging time when we need to step up our support for ITS research and better articulate a large and growing ITS industry."

At its meeting on May 23, the ITS America Board of Directors also appointed the following new members: Richard Clasby of Help, Inc.; Steven Dellenbeck of Southwest Research Institute; Link Hoewing of Verizon; Steve Kenner of Ford Motor Company; Chris Murray of Kapsch, North America; and Alice Tornquist of Qualcomm, Inc.; Jill Ingrassia of AAA; and Gerry Mooney of IBM Corporation were reappointed.

ITS America represents more than 400 member organizations including public agencies, private corporations, and academic institutions involved in the research, development, and deployment of technologies that improve safety, increase mobility, strengthen the economy, and sustain the environment.

ITS America can be found at <http://www.itsa.org>.

Romine to Lead UMTRI Marketing and Communications



Francine Romine, formerly of Ford Motor Company, joined UMTRI on March 5 as the institute's new director of marketing and communications.

In her new position, Francine will develop and manage marketing and

communication strategy for UMTRI, aimed at reinforcing UMTRI's expertise and leadership among its various target audiences, both internal and external to the University of Michigan.

Francine will also oversee marketing and communication for UMTRI's Safety Pilot Model Deployment. This thirty-month program will test connected-vehicle technology in a real-world, multimodal setting on roadways in and around Ann Arbor, Michigan.

Francine's professional background includes more than sixteen years in marketing and communications at Ford Motor Company, where she provided guidance and assistance to engineers, scientists, and management regarding the public dissemination of research findings and corporate activities. In the course of her work, she addressed many of the same topics on which UMTRI conducts research, including vehicle safety and sustainability.

"I believe Francine has a remarkable ability to articulate the importance of UMTRI's work, the role it plays in serving society, and the significance of transportation safety and sustainability on a personal level," said UMTRI director Peter Sweatman. "She will be a great asset for UMTRI and the U-M."

RR

Most UMTRI reports are available in full text online. See the website address at the end of the citation. Please contact the UMTRI Library at 734-764-2171 or umtridocs@umich.edu to inquire about the availability of other publications listed here.

Journal Articles

Brinkey, L.; Manary, M.; Santioni, D. 2011. "Development of an Alternative Five-Point Restraint Harness to Accommodate Children with Special Healthcare Needs in Child Safety Seats." *Journal of Pediatric Rehabilitation Medicine*, vol. 4, no. 4, pp. 289-300, DOI:10.3233/PRM-2012-0192.

Classen, S.; Eby, D.W.; Molnar, L.J.; Dobbs, B.; Winter, S. 2011. "Transportation and Aging: Evaluating Stakeholders Perspective on Advancing Safe Mobility." *South African Journal of Occupational Therapy*, vol. 41, no. 33, pp. 18-24, <http://www.sajot.co.za/index.php/sajot/article/view/42>.

Luoma, J.; Sivak, M. 2012. "Interactions of Environmental and Safety Measures for Sustainable Road Transportation." *European Transport Research Review*, published online April 27, 2012, DOI:10.1007/s12544-012-0078-5, <http://www.springer-link.com/content/h724t4j1507367t0/>.

Manary, M.A.; Schneider, L.W. 2011. "Applying Basic Principles of Child Passenger Safety to Improving Transportation Safety for Children Who Travel while Seated in Wheelchairs." *Journal of Pediatric Rehabilitation Medicine*, vol. 4, no. 4, pp. 241-250, DOI:10.3233/PRM-2012-0191.

Schneider, L.W.; Manary, M.A. 2011. "Transportation Safety for Children with Special Healthcare Needs." *Journal of Pediatric Rehabilitation Medicine*, vol. 4, no. 4, pp. 239-240, DOI:10.3233/PRM-2012-0193.

Silverstein, N.M.; Gottlieb, A.G.; Eby, D.W.; Molnar, L.J.; Kwan, N.; Materdey, T.; Adler, G.; Van Ranst, E. 2011. "Do Memory-Impaired Drivers and Their Family Members Agree on Driving Ability and Behaviors?" *Transportation Research Record*, no. 2265, pp. 200-206, DOI:10.3141/2265-23.

Sivak, M.; Schoettle, B. 2011. "Recent Changes in the Age Composition of U.S. Drivers: Implications for the Extent, Safety, and Environmental Consequences of Personal Transportation." *Traffic Injury Prevention*, vol. 12, no. 6, pp. 588-592, DOI:10.1080/15389588.2011.605817.

Technical Reports

Blower, D.; Matteson, A. 2012. Evaluation of 2010 Delaware Crash Data Reported to the MCMIS Crash File. Report no. UMTRI-2012-3. <http://hdl.handle.net/2027.42/90844>

The research documented in this report was sponsored by the Federal Motor Carrier Safety Administration.

Eby, D.W.; Molnar, L.J. 2012. Has the Time Come for an Older Driver Vehicle? Report no. UMTRI-2012-5. <http://hdl.handle.net/2027.42/89960>

The research documented in this report was sponsored by UMTRI's Sustainable Worldwide Transportation program.

