

WTI
Western Transportation
INSTITUTE

Research
Outreach
Education
News from the Labs
New Projects
Staff News

[about WTI](#) | [research areas](#) | [laboratories](#)



July 2011 Newsletter

Message from the Director

Building Global Connections

"Think globally, act locally" is a popular call to arms for environmental interests, designed to encourage people to take actions in their own communities that protect the long-term interests and health of the entire planet. I would propose that "thinking globally" is also a wise approach for transportation development.

From a literal perspective, thinking globally means ensuring that our transportation systems not only connect us to the next city or state, but also to anywhere in the nation or world. To revitalize an increasingly global economy, we must be able to move people and goods quickly and efficiently, wherever business opportunities await. So we need to work with transportation leaders at every level — local, state, national, and international — to develop a seamless transportation network.

In addition, "thinking globally" represents an effective problem solving approach that we use for our research — holistic, integrated investigations that consider multiple aspects of one problem in order to develop a comprehensive solution. At WTI, we have found this to be a particularly successful approach to safety research. With our multi-disciplinary staff, we can address a broad range of factors that influence the challenge:

- Human factors, such as the driver's performance or traveler's behavior
- Infrastructure factors, such as the condition of the facilities

- Environmental factors, such as the impact of weather
- Technology factors, such as the availability or absence of communications

In this issue of the newsletter, you'll read about how we use this "big picture" approach to create and implement innovative solutions that address critical safety challenges facing transportation agencies on a day-to-day basis. For example, you'll learn about how WTI's Center for Health and Safety Culture is working with the Idaho Transportation Department to reduce crashes through a communication campaign that educates drivers about risky decisions and behaviors. The project integrates WTI's expertise and research knowledge on rural road safety, human factors, and cultural norms to deploy a pro-active effort that could reduce injuries and prevent fatalities on Idaho roads.

You'll also read about a number of our other partnerships that reflect our commitment to collaborating with partners around the country and around the world. We are very excited by our growing number of international partnerships (highlighted in their own article); in the last year alone our researchers have been invited to speak or share their expertise in countries such as Brazil, China, and Jordan.

With this outlook, we are always seeking new partners who share our interest in developing an integrated, safe, and sustainable transportation system. If you are interested in working with WTI, please contact me at stevea@coe.montana.edu.

[Back to top](#)

Research

Multi-disciplinary + Collaborative efforts + Implementation = Keeping Motorists Safe

The mission of the Western Transportation Institute's Safety and Operations program is to provide national leadership in the development of sustainable solutions to safety and operational challenges in rural America. By taking a holistic approach - emphasizing safety, operations, and human factors - WTI has been able to develop comprehensive solutions, not just treat individual symptoms. The depth of resources and multi-disciplinary methods utilized in the Safety program include:

- Human factors as related to driver performance, highway design, information systems, special users, education and training;
- ITS planning, demonstration, deployment, and evaluation;

- Traffic safety improvement through engineering, education, enforcement and EMS;
- Development of tools to better monitor and assess traffic operations on rural highways;
- Traffic control and safety during nonrecurring events (e.g., extreme weather conditions, work zones, traffic-related incidents, special events, natural disasters); and
- Supporting multi-agency transportation system management and coordination efforts.

Recognizing the importance of pooling resources for a greater whole has enabled the Safety program to expand its potential. In 2009, WTI incorporated a new center that examines the health and safety culture. This new center and its practices now play a significant role in the Annual National Summit for Rural Traffic Safety Culture, sponsored by WTI. The Safety program has also pursued collaborative opportunities with other universities and established long-term working relationships on multiple projects.

Safety Culture

Health and safety are impacted by culture. Focusing only on single solutions, such as infrastructure improvements or vehicle design, will not achieve comprehensive safety results. WTI's Center for Health and Safety Culture uses a process to transform cultures, measurably improving health and safety outcomes. The Center's areas of focus are directly connected to the Safety Program in terms of transportation safety, automated enforcement, impaired or distracted driving, seatbelt use, farm safety, and workplace transportation safety.

"Enhancing our traffic safety culture, in my opinion, is the key to moving towards a zero death future. And, I look forward to the contributions the Center for Health and Safety Culture can make to overcome the challenges associated with this cultural change."

— *Peter Kissinger, President and CEO, AAA Foundation for Traffic Safety*

Project on the Ground: Tools to Reduce Fatalities and Injuries from Run-off-Road Crashes

The Center recently began work with the Idaho Transportation Department to develop an evidence-based social marketing campaign to reduce single vehicle run-off-the-road (ROR) crashes, utilizing a science-based process developed by the Center from over 20 years of research and outcomes. The Center seeks to transform culture around a variety of health and safety issues including ROR crashes. The project focuses on developing a communication campaign to address driver decisions to NOT engage in risky driving behaviors associated with ROR crashes.

Safety Culture at work: 2011 National Summit for Rural Traffic Safety Summit

Focused on safety and the human factors component, the 3rd Annual National Summit for Rural Traffic Safety Summit, sponsored and hosted by WTI, will kick off on July 11 in Big Sky, Montana. Building upon the last two Summits, and using the Positive Community Norms model introduced by the Center for Health and Safety Culture, the intention for the 2011 Summit is to move beyond informative presentations that have provided foundation for this important work, and begin to take action to transform rural driving culture Towards Zero

Deaths (TZD).

University Collaborations

WTI has been collaborating with other University Transportation Centers to develop safety solutions. Working closely with the National Advanced Driving Simulator at the University of Iowa and the University of Wisconsin, WTI has been providing simulator resources and developing validation methodology for a large scale, three phase research collaboration on behalf of the FHWA Exploratory Advanced Research Program. The "Making Driving Simulators More Useful for Behavioral Research" project is helping to refine driving simulator research methods so that findings correspond more closely to on-road behavior, making simulators useful for roadway design. Most recently, WTI replicated an Arizona roundabout in the virtual environment of the WTI driving simulator.

