



Research

WTI Driving Simulator Laboratory Grows

In September 2008, the Western Transportation Institute (WTI) at Montana State University expanded its research capacity with the installation of a high fidelity, motion based simulator. This new high-fidelity simulator joins the suite of existing desktop and fixed base simulators. WTI's Driving Simulator Suite now represents one of the largest fidelity range and most advanced simulation capabilities funded and operated by a research university in North America. WTI Director, Steve Albert says, "This level of investment in research infrastructure reflects the commitment by WTI and Montana State University to investigate human factors and devise new driver support systems to reduce the high risk of fatal traffic crashes on our rural roads."



Photo: Kelly Gorham, MSU News Services

Realtime Technologies, Inc. (RTI), a Michigan based company specializing in graphical simulation and modeling, installed the high-fidelity 6-DOF (degree of freedom) simulator at WTI's Driving Laboratory. Two interchangeable, real vehicle bodies - an Impala passenger car and a Chevy Silverado pickup truck - are mounted on a motion platform. The 6-DOF allows the simulator to heave, sway, surge, pitch, yaw, and roll, realistically creating an actual driving experience. The vehicle is surrounded by a 240-degree field of view arc of projector screens, upon which computer generated scenery, powered by six projectors, present the driver with a variety of driving environments and traffic scenarios. LCD panel rear view mirrors and a three dimensional audio system, contribute to the 360-degree view of the simulated environment. "It's totally immersive," said WTI's simulator manager Suzy Lassacher. "The wrap-around field of view makes it very realistic."

Other key components include SimCreator and SimVista software packages. The simulator also utilizes FaceLab, an eye tracking system with data collection and analysis software. Cameras mounted on the dashboard track the driver's eye movements and head position.

A unique additional capability of this system is the integration of Presagis MultiGen Creator Pro software. "MultiGen allows us to create our own worlds from satellite and survey data that are exact replications of actual driving environments we wish to study, such as accident black spots identified by state DOT databases," points out Professor Nicholas Ward, lead of the human factors consortium at Montana State University. "This dual capability is important for efficient and valid research, not only on traffic safety, but also for supporting visualization of traffic engineering solutions."



Photo: WTI

"Simulators provide a safe and controlled environment to test initial design concepts, which upon validation, can then be tested on the road, such as on test tracks or in naturalistic driving conditions," says Assistant Professor Laura Stanley. Utilizing WTI's TRANCEND facility in nearby Lewistown, MT, controlled test-track studies and naturalistic on-road studies are then used to validate and extend research conclusions with deployable systems.

The Driving Simulator Suite's full range of capabilities allows WTI to appropriately match fidelity levels of research tools with the validity level required for a research question in a cost effective manner. Ward states, "With this suite and the full range of research capabilities at WTI, we are able to comprehensively study the critical factors associated with the high risk of fatal crashes in rural areas

Students Hit the Road with Huijser

Throughout 2008, WTI Research Ecologist, Dr. Marcel Huijser, has shared his time and wealth of knowledge with students and teachers from the College of Forestry and Conservation Sciences program at the University of Montana (U of M) in Missoula. He has been invited as a guest lecturer, conducted a seminar, and led several class excursions along US Highway 93 demonstrating on-going wildlife crossing research and the effectiveness of under and overpasses.



*Dr. Marcel Huijser at a Hwy 93 underpass on the Flathead Indian Reservation
(Photo: Tiffany Holland WTI-MSU)*

Dr. Huijser is the Primary Investigator for WTI's "Evaluation of Wildlife Mitigation Measures along U.S. Hwy 93" project. Over the last year, 75 students have accompanied him as he collects data from some of the 11 wildlife underpasses involved in the study. Students had the unique opportunity to experience first-hand a research project in progress. They were able to examine the fences, jump-outs, and sand tracking beds, as well as study the images the wildlife camera had recorded of the underpass wildlife traffic patterns and behavior.

Nicky Phear, Program Coordinator and Instructor for Wilderness and Civilization - a 34 year old program at U of M, believes Dr. Huijser is a tremendous resource. "This was one of the best meetings students had all year. Marcel was exceptional in his capacity to clearly explain the project, its intention, connection to the tribe, research and funding. Students wanted more time with Marcel." Three of Phear's students were inspired by Huijser's research and elected to perform further studies on wildlife crossings for a case study assigned in class. Huijser followed up by providing additional materials for the students and invited them to accompany him on future field monitoring trips.