Klinich, K.D.; Flannagan, C.A.C.; Manary, M.A.; Moore, J.L. 2012. LATCH Usability in Vehicles. Report no. UMTRI-2012-7. <http://hdl.handle.net/2027.42/90856>

Luoma, J.; Sivak, M. 2012. Road-Safety Management in Brazil, Russia, India, and China. Report no. UMTRI-2012-1. <http://hdl.handle.net/2027.42/89427>

The research documented in this report was sponsored by UMTRI's Sustainable Worldwide Transportation program.

Reed, M.P.; Ebert-Hamilton, S.; Rupp, J.D. 2011. Effects of Obesity on Seat Belt Fit. Report no UMTRI-2011-27. <http://hdl.handle.net/2027.42/89867>

The research documented in this report was sponsored by the National Highway Traffic Safety Administration.

Reed, M.P.; Hu, J. 2011. Development of a Methodology for Simulating Seat Back Interaction Using Realistic Body Contours. Report no UMTRI-2011-28. <http://hdl.handle.net/2027.42/89868>

The research documented in this report was sponsored by the Faurecia Group.

Sivak, M.; Schoettle, B. 2011. Recent Changes in the Age Composition of Drivers in 15 Countries. Report no. UMTRI-2011-43. <http://hdl.handle.net/2027.42/86680>

The research documented in this report was sponsored by UMTRI's Sustainable Worldwide Transportation program.

Schoettle, B.; Sivak, M. 2012. Recent Fuel Economy Trends for New Vehicles in the U.S. Report no. UMTRI-2012-2. <http://hdl.handle.net/2027.42/89864>

The research documented in this report was sponsored by UMTRI's Sustainable Worldwide Transportation program.

Sivak, M.; Pottinger, M. 2012. Analysis of Performance Ratings for Tires. Report no. UMTRI-2012-8. <http://hdl.handle.net/2027.42/90513>

The research documented in this report was sponsored by UMTRI's Sustainable Worldwide Transportation program.

Sullivan, J.M.; Sivak, M. 2012. Carbon Capture in Vehicles: a Review of General Support, Available Mechanisms, and Consumer Acceptance Issues. Report no. UMTRI-2012-12. <http://hdl.handle.net/2027.42/90951>

The research documented in this report was sponsored by UMTRI's Sustainable Worldwide Transportation program.

RR

June

New Partners for Smart Growth
Telematics Detroit 2012
June 6-7; Novi, Michigan
www.telematicsupdate.com

Lifesavers: National Conference on Highway
Safety Priorities
June 14-16; Orlando, Florida
www.lifesaversconference.org

International Bridge Conference
June 10-13; Pittsburgh, Pennsylvania
www.internationalbridgeconference.org/

ITS Canada Conference
June 10-13; Quebec City, Canada
www.itscanada.ca/english/annualconferences.htm

National Association of Regional Councils
(NARC)
June 10-14; St. Petersburg, FL
www.narc.org/

International Conference on Aging, Mobility
and Quality of Life
June 24-26; Ann Arbor, Michigan
www.agingmobilityconference.com

ITE Midwestern District Conference and TRB
4th Urban Street Symposium
June 24-27; Chicago, Illinois
www.mwite-uss4-2012.org

Transportation-Related Environmental
Analysis, Ecology, and Air Quality Summer
Conference
June 24-27; Little Rock, Arkansas
www.trb.org/calendar

TRB/AASHTO Policy Committees' Summer
Meeting
June 25-27; Irvine, California
www.trb.org/calendar

July

TRB Planning Committee Summer Meeting
July 8-11; Irvine, California
www.trb.org/Calendar

International Conference on Concrete
Pavements
July 8-12; Quebec City, Quebec, Canada
<http://www.concretepavements.org/10thiccp/>

SHRP 2 Safety Research Symposium
July 12; Washington, D.C.
www.trb.org/Calendar

STN Expo
July 21-25; Reno, Nevada
www.stnonline.com/expo

Powertrain Strategies for the 21st Century
July 25; Ann Arbor, Michigan
<http://www.umtri.umich.edu/divisionPage.php?pageID=265>

Workshop on the Future of Road Vehicle
Automation
July 25-27; Irvine, California
www.trb.org/Calendar

August

COTA International Conference of
Transportation Professionals
August 3-6; Beijing, China
www.cictp.org

CAR Management Briefing Seminars
August 6-9; Traverse City, Michigan
<http://www.cargroup.org/?module=Page&ID=management-briefing-seminars>

ITE Annual Meeting and Exhibit
August 12-15; Atlanta, Georgia
<http://www.ite.org>

RR

UMTRI RESEARCH REVIEW

The *UMTRI Research Review* is sent out free of charge, upon request. If you wish to be added to or removed from our mailing list, please send your complete address, plus e-mail address, to umtri@umich.edu.



UNIVERSITY OF MICHIGAN
TRANSPORTATION RESEARCH INSTITUTE

2901 Baxter Rd
Ann Arbor MI 48109-2150

Need to change your address?

Go to <http://umtri.umich.edu/url.plp?f>

Non-Profit Organization

U.S. Postage

PAID

Ann Arbor, MI

Permit No. 144