WTI has also collaborated with the University of Iowa on the Advanced Vehicle-Based Countermeasures for Alcohol-Related Crashes. The SHRP II: S02 Proposal: "Integration of Analysis Methods and Development of Analysis Plan" project was a collaborative effort with not only the University of Iowa, but also Iowa State University, and the University of Wisconsin.

"Iowa and Montana share common interests both in terms of the importance of traffic safety to our regions and in terms of the complementary research skills and facilities we have. This is an example of an effective and friendly partnership built that leverages both our areas of expertise and our shared spirit of collaboration."

— *Dr. Nicholas Ward, Senior Research Scientist, Western Transportation*

Implementation

WTI's success as a trusted partner results only in part from the valuable research conducted. While research represents the critical foundation, the implementation and evaluation components have a greater direct impact on safety solutions. True safety can only be achieved if research results are pulled from the pages of final reports and implemented on the ground, then evaluated for their effectiveness.

Project on the Ground: Evaluating the Effectiveness of Winter Chemicals on Reducing Crashes in Idaho

Various winter chemicals have different performance levels, costs, and best conditions for use. The Idaho Transportation Department (IDT) is investigating the safety issues involved with winter maintenance practices and is seeking to identify the most cost-effective and environmentally sound ways of using winter chemicals.

WTI will evaluate winter chemicals and provide guidance on the most appropriate winter maintenance strategies to apply under specific roadway and climatic conditions within ITD districts. The research will evaluate the effectiveness of different winter chemicals on reducing crashes in Idaho.

"Having a better understanding of treatments to use under different conditions reduces crashes, improves driver safety, and reduces disruption to motorists by improving roadway conditions," says David Veneziano, WTI Research Scientist. "It also presents financial savings through more efficient use of materials."

For more information on WTI Safety projects and resources, please contact:

Dr. Ahmed Al-Kaisy, WTI Safety and Operations Program Manager, aalkaisy@coe.montana.edu

Jeff Linkenbach, Center for Health and Safety Culture, Director, jwl@coe.montana.edu

Dr. Nicholas Ward, WTI Safety and Operations Senior Research Scientist,
nward@coe.montana.edu

[Back to top](#)

Reaching Out Globally

What do Jordan and Mexico have in common? They join a growing list of countries collaborating with WTI to find innovative solutions to evolving transportation issues common to multiple regions of the world. As reported in last October's issue, researchers from WTI have been developing relationships not only across the country, but across the globe, and identifying mutual transportation challenges. Whether it is animal vehicle collisions — be it elephant or deer! - or texting while driving, the roadways around the world are not so unique.

WTI researchers are working in multiple ways to disseminate research results and spur international implementation. In the last six months alone, WTI has participated in some type of research or scientific exchange with:

- Australia
- Brazil
- Canada
- China
- Jordan
- Mexico

By collaborating with authors around the world on peer reviewed journals, hosting and serving as guest lecturers or workshop leaders, and traveling to other regions to see firsthand the problems and solutions at work, WTI is establishing effective partnerships to advance diversity.

Australia

Dale Steinhardt, Senior Research Officer at the Centre for Accident Research and Road Safety — Queensland (CARRS-Q) — Queensland, Australia, presented "Profiling off-road motorcycle and all-terrain riders in Queensland, Australia" to an audience of WTI and MSU students, professors, and researchers in May 2011. Over the two day visit, Streinhardt attended presentations by WTI Program managers, toured WTI's simulator suite, and visited with representatives of Montana's Young Driver Group. CARRS-Q conducts research and provides training to improve safety on Queensland roads and in the workplace.

Brazil



Brazilian researcher with a wildlife camera in the Jatai Nature Reserve. (Courtesy of Marcel Huijser)

Last summer, Fernando Abra from São Paulo, Brazil, interned with the WTI Road Ecology program. This spring, WTI Road Ecologist, Dr. Marcel Huijser traveled to São Paulo to collaborate with Abra and several researchers and universities. While there, Dr. Huijser:

- Conducted a mini course in Road Ecology at University of São Paulo (USP). The University of São Paulo is one of the largest universities in the world with over 70,000 undergraduates and 30,000 graduate students. Road Ecology is emerging in Brazil and USP is looking for collaborative efforts;



Dr. Huijser conducting mini course at USP. (Courtesy Bethanie Walder)

- Presented a guest lecture "Introduction to Road Ecology" at the Federal University of São Carlos;
- Participated in a field visit of highway mitigation measures along BR369 between Jau' and Itirapina. Along with China and India, Brazil is one of the largest growing economies in the world and is actively building new and maintaining old infrastructures.



*Brazilian researchers take DNA sample from a road killed jararaca (*Bothrops jararaca*) – a venomous pit viper species. (Courtesy of Marcel Huijser)*

Canada

WTI continues to expand and build on its strong partnerships with Canadian researchers, particularly in the field of road ecology. Road Ecologist, Dr. Tony Clevenger, presented "The changing landscape of transportation: designing roads to conserve wildlife populations," at the Roads and Terrestrial Fauna: from Science to Solutions Symposium, Québec City, Quebec, Canada, in May 2011.

Road Ecologists Angela Kociolek and Dr. Tony Clevenger collaborated with two Canadian researchers on a recently published peer reviewed article, Effects of Road Networks on Bird Populations. [More information.](#)

Dr. Marcel Huijser continues research to identify mitigation efforts that will help reduce animal-vehicle collisions, particularly for carnivores, and preserve habitat connectivity across the roads and railroads in Mount Robson Provincial Park (MRPP) and Jasper National Park (JNP) in Canada.

WTI's Center for Health and Safety Culture will launch a comprehensive Positive Community Norms research project for Workplace Safety and Prevention Services (WSPS) to reduce motor vehicle incidents in Ontario. WSPS provides industry-specific health and safety products, training and consulting services to 154,000 businesses and 3.8 million employees in Ontario's agricultural, manufacturing and service sectors.