Dr. Huijser joined the road ecology group at WTI as a Research Ecologist in September 2002. He has over 16 years experience working as an applied ecologist, mostly on road-wildlife interactions. He specializes in investigating the effect of transportation infrastructure on wildlife; investigating strategies to avoid, mitigate or compensate the effects of transportation infrastructure on wildlife; and advising transportation agencies on the use of mitigation measures. Dr. Huijser is a committee member of the Transportation Research Board's Taskforce on Ecology and Transportation, co-chairs the subcommittee on animal-vehicle collisions and has published a range of peer-reviewed papers, conference proceedings and reports in the United States and Europe.



[Click here to find out more](#) about Dr. Huijser's wildlife mitigation research on Hwy. 93.

"To be able to stand inside of the corridor and see photos of the animals that had traveled through it was not only fascinating but also helped to ground some of our (classroom) discussions in a real and physical setting," - U of M Wilderness and Civilization student. Huijser points out animal tracks in one of the larger underpasses along US93 on the Flathead Indian Reservation, MT.

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Pacific Northwest Wildlife Connections

More and more people are concerned about animal populations and human safety in relation to wildlife-vehicle collisions, as was evident last October 2008 at the Pacific Northwest Wildlife Connections (PWNC) conference at the Oregon Zoo in Portland. The capacity crowd of over 115 biologists, transportation planners, designers and conservationists spent four days discussing the wildlife linkage issues and sharing ideas. The conference included a symposium, a road design workshop and a transportation planning workshop.

WTI's Dr. Anthony Clevenger kicked off the PNWC as the keynote speaker at the opening reception. His presentation, "The Changing Landscape of Transportation: Designing Roads to Conserve Wildlife Populations," summarized his research at Banff National Park and presented a number of crossing structures and associated monitoring efforts, as well as projects representing cutting edge examples of connectivity research. Clevenger also presented "Mitigating Fragmented Landscapes" during the Road Ecology session of the conference symposium.

PNWC was a collaborative effort between Oregon Zoo, Oregon Department of Fish and Wildlife, Oregon Department of Transportation, Washington Department of Transportation, Federal Highway Administration and USDA Forest Service. Workshop coordinators aimed to "unite biologists, planners, designers and conservations towards a common goal of connecting wildlife across the landscape."

The conference highlighted transportation planners' major concerns of addressing wildlife passage and provided an opportunity for a wide range of specialty groups to network and exchange ideas. "The good news is, this conference is only the beginning," said Audrey Hatch, ODFW technical coordinator for the Oregon Conservation Strategy. "With transportation planners and wildlife biologists working together, we are in an excellent position to take action to benefit fish and wildlife over the long-term."

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'Division Street,' a 63 minute feast for the eyes, is the film creation of WTI graduate fellow, Eric Bendick. The film will make its screening debut as an official selection at Patagonia's 7th Annual Wild and Scenic Environmental Film Festival (WSEFF), January 9-11, 2009 in Nevada City, CA. WSEFF has selected it for its tour with showings in over 70 cities. From Banff National Park and pristine roadless areas in Yellowstone, to the concrete jungles of southern Florida, Bendick tours North America - dodging Yellowstone's grizzlies and Miami's taxicabs - to highlight sustainable road projects and wildlife corridors for the 21st century. As roads have fragmented wild landscapes and ushered in the age of urban sprawl, 'Division Street' introduces us to a new generation of ecologists, engineers, city-planners, and everyday citizens who are transforming the future of the American road.

Rob Ament, WTI's Road Ecology Program Manager, provided advisory and research support throughout the two year filming process. WTI's road ecologists Drs. Tony Clevenger and Marcel Huijser, and former WTI wildlife ecologist Dr. Dan Smith, all lent their expertise and appear in the film.

Eric earned a B.A. in Modern Culture & Media at Brown University and is an M.F.A. candidate at Montana State University in Science & Natural History Filmmaking. His producing and directing credits include over sixty short and medium-length science documentaries. He is also the Series Producer and co-founder of the "[TERRA: The Nature of Our World](#)" video podcast, the first ever online science and nature film series. Since 2005, TERRA films have been viewed over seven million times.