China

As a rapidly growing economy, China has a strong interest in research collaborations to enhance its transportation networks. WTI's Xianming Shi gave a presentation in April at the Harbin Institute of Technology in Harbin, China on Corrosion & Sustainable Infrastructure Laboratory: Research Practices & Vision for the Future.

Shi also completed two joint publications on anti-icing coatings with researchers from Chongqing University (Chongqing, China): "Fabrication of Super-Hydrophobic Surfaces with Long-Term Stability," and "Anti-icing Performance of a Superhydrophobic Polydimethylsiloxane / Nano-silica Hybrid Coating for Insulators."

WTI Road Ecology will host delegates from the China Academy of Transportation Science (CATS) in August for four days. This is CATS's second visit to WTI in two years and is a reciprocal to WTI's trip to China last September. While in Montana, the delegates will tour:

- An Aquatic Passage Project at the USFWS Hatchery
- A Vegetation Reclamation Project along MT Highway 84
- A Wildlife Passage Project at the Bozeman Pass on Interstate Highway 90
- Missoula - US 93 Wildlife Crossings Project: Evaro Hill to Polson, MT
- Yellowstone National Park.

Jordan

WTI's Dr. Ahmed Al-kaisy is collaborating with a faculty member at the University of Jordan, Amman, Jordan to examine the perceived risks of using cell phones while driving in Jordan. Al-kaisy presented this project at the 2011 TRB meeting and is submitting another journal article for publication.

Mexico

In June, Dr. Tony Clevenger traveled to Tabasco, Mexico to present three lectures at a workshop on Human Infrastructure Impacts on Wildlife in Latin America at the Universidad Juarez Autonoma. His topics included Basics of Road Ecology; Mitigating highway impacts on wildlife: Banff National Park, Alberta as a case study; and Planning and designing effective highway mitigation for wildlife. This workshop was an inaugural forum open to students and the public.

WTI looks forward to building on these established relationships and creating new partnerships

with other countries. Through continued collaborations researchers can help ensure the safety of motorists and promote livability around the world.

[Back to top](#)

International Research Highlight: Road Ecologists Develop Wildlife Connectivity Plan for Canadian Parks

The Road Ecology team at WTI has expanded its international research portfolio, as it begins work on a new habitat connectivity plan in the Canadian Rockies.

Jasper National Park (JNP) and Mount Robson Provincial Park (MRPP), located along the border between British Columbia and Alberta in Western Canada, are home to numerous species of large animals, including coyotes, wolves and bears. Park and wildlife officials have concerns about the impacts that two of the major transportation corridors — Highway 16 and a railroad that runs parallel to it — are having on the populations of some of these species. "When a road or a railroad runs through the middle of an animal's habitat, it can have numerous consequences," said Dr. Marcel Huijser, the WTI Research Ecologist leading the study; "the most obvious is that animals may be hurt or killed trying to cross the corridor, but it can cause other changes too, such as blocking their access to food and water sources or isolating them from other animals, effectively creating smaller populations with reduced survival probability."

The Trans Mountain Legacy Fund — which was founded to improve the ecological integrity of the parks — selected Huijser and his team to identify mitigation efforts that will help reduce collisions and preserve habitat connectivity for medium and large-sized carnivore species. Researchers will collect and analyze data to identify high mortality and movement areas, and select locations where mitigation efforts will have the greatest benefit. The team will also identify suitable site specific mitigation measures, including cost estimates. "Some major mitigation efforts like wildlife overpasses are very effective, but they are also a significant investment and are built to last for 75 years," Huijser explained; "so you need to make sure that you are not only picking the right tool, but putting it in exactly the right place so that animals will use it on a long-term basis."

The project also gives Huijser and WTI Road Ecology staff the opportunity to expand their experience working in Canada's National Park System. "We've done extensive work evaluating the wildlife crossing structures in Banff, and we also did a similar mitigation plan to this one for Kootenay National Park," concluded Huijser; "we're pleased to put what we've learned to work in Jasper and Mt. Robson."

[Back to top](#)

Multi-modal projects help federal lands preserve precious natural resources

For over a decade, WTI's Mobility and Public Transportation program has spearheaded efforts to expand transportation options in small and remote communities. These projects have helped to enhance livability and preserve a high quality of life in rural areas.

In addition, WTI is increasingly bringing this multi-modal expertise to federal lands. In national parks, recreation areas, forests and other public lands, alternative transportation options can improve the experience for visitors and help preserve fragile natural and historical resources.

As the team leader for the Paul S. Sarbanes Transit in Parks Technical Assistance Center (TAC), WTI has a growing number of opportunities to work with federal land managers on alternative transportation projects. The TAC offers a "one-stop-shop" of information, training and personal assistance for public land units who want to implement alternative transportation solutions ranging from clean fuel buses to bicycle networks to water taxis and intelligent transportation systems that may support them.

"Concentrated visitation during the peak season is overloading the capacity of the transportation systems to and within many public lands," said WTI Research Scientist Natalie Villwock-Witte, "federal land managers are working hard to accommodate a large number of visitors, ensure that they have a positive experience, and minimize the impact of these visitors on the surrounding environment. To help managers visualize how alternative transportation may solve their transportation challenges, the TAC can provide successful examples of alternative transportation from other units."

To this end, the TAC recently completed a series of four case studies that showcase federal land units that have used multi-agency partnerships to implement, operate or integrate alternative transportation systems. In many cases, these collaborations allow the agencies to overcome operational obstacles or achieve ongoing financial sustainability. The case studies highlight the transportation initiatives at:

- Santa Ana National Wildlife Refuge
- North Moab Recreation Area
- Cape Cod National Seashore
- Grand Island National Recreation Area

The Santa Ana and North Moab reports are available on the [TAC website](#). The other two case study reports will also be available on the website following their upcoming release.

In addition to facilitating TAC projects, WTI also partners directly with public land units to test and

deploy technologies that can promote the use of multi-modal options. This summer, Rocky Mountain National Park (ROMO) in Colorado will implement a pilot Intelligent Transportation System (ITS) composed of Dynamic Message Signs (DMS) and Highway Advisory Radio (HAR). WTI researchers developed the ITS operations plan, as well as the evaluation plan to study whether the traveler information messages help guide drivers to park and ride lots and shuttle services available in the Park and gateway communities.

"Almost 3 million people visit ROMO every year — and the overwhelming majority of them visit from mid-June to mid-August — so the roads to and in the Park can become seriously congested during peak season," explained Villwock-Witte; "if we can reach drivers on their way into the area, we may be able to encourage them to use an alternative way of traveling through the Park and to popular destinations in the gateway community. By doing that, we may be able to reduce congestion and vehicle emissions, which will help protect the environmental resources and habitats in ROMO for generations to come."

For more information, contact Jenni West, TAC Manager, Paul S. Sarbanes Transit in Parks Technical Assistance Center, jenni.west@triptac.org Natalie Villwock-Witte, WTI Research Scientist, natalie.witte@coe.montana.edu.

[Back to top](#)

Multi-State Partnerships: Maximizing Resources

In addition to developing international relationships and collaborating with other universities, WTI has been steadily building programs and interactions between states, demonstrating that bi- and multi-state partnerships are both feasible and advantageous. Connecting states with shared borders and issues and bringing them together allows for maximization of resources and provides a source for fresh ideas and perspectives. The California – Oregon Advanced Transportation Systems (COATS) and the Western States Rural Transportation Consortium are thriving examples of states coming together to maximize efforts as well as promoting tech transfer and education through the annual Western States Rural Transportation Technology Implementers Forum. The newly forming State Departments of Transportation Pooled Fund seeks to demonstrate that such partnerships are advantageous as they further national transportation safety initiatives on "Towards Zero Deaths."

California Oregon Advanced Transportation Systems (COATS)

Since 1998, WTI has been working in cooperation with the California and Oregon Departments of Transportation on the California — Oregon Advanced Transportation Systems (COATS) project.

COATS established bi-state cooperation to investigate and address rural concerns with advanced transportation technologies. This effort has identified regional challenges, as well as developed and evaluated solutions throughout the northern California and southern Oregon region. It has served as the impetus for long-term partnerships, provided a forum for discussion and information dissemination, and created an incubator for ideas that have evolved into stand-alone projects and products.

Spanning over twelve years and beginning the fifth phase of COATS, the efforts are now expanding the service area to Washington and Nevada. Connecting additional western states will help broaden the partnership and foster greater research and technology transfer and collaboration.

COATS Phase IV on the ground project: Effective Deployment of Radar Speed Signs

Radar speed signs are typically applied and deployed subjectively, without guidance from engineering studies. The devices are placed wherever there is a perceived problem with little quantification of the problem itself. Developed for practitioners in the COATS region to guide purchase and installation and develop consistency between deployments, this research established situations warranting radar speed signs, documented effectiveness in similar applications, and established location (both setting and placement), and technical specifications for procurement, operations, and maintenance.

COATS Phase IV on the ground project: Evaluation of the Fredonyer Icy Curve Warning System

This project evaluated the impacts on vehicle speeds and crash occurrence following deployment of an Icy Curve Warning System (ICWS) on Fredonyer Pass, located on State Highway 36 in northeastern California. The ICWS includes a system consisting of pavement sensors to detect icy conditions in combination with dynamically activated signage to provide motorists with real-time warning when icy conditions are present. Initial results have indicated that the system has been effective in reducing ice-related crashes, as well as producing speed reductions while the system is active.



(Courtesy of Chris Strong)

The newly expanded COATS region is now the Western States Rural Transportation Consortium (WSRTC), a multi-state partnership established to facilitate and enhance safe, seamless travel throughout the western United States. The Consortium seeks to promote innovative partnerships, technologies and educational opportunities to meet these objectives. The Consortium provides a collaborative mechanism to leverage research activities in a coordinated manner to respond to rural transportation issues among western states related to technology, operations and safety. Members of the Consortium include the states of California, Oregon, Nevada, and Washington. To achieve its mission, the WSRTC's activities include technology transfer and education through the Western States Rural Transportation Technology Implementers Forum.

Western States Rural Transportation Technology Implementers Forum

The annual Western States Rural Transportation Technology Implementers Forum is an excellent example of multi-state collaboration, providing an opportunity to learn from and network with other intelligent transportation systems (ITS) professionals who are implementing projects in rural areas. Originating from the COATS partnership, this year's 6th annual event was held in June in Yreka, California. Engineers, technicians, researchers, and students gathered for the two-day Forum to learn about and discuss rural ITS projects with practitioners from the western states. Participants represented California, Nevada, and Washington State Departments of Transportation, five different universities, the ITS Joint Program Office at the U.S. Department of Transportation, and the California Highway Patrol.

State Departments of Transportation Pooled Fund

In an effort to address national needs, the WTI Center for Health and Safety is currently investigating the concept of a FHWA Pooled Fund study that would inventory existing challenges, opportunities, and best practices relating to culture, transportation, and safety. The proposed fund will include a variety of state Departments of Transportation and will build upon WTI's recent FHWA White Paper on Traffic Safety Culture, "Towards Zero Deaths: A National Strategy on Highway Safety." If you are interested in participating and joining the pooled fund, please contact Jeff Linkenbach jwl@coe.montana.edu.

The evolution of COATS into WSRTC illustrates the benefits of states seizing opportunities to work together on shared goals. As the State Departments of Transportation Pooled Fund initiative comes to fruition, the goal is that it will achieve similar successes as those in the west to connect states on a broader level.

Please contact David Veneziano david.veneziano@coe.montana.edu or Doug Galarus dgalarus@coe.montana.edu or visit www.westernstates.org/default.html to learn more about WSRTC and COATS.