TERRApod, a TERRA spinoff targeting youth ages 10-18, partnered with WTI in 2007 to produce a three-segment video module on the emerging science of road ecology. Terrapod's mission is to encourage kids to use filmmaking and the Internet to research, direct, and create science-based podcasts. WTI staff provided their expertise and funding for filming the segments, with Eric directing, producing, and editing the module. [Click here for more information](#) on future 'Division Street' screenings.

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Outreach

Road Dust Management Practices and Future Needs Conference

Over ninety participants, representing three countries, gathered in San Antonio, TX last November for the 2008 Road Dust Management Practices and Future Needs Conference. As the first conference of its kind, the event brought together researchers, vendors, practitioners, Local Technical Assistance Programs, and environmental groups to present, discuss, and prioritize current and future road dust management best practices and to create a "road map" for the future.

Focused on moving beyond small-scale experimentation and on to full-scale implementation of dust control, the ultimate goal was to generate a plan for achieving wider, environmentally sustainable, and cost-effective implementation of dust control Best Management Practices on unsealed roads and adjacent areas. The conference provided an unprecedented opportunity for these disparate groups to engage in a high level of cross-talk and dialogue and provided better communication and outreach for the future.

Conference participant, Jerold Vincent, Tetra Technologies, Inc., emphasized the significance of the networking opportunities. "As a manufacturer of calcium chloride, a widely used dust control material, it was very beneficial to discuss common issues and practices with a full range of people from public officials, to vendors, to college professors."

Keynote speaker presentations, each with insights from a national, research, vendor/construction, or maintenance perspective, provided participants with critical background information on past, continuing, and new dust management efforts. Keynotes included Michael Long, Chair, TRB LVR Committee, Oregon Department of Transportation, David James, University of Nevada, Las Vegas, Ron Wright, Idaho Transportation Department, and Ken Skorseth, South Dakota State University.

The conference was a huge success that culminated in the development of a strategic plan including performance measures, protocols, education, outreach, and the formation of a strong network of constituents. Over twenty vendors, consultants, government and university researchers, and university transportation center personnel committed to serve as champions to help move these conference outcomes forward.

Co-chaired by Roger Surdahl, FWHA Central Federal Lands, and Western Transportation Institute's (WTI) Steve Albert, the event was sponsored in part by EnviroTech Services, Inc., North American Salt, Bureau of Indian Affairs, FHWA - Federal Lands Highway, National Park Service, United States Fish and Wildlife Service, United States Forest Service, and WTI. Additional input and planning assistance was provided by the United States Geological Survey, National Association of County Engineers, University of Nevada at Las Vegas, University of California at Davis, Department of Environmental Quality & Environmental Management in Clark County, Nevada, Local Technical

Upcoming Conference: National Rural Summit on Traffic Safety Culture 2009

The National Rural Summit on Traffic Safety Culture will be held in Big Sky, Montana on June 22, 2009. This conference is being held in conjunction with the [5th International Driving Symposium on Human Factors in Driver Assessment, Training and Vehicle Design](#). Traffic safety culture is an important determinant of driver risk taking and acceptance of traffic safety interventions. Attempts to make our transportation system safer cannot succeed without considering the cultural factors that define our values and govern our behavior. In recognition of this, the Western Transportation Institute and the AAA Foundation for Traffic Safety are hosting a summit to discuss traffic safety culture and its role in the safety of our rural transportation system.

What can participants expect? The Summit will strive to increase understanding and unify concern amongst traffic safety researchers, practitioners, and policymakers about the role of traffic safety culture on (1) behavioral factors; and (2) attitudinal barriers to public and political acceptance of traffic safety interventions. Presentations by national and international experts followed by focused discussion will ensure that this event is a must attend for individuals in the traffic safety arena.

For more information please visit the conference websites: www.meetingsnorthwest.com or www.westerntransportationinstitute.org.

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Education

UTC Student of the Year

Each year at the Transportation Research Board annual meeting in Washington, DC, the U.S. Department of Transportation Research and Innovative Technologies Administration honors the most outstanding student from each University Transportation Center (UTC). The UTC Students of the Year are selected based on their accomplishments in research, academics, professionalism, and leadership.