[Back to top](#)

Outreach

WTI continues to use a variety of outreach activities to disseminate research findings, share lessons learned and help advance the state of the practice in rural transportation. Our researchers are leading field trips, developing an institute dedicated to road dust and sponsoring relevant conferences.

6th Annual Western States Rural Transportation Technology Implementers Forum

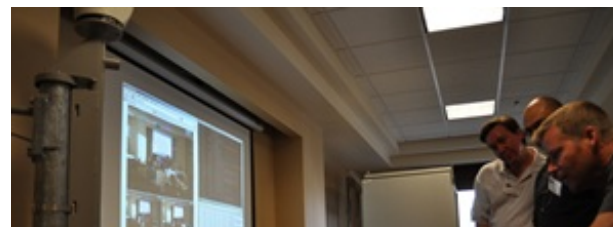
The 2011 Western States Rural Transportation Technology Implementers Forum was held June 14th – 16th, in Yreka, California. Engineers, technicians, researchers, and students involved in rural intelligent transportation systems (ITS) gathered for the two-day Forum to learn about and discuss rural ITS projects with practitioners from the western states. Participants represented California, Nevada, and Washington State Departments of Transportation, five different universities, the ITS Joint Program Office at the U.S. Department of Transportation, and the California Highway Patrol.

The Forum is designed to foster transparency and trust by providing an informal atmosphere where rural ITS engineers and technicians can share dialogue about actual projects that have been implemented, discussing what worked and what did not. Presentations and demonstrations are one to two hours in length, allowing speakers ample time to present detailed information and delve into the nuts and bolts of a project. Questions and discussion are encouraged throughout the presentation and are continued during the extended breaks and networking sessions.

The Forum's Day 1 presentations are generally in depth, detailed, 90 minute to two hour technical presentations, while Day 2 speakers incorporate hands-on demonstrations during an hour long presentation. Speakers and participants bring actual components of their equipment and



Western States Forum participants watch and listen as Keith Koeppen, Caltrans District 2, demonstrates an information management and retrieval system for ITS devices that he has helped to develop. (Courtesy: Doug Galarus)



technology to display and demonstrate, spurring immediate technology transfer across state borders. This year, speakers represented three state departments of transportation, three universities, and the U.S. DOT.



Dean Campbell from Caltrans District 3 demonstrates a power management controller to Stan Slavin and John Castro, also from Caltrans. (Courtesy: Doug Galarus)

Day 1 technical presentations included:

- *Wireless Communications for Rural ITS*, Washington State DOT (WSDOT) — a detailed review of WSDOT's wireless data communication systems for rural ITS, including lessons learned from previous projects, and engineering, tools, and technology used to implement the current system.
- *Photovoltaic Power Systems for Rural ITS*, Nevada DOT - a discussion about Nevada's use of solar systems to power rural ITS elements, including design methods and calculations, system lifecycle costs, and lessons learned.
- *Voice Communications in Rural Areas (Voting Scan)*, Caltrans Office of Radio Communications — a look at how Caltrans designed and is implementing a voting scan radio communications system for maintenance operations.
- *The IRIS Open Advanced Traffic Management System: Development, Deployment, Capabilities, and Maintenance*, Caltrans District 10, AHMCT at the University of California-Davis — a detailed presentation discussing the IRIS open source advanced transportation management system being deployed in several Caltrans districts, including development, functionality, configuration, testing, maintenance, costs, and scalability.
- *Redefining the Path to ITS Standards Training*, US DOT, RITA, ITS FPO: an overview of the ITS Joint Program Office's Professional Capacity Building program's efforts to redesign ITS standards training to build and enhance the professional capacity of the ITS profession.



Jon Dickinson from the Nevada Department of Transportation discusses a solar panel with Tim McDowell and Ted Bailey from the Washington State Department of Transportation. (Courtesy: Leann Koon)

Day 2 technical presentations and demonstrations included:

- *The Power of Information* , Caltrans District 2 — a review and demonstration of a system and single processor that has been designed and configured to both pull data from the field/local devices as well as push information to external sources, simplifying information exchange and eliminating unneeded devices and processes.
- *Avoiding the Remote Callout* , Caltrans District 3, Caltrans Division of Research and Innovation — explanation and demonstration of a remote power controller with telephone and internet control functions that can reduce or eliminate the need for personnel callouts to rural ITS field elements.
- *Antenna Characterization for Bluetooth-based Travel Time Data Collection* , Oregon State University — results and discussion from a research study comparing the effect of the characteristics of various antennas on travel time data collection using Bluetooth-based technology.
- *MAC Address-Based Delay Measurements at Rural "Gateways"* , University of Washington — results and discussion on using Bluetooth technology to measure delays at rural "Gateways" such as ports of entry and weigh stations.

The Forum continues to be an excellent opportunity to learn from and network with other ITS professionals who are implementing ITS projects in rural areas.

To review presentations from previous Forums and to learn more about the event, please visit www.westernstatesforum.org.

[Back to top](#)

International Researcher Presents at WTI

WTI hosted a presentation given by visiting researcher, Dale Steinhardt, on May 19. Steinhardt is a Senior Research Officer at the Centre for Accident Research and Road Safety – Queensland (CARRS-Q) in Queensland, Australia. Steinhardt's recent work was conducted under a Rural and Remote Road Safety Study (RRRSS) aimed at identifying human factors related to the occurrence of serious traffic incidents in rural and remote areas of Australia. His presentation, "Profiling off-road motorcycle and all-terrain riders in Queensland, Australia," identified key riding groups, risk factors, and interventions.

[Back to top](#)

National Summit for Rural Traffic Safety Culture



Hosted by the Western Transportation Institute and the AAA Foundation for Traffic Safety, the third annual National Summit for Rural Traffic Safety Culture will be held July 11-13, 2011 in Big Sky, Montana. This growing event is sponsored by the Transportation Research Board, the National Highway Traffic Safety Administration, American Traffic Safety Services Association, and the Center for Disease Control and Prevention.

The 2011 Summit will combine informative presentations and interactive work sessions, which will result in important foundational work to guide efforts over the next several years in transforming

rural traffic safety culture Towards Zero Deaths. Participants will also gain valuable skills which they can use to influence culture within their own organizations. Peter Appel, Administrator for the Research and Innovative Technology Administration, United States Department of Transportation (U.S. DOT), will discuss initiatives at the U.S. DOT and partnerships with key stakeholder groups aimed at dramatically reducing fatalities and injuries on our nation's roadways through cultural change strategies.

For registration, lodging, agenda, and travel tips for the 2011 event as well as proceedings from 2009 and 2010, please visit www.RuralITSCSummit.org.

[Back to top](#)

National Rural ITS Conference

Coeur d'Alene, Idaho -- August 28-31, 2011



Named by French-speaking fur traders, Coeur d'Alene, Idaho has long been a hub for exchanging goods. In 2011, we will continue this tradition as we exchange knowledge and information at the 2011 National Rural ITS Conference and ITS Rocky Mountain Annual Meeting. Located on the shore of beautiful Lake Coeur d'Alene, attendees can mix family-friendly fun with training and networking opportunities, dozens of technical sessions and exciting professional tours. Don't forget to save time for the golf tournament hosted by the ITS Rocky Mountain Chapter. You wouldn't want to miss the opportunity to hit a golf shot onto the world's only moveable, floating green! It's always an adventure here, so join us for "Adventures in ITS".

This conference will provide participants the opportunity to network and share experiences within and across a wide variety of ITS disciplines. In addition to traditional ITS topics, this event will bring together both traditional and non-traditional ITS users to address such issues as rural safety, creating and maintaining

livable/sustainable communities, multi-agency coordination, and workforce development, as well as EMS and transit issues. The 2011 sponsors include Ada County Highway District, Idaho Transportation Department, ITS America, ITS Joint Program Office, Research and Innovative Technology Administration (RITA), ITS Rocky Mountain, Open Roads Consulting, Inc., RouteMatch

Software, Inc., Washington State Department of Transportation, and Western Transportation Institute.

The many different training and networking opportunities available through this event will provide participants with the tools necessary to effectively plan and deploy ITS technologies within their own jurisdictions. More information can be found on the conference website:

<http://nritsconference.org>

[Back to top](#)

2nd Road Dust Best Management Practices Conference

Las Vegas, Nevada - November 7-9, 2011

The 2011 Road Dust Best Management Practices Conference will bring together local, state and county road practitioners, as well as researchers and federal agencies to discuss current practices, identify best practices and share lessons learned, in order to assist everyone with an interest in enhancing the management of dust on unpaved roads. The themes of the 2011 Road Dust Best Management Practices Conference will be Environmental Compatibility and Sustainability, General and International Best Practices, and Unique and Extreme Conditions.

The conference will feature national and international experts presenting current best management practices and will use presentations and poster sessions, roundtable dialogue and training sessions to accomplish this. To better serve the road dust community, the conference will also be offering a training session on How to Put Down Product and/or Understanding Dust Plume Opacity. The event is sponsored in part by the Federal Highway Administration-Federal Lands Highways, University of Nevada-Las Vegas, the Alaska University Transportation Center, and the Western Transportation Institute.

To learn more about registration, lodging, submitting an abstract or sponsorship, and vendor opportunities, please visit <http://roaddustinstitute.org/conference>. Questions may also be directed to event support staff at Meetings Northwest (866.633.8110).

[Back to top](#)

Education

WTI Graduates Cohort of Students with Wide Array of Transportation

Expertise

Several WTI graduate research assistants completed all requirements for their Master's degree this spring. Two graduate students working within the WTI Road Ecology focus area received their Master's degrees in Ecology. Joe Smith successfully defended his thesis *Movement and Gene Flow of Northern Flying Squirrels across an Interstate Highway*. Smith's study combined telemetry and molecular genetic techniques to examine the effects of a high-speed, high-volume highway on the movement and population genetic structure of northern flying squirrels (*Glaucomys sabrinus*) in the Cascade Mountains of Washington. He trapped and radio-tracked flying squirrels over a two-year period to gather data on movement within their home ranges and to detect movement across the highway. Additionally, effects of the highway on genetic variation in the study area were tested using DNA extracted from cheek cells of squirrels. The width of the gap between forest edges across the highway appeared to negatively influence crossing rates and no crossings were observed at a site where the average gap width exceeded 80 meters. Genetic analysis provided no evidence that either geographic distance or the presence of the highway was associated with genetic differences between sites at the landscape scale. Results suggest that populations on either side of the highway are well connected demographically and genetically, and that connectivity can be maintained if gaps in forest canopy associated with the highway are kept to a width within the gliding range of flying squirrels. Joe worked with WTI research staff Paula MacKay and Robert Long in Eastern Washington. After graduation, Joe is enrolling in a PhD program at University of Montana and beginning a research project on sage-grouse near Roundup, Montana.

Tiffany Allen also successfully defended her thesis on *The Use of Wildlife Underpasses and the Barrier Effect of Wildlife Guards for Deer and Black Bear*. Allen's thesis explored the effectiveness of wildlife mitigation measures constructed along U.S. Highway 93 on the Flathead Indian Reservation in Montana. The mitigation measures include 2.4-m fencing, crossing structures, and wildlife guards. These measures are aimed at reducing wildlife—vehicle collisions and increasing human safety, while allowing unimpeded wildlife movement and traffic flow. The project monitored wildlife movements with cameras at two guards and in one culvert adjacent to a guard and used both sand tracking beds and cameras to monitor 11 underpasses for over two years. The guards were $\geq 85\%$ effective as a barrier to deer, and 93.5% of deer used the crossing structure instead of the adjacent guard. Though the guards were not an absolute barrier, the results indicate deer were substantially discouraged from crossing, and the vast majority crossed the road using the crossing structure rather than the guard. Tiffany worked with WTI Research Ecologist Marcel Huijser in Missoula, Montana. Tiffany plans to continue working on Road Ecology research at the Western Transportation Institute after graduation. Both Tiffany Allen's and Joe Smith's graduate work were supported by a UTC Graduate Transportation award.