Mike Sawaya was selected as the 2009 UTC Outstanding Student of the Year for the Western Transportation Institute (WTI). Mike has extensive experience in the area of conservation biology. He received a Bachelor of Science in Wildlife Biology at the University of Montana in 1997. For the past eleven years, Mike has been studying bears, cougars and wolves using methods ranging from radio-telemetry to noninvasive genetic sampling. After receiving his Bachelors degree, he spent three years working on the Greater Glacier Bear DNA Project in Glacier National Park and then five years working for the Hornocker Wildlife Institute and the Wildlife Conservation Society on the Yellowstone Cougar Project in Yellowstone National Park. Mike's desire to gain a better understanding of the effects of transportation systems on wildlife populations and developing ways to mitigate those effects led him to pursue a graduate degree through the Road Ecology Program at the Western Transportation Institute. Mike is currently working on his third year of his PhD in Fish and Wildlife Biology in the Ecology Department at Montana State University. Mike's research with WTI focuses on evaluating the conservation benefits of wildlife crossing structures for black and grizzly bear populations in the Bow Valley of Banff National Park, Alberta. Mike's drive, energy, professionalism, and dedication to research in this area continually impress his research advisors and collaborators.



Upcoming Education Program Application Deadlines

The Western Transportation Institute (WTI) is one of 10 National University Transportation Centers (UTC) recognized as centers of excellence in the transportation field by the U.S. Department of Transportation's Research & Innovative Technology Administration. The UTC program supports high quality research and education in transportation at select institutions of higher learning. In order to strengthen the pool of talented professionals working to meet the challenges of safe, efficient, and environmentally sound movement of people and goods, WTI offers students from various academic disciplines a number of unique research, education, and funding opportunities.

Graduate Transportation Award

Eligibility: Current or entering Masters or PhD students at MSU.

Application deadline: March 1, 2009

[Program Information](#)

Safe Passages Research Experience for Undergraduates (REU)

Eligibility: Undergraduates in all fields of engineering, biology, environmental and earth sciences or related fields

Application deadline: March 1, 2009

[Program Information](#)

Summer Transportation Institute

Eligibility: High school students entering 10th, 11th, or 12th grades in Fall 2009

Priority application deadline: March 1, 2009 (applications accepted until program filled, but priority given to applications received by March 1)

[Program Information](#)

Continuing Education Road Ecology On-line Course

Eligibility: Free to the public

New Projects

Benefit-Cost Analysis, Colorado Case Study - UTC

The goal of this research project is to assess the benefits and costs associated with the implementation of Maintenance Decision Support System (MDSS), a system designed to provide weather and road condition forecasts and real-time treatment recommendations specific to winter road maintenance routes, which is tailored for winter maintenance decision makers. Specifically, this project will focus on tangible benefits and costs of the MDSS as it where it has been deployed as an operational prototype. [Find out more](#)

Deploying Portable Traveler Information Systems

This research will provide expertise and support to the California Center for Innovative Transportation (CCIT) on a project looking at deploying portable, remotely controlled, changeable message signs that provide real-time delay information at critical times and locations as part of an integrated advanced traveler information system (ATIS). [Find out more](#)

The Nature Aggregate-Asphalt Bond: A Lab Study

This research is directed at developing a laboratory-based test method to investigate the nature of the aggregate-asphalt bond using different analyticochemistry analysis approaches. The project proposes to identify the mechanisms that contribute to adhesive failure of asphalt mixes, to understand the contribution of material properties (asphalt and aggregate structure) to the adhesive failure of mixes, to understand the contribution of mixture properties, and to develop a test to evaluate the adhesive failure of mixes. [Find out more](#)

SHRP II: S02 Proposal: Integration of Analysis Methods and Development of Analysis Plan

The objective of the S02 project is to integrate the results of the prior SHRP 2 safety projects and to produce prioritization of research questions and an analysis plan for the data collected from the in-vehicle naturalistic field studies. This project will identify analytical methods necessary to address a set of research questions and delineate the steps involved in obtaining appropriate measures of effectiveness, evaluation factors, and sampling designs of large naturalistic driving data sets. [Find out more](#)

Examining Paved Road Impacts on Birds - UTC

The purpose of this project is to improve overall knowledge of paved road impacts on birds throughout the Yellowstone to Yukon Conservation Initiative Society (Y2Y) region and determine appropriate conservation measures necessary for conserving avifauna found across the Y2Y region. [Find out more](#)