Zachary Kirkemo worked as a research assistant in the Safety and Operations research focus area and completed all degree requirements for his Master's degree in Civil Engineering this May. His thesis entitled *Montana Rest Area Usage: Data Acquisition and Usage Estimation* gathered rest area usage data that could be used to support various aspects of rest area

planning, design, and operations in the future; and developed rest area usage guidelines, including recommended procedures that could be used in predicting rest area usage in the state of Montana. The project was funded by the Montana Department of Transportation. Zachary's research was also incorporated into a paper successfully submitted to the Transportation Research Board:

- Al-Kaisy, A., Kirkemo, Z., Veneziano, D. and Dorrington, C. "Traffic Usage of Rest Areas on Rural Highways: A Recent Empirical Study" Presented at the 90th TRB Annual meeting, January 23-27, 2011 and accepted for publication in the Transportation Research Records, 2011.

[Back to top](#)

Student Conference Presentation

In May, Civil Engineering graduate student Colter Roskos traveled to the World of Coal Ash conference to present *Identification and Verification of Self-Cementing Fly Ash Binders for "Green" Concrete*. His presentation described on-going efforts at Montana State University to identify fly ashes (a byproduct of coal fired power plants) from around the country that are capable of replacing 100 percent of the Portland cement as the binder in conventional concrete. These ashes are further being added to concretes in which recycled/pulverized glass is being used as the aggregate to produce a "green" concrete. Work on this effort began with a review of the major macro-scale factors known to affect the self-cementitious properties of fly ashes (i.e., coal type, combustion process, and emission controls). Based on these macro-scale criteria a large database of 491 power plants was screened and 15 ashes were identified for further consideration. Concrete mixes were made with samples of these 15 ashes (consisting of fly ash, recycled glass, water, and set retarding admixtures), and selected engineering properties were evaluated. Of these 15 fly ashes, 8 produced concretes with 28-day compression strengths of at least 20.68 MPa (3,000 psi), making these concretes potentially viable for standard construction applications. Colter did an excellent job in representing WTI and MSU at the conference, and the event provided him with valuable professional development experience.

[Back to top](#)

Expanding Your Horizons

On Saturday, April 30, approximately 45 girls explored the use of virtual reality simulators to study transportation safety issues as part of *Expanding Your Horizons – A Day of Science and Math Exploration* for girls in grades 6, 7, and 8. The girls learned how to build a simulated world and then viewed their models of a road network displayed on WTI's fixed base driving simulator. They were then able to get behind the wheel to study real-world situations from the driver's seat. How does time of day affect driving behavior? How about weather? What can we learn about the safety impacts of common driver distractions like texting or cell phones using the driving simulator? Tawny Hoyt and Rhea Poole, graduate students in Industrial Engineering, facilitated the activities.



[Back to top](#)

Give it a rest... WTI researcher and students set out to study rest stops across the state of Montana

In a state as large as Montana, keeping track of the conditions at 48 rest stops spread out over thousands of miles of highways and interstates can be a daunting task. So how did a MSU professor tackle such a project? A road trip, of course.

When the Montana Department of Transportation (MDT) commissioned an extensive study of its rest stops, MSU Professor and WTI Research Engineer Ahmed Al-Kaisy needed a plan for collecting updated information about who uses rest stops, how long they stay, and the facilities they use. He enlisted the help of three MSU students to join the research team and gather data firsthand from as many rest areas as possible.

Over a twenty-month period, the team visited 44 of the 48 rest stops, most of them at least twice. MSU grad student Zachary Kirkemo of Belgrade, Montana, estimates that he drove more than 12,000 miles for the study. He often worked 12-hour days with 10 of those hours spent driving. "It was kind of painful at times," he recalled.

Despite the hardships, Kirkemo and the other students gained valuable field research experience, learning observation techniques and using equipment such as traffic counters, door counters, water meters and surveillance cameras, in order to count vehicles and people,

document water usage, and determine length of stays and peak usage periods. Kirkemo used the data to develop and write his Master's thesis, which he successfully defended this spring.

The students' efforts on this project also benefited the depth and quality of the research. "To my knowledge, it's the most comprehensive study in the nation for the number of sites investigated and the kind of data we collected," Al-Kaisy said; "we collected a lot of information that was not available in the literature or in national research documents."

The study has helped establish some rest stop usage characteristics that appear to be unique to Montana; for example, the findings show that a higher percentage of people tend to stop at Montana's rest areas than in other states. Al-Kaisy believes this may be due to the fact that Montana cities are far apart and travelers don't have as many alternative places to stop. Another interesting finding is that rest stop visitors in Montana use substantially less water per person than the amount recommended in national guidelines, which may be attributable to environmental conservation policies such as the installation of low-flow toilets.

MDT can use findings such as these to develop their own guidelines for designing, operating and maintaining rest stops, rather than relying on national standards. As Al-Kaisy concluded, "MDT engineers could then tailor rest stop projects to fit Montana usage trends, and make the best use of our state's transportation resources."

[Back to top](#)

News from the Labs

Human Factors Research Facilities Update

The Western Transportation Institute is dedicated to understanding the driver role in fatal rural traffic crashes and developing driver support systems to improve traffic safety. WTI's state-of-the-art facilities allow our team of researchers to conduct complex and realistic traffic research in a controlled environment, then extending the research to the naturalistic setting of test track and open road studies.



Naturalistic Data Lab

In 2008, WTI was awarded a grant by the M. J. Murdock Charitable Trust Foundation to instrument a fleet of vehicles for naturalistic studies of rural traffic safety human factors and field tests of rural traffic safety interventions. The Murdock Naturalistic Driving Fleet and Lab uses vehicles and sensor systems to help researchers find ways to make rural roads in the US less deadly. The vehicles can be equipped with a variety of data logging and measuring devices to evaluate the driver's performance in real world driving scenarios. Future use of the Murdock equipment includes assessing the validity and transferability of simulated training for teen drivers.

For more information, please contact Laura Stanley (406) 994-1399, laura.stanley@coe.montana.edu. Visit our website at www.westerntransportationinstitute.org/laboratories/fleet.

Driving Simulator Laboratory

WTI's driving simulator suite now represents one of the most advanced simulation capabilities funded and operated by any research university in North America. The suite includes high, medium, and low fidelity simulators, eye tracking technology, and instrumented vehicles, allowing researchers to match each simulator's capabilities to the needs, complexity, and budget of the project. The simulators are used to do experimental research on driver behavior and to help engineers "visualize" new technology systems or traffic engineering designs at early stages of development.

The high fidelity simulator has recently been tuned so it requires the same effort to drive as a real car. This tuning work was done under contract with Dr. Erwin Boer who is an international expert of driving simulators. According to Dr. Boer, "The WTI moving base driving simulator offers steering, pedal, and motion feedback of a level of realism that enables subjects to drive stably through complex city routes. Particularly the over shoot in steering and subsequent oscillations following a turn at an intersection that are seen in so many simulators are minimal in the WTI driving simulator. Similarly, the unrealistic multi-modal deceleration profiles during stopping that are seen in many driving simulators is minimal in the WTI driving simulator due to the realistic brake pedal feedback as well as the salient motion cues that the hexapod motion base provides. The feedback steering wheel, pedals and motion base were closely matched to those observed in an instrumented version of the Impala that is mounted on the motion base. The realistic control feedback provided by WTI simulator assures that the workload drivers experience in the simulator is similar to what they experience in the real world. This is important for most simulator studies because without a representative driving workload, the utility of results obtained in the simulator in reality remains uncertain."

The Human Factor Lab is currently using the high fidelity simulator for a National Highway



Traffic Safety Administration (NHTSA) project that includes Westat, George Mason University, and Virginia Tech. The WTI study is looking specifically at the effects of concurrent information presented by different driver support systems in the vehicle. The goal of the study is to inform future guidelines for the integration of multiple in-vehicle systems to support safe driving.

Whether you are interested in traffic safety research, product usability testing or driver skill training; WTI can help you conduct valid research, efficiently test products, or create specialized training scenarios.

For more information please visit www.westerntransportationinstitute.org/laboratories/driving or contact [Nicholas Ward](#) (406) 994-5942.



Example of two visual displays from different driver support systems (brake warning, navigation).

[Back to top](#)

New Projects

Jackson Hole Highway: A Mitigation Assessment for Animal Movement and Wildlife-Vehicle Collisions

Project Objective: This study aims to identify and prioritize locations along three proposed Wyoming highway expansion segments that are important for wildlife and make recommendations for mitigation measures aimed at reducing wildlife-vehicle collisions and providing safe crossing opportunities for wildlife.

[Find out more »](#)

Evaluation of a New Arch Bridge Technology for Short Spans

Project Objective: The objective of this research is to conduct a review of the Bridge-in-a-Backpack system - a new construction technology for a corrosion-resistant arch bridge - and

other traditional crossing systems that may be used in Montana, to determine where they can be applied with maximum efficacy.

[Find out more »](#)

ARC Technology Transfer Initiative – UTC

Project Objective: The objective of this initiative is to build on the momentum of the ARC competition and its message: New Methods-New Materials-New Thinking by inspiring transportation and natural resource communities and the next generation of practitioners through a series of activities over the course of twelve months. This initiative intends to acknowledge the virtues of the winning design while celebrating the promising ideas of all finalist designs. It also strives to keep innovation at the forefront of our collective thinking about wildlife crossing structure design.

[Find out more »](#)

Testing and Evaluation of Recovered Traction Sanding Material

Project Objective: The goal of this study is to evaluate the practical suitability and the cost effectiveness of a statewide program for recycling and reusing traction sand on Montana roadways.

[Find out more »](#)

Evaluation of the Effectiveness of Winter Chemicals on Reducing Crashes in Idaho

Project Objective: The goal of this research project is to evaluate winter chemicals and provide guidance on the most appropriate winter maintenance strategies to apply under specific roadway and climatic conditions within the Idaho Transportation Department districts. The research will evaluate the effectiveness of different winter chemicals on reducing crashes in Idaho.

[Find out more »](#)

Best Practices for Protecting DOT Equipment from the Corrosion Effect of Chemical Deicers – UTC

Project Objective: The objective of this project is to identify, evaluate and synthesize best practices that can be implemented to minimize the effects of deicer corrosion on DOT winter vehicles and equipment, such as design improvements, maintenance practices, and the use of coatings and corrosion inhibitors.

[Find out more »](#)

[Back to top](#)

Staff News

Brandy Murray

WTI welcomes Brandy Murray as the new Business Manager for the Transit in Parks Technical Assistance Center (TAC). Brandy will be assisting the TAC team with initiating and administering subcontracts, establishing and analyzing budgets, tracking progress, and allocating resources where needed. She will also serve as liaison between the TAC Management Team, WTI, and subcontractors and partners.

Brandy graduated from Montana State University (MSU) with degrees in both Finance and Economics. While attending school at MSU, Brandy worked for the Associated Students of Montana State University (ASMSU) as an Operations Manager managing student fees.

A native Montanan, Brandy enjoys all that the Montana outdoors has to offer — snowboarding and snowshoeing in the winter and Montana's rivers and golfing in the summer. She and her husband are expecting their first child this month.

[Back to top](#)

Montana State University College of Engineering
PO Box 174250
Bozeman, MT 59717
Tel: (406) 994-6114
www.westerntransportationinstitute.org

eNewsletter by [Blue Tent](#) | To unsubscribe, [click here](#)