Rural Traveler Information (One Stop Shop) Phase 1

The objective of this project is to put a variety of real-time information together in a single web-based location in a user-friendly format. This will provide travelers making a trip in or through rural areas access to current travel information on a route-specific basis, customized for a specific origin and destination, enabling drivers to travel more safely and with a minimum of delay. [Find out more](#)

Cut Slope Composting: Field Trials and Evaluation

The purpose of this project is to expand the knowledge base and further refine the use of various materials and application techniques to increase the performance of compost at lower application rates that promote the establishment of native plants on steep cut slopes along highways. [Find out more](#)

Road Ecology Book - UTC

The purpose of this project is to write a road ecology book focusing on habitat connectivity across highways for terrestrial and aquatic wildlife. [Find out more](#)

North American Wildlife Crossing Design Contest - UTC

This design contest will provide an avenue for college students to think creatively and hone their skills in an extracurricular setting and increase awareness for the need for cost efficient (value-engineering) solutions for highway designs that provide for motorist safety, wildlife protection, and habitat connectivity. Students, universities and professionals will engage in the multi-disciplinary nature of road ecology with a real world application. [Find out more](#)

Steven's Pass Wildlife Dispersal Habitat Modeling

The purpose of this project is to develop a model that can be used to address the potential effects of the proposed land-change projects in the Steven's Pass region on habitat connectivity for select focal wildlife species. [Find out more](#)

An Assessment of Habitat Connectivity and Fracture Zones for Carnivores Within and Between the I-90 and US2 Corridors - UTC

The purpose of this project is to assess carnivore habitat connectivity and the impact of landscape fracture zones on carnivores within and between the I-90 and US Route 2 transportation corridors. [Find out more](#)

New Staff

Jaydeep Chaudhari joined WTI in October 2007 as a Research Associate, bringing with him

multiple skills in the fields of public transportation, land use planning, administration, and architecture. He holds masters' degrees, both in Community Planning and Public Administration with an emphasis on public transportation from Auburn University and a bachelor's degree in Architecture.

Jaydeep spent two and a half years as a research assistant for Auburn University's Multimodal Transportation Planning project, funded by the Federal Transit Administration and was a GIS intern for the city of Auburn, Alabama. He was recently awarded the "2008 Excellence in Regional Transportation Award" by the National Association of Development Organizations for his Auburn University Campus Transit Program work.

Jaydeep's research with WTI is primarily under the Mobility and Public Transportation focus area. His current projects include the Greater Yellowstone Regional Traveler Information System- US 89 project, Grand Teton National Park Transit Feasibility Study, and the North-central Montana Public Transportation Implementation Plan.

In his spare time, Jaydeep enjoys hiking, playing cricket, and exploring nature and culture through travel and reading. He recently married Dr. Harshida Chaudhari. His wife is pursuing her MD (family Medicine) in India.

WTI is pleased to welcome **Dr. Nicholas Ward** to the Safety and Operations program. Dr. Ward joined MSU in November 2007 on a joint faculty appointment; he will work as both a professor of industrial engineering and a senior research scientist at WTI. Nic comes to us from the University of Minnesota, where he was director of the Human Factors Interdisciplinary Research in Simulation and Transportation (HumanFIRST) program. His research at the University of Minnesota, and earlier research at Leeds University, focused on driver behavior research and human factors design with Intelligent Transportation Systems, specifically through the use of immersive driving simulation.

At WTI, Ward's research will focus on human factors related to traffic crashes including the role of traffic safety culture; system interfaces and how users adapt to systems; determinants of risk taking; and using virtual reality, or simulators, for transportation research. To that end, Dr. Ward has begun a study that, over the next year, will use state-of-the-art video cameras to help teenage drivers stay safe on Montana's rural roads. The study will use automated in-car cameras to gauge the effect of Montana's drowsy and distracted driver's education modules on teen attitudes and behaviors behind the wheel. "Distraction and fatigue are big issues with teen drivers, particularly for teen drivers in rural areas" says Ward who believes the higher number of teen deaths on rural roads stems from a combination of road design, distance from medical help and a culture of potentially distracting activities and unsafe behaviors, such as using cell phones and not using seat belts.

Nic and his two dogs (oh - and one cat) live in Bozeman where he spends his free time enjoying hiking and hot tubing.

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