Human Factors Facilities

In addition to traditional on-road and test-track research capabilities, WTI manages a suite of driving simulators that represent a range of simulation fidelity. This suite represents the largest fidelity range and most advanced simulation capabilities funded and operated by any research university in North America. This range of capability provides for the appropriate matching of simulation fidelity to research question complexity (and magnitude of research budget). The advantages of simulation include the ethical exposure to risk factors, realistic interaction with near-crash events, and the reliable control of all scenario conditions.

The WTI simulators are used both for experimental research and the visualization of future Intelligent Transportation Systems and traffic engineering designs, including roadway network infrastructure and configurations. Controlled test-track studies and naturalistic on-road studies are then used to validate and extend research conclusions with deployable systems.

Example Human Factors Projects

- Driver competency - Study of effectiveness of defensive driver training among young drivers (Montana DOT).
- Driver impairment - Evaluation of driver distraction during mobile phone interaction with the 511 information systems (USDOT/RITA).
- Interface design - Transportation Research Applications and Instrumentation Lab (USDOT/RITA); Bozeman Pass ITS Evaluation (FHWA).
- System evaluation and visualization - A high fidelity driving simulator as a tool for the design and evaluation of highway infrastructure upgrades (Montana DOT); Cooperative advanced warning system evaluation (Preventive Safety Research, Inc.).

For more information, please contact Nicholas Ward, PhD
Program Leader, MU-HFC
Western Transportation Institute
College of Engineering
Montana State University
P.O. Box 174250
Bozeman, MT 59717-4250
Tel: (406) 994-5942 Fax: (406) 994-1697

As a social goal, sustaining transportation mobility while reducing fatal and disabling traffic crashes is vitally important. In support of this goal, the Western Transportation Institute (WTI) at Montana State University (MSU) was constituted in 1998 by the U.S. Department of Transportation as a University Transportation Center (UTC) to contribute to the national mission of “providing fast, safe, efficient, and convenient transportation.”

This mission is most salient in rural America, which consistently has the worst traffic safety record and the least developed public transportation and emergency response systems. The decision, then, to locate WTI in Montana, a state that records the highest percentage of rural vehicle-miles traveled in the nation and has a traffic fatality rate double the national average, was a natural one.

As a national center of excellence for rural transportation research, WTI employs 40 researchers and 20 students among a staff of 75, and operates with a research budget of $7.5 million. It has close affiliations with many leading state, regional, and national organizations including:

- U.S. Department of Transportation
- Transportation Research Board
- Federal Highway Administration
- California and Montana Departments of Transportation

Research at WTI is sponsored through an intramural program using UTC funds in conjunction with external funding from state, federal, and commercial sources. The UTC funding is also used as leverage to attract and match external funds. The management of this research is directed toward the development, evaluation, and deployment of viable systems and programs to support the national strategy for transportation research.

“All too often, research is conducted that examines issues from one dimension, follows the interests of the investigator rather than the sponsor, ignores possible interrelationships with other work being done on the same or related issues, and is irrelevant to the national strategy for surface transportation. In contrast, WTI conducts research that supports the national research strategy by focusing on high quality, collaboration, and sponsor-driven activities to make significant advancements in both traditional methods and advanced technologies in rural transportation.”

Steve Albert, WTI Director

Among its several areas of focus, WTI conducts research in transportation safety, operations, and systems engineering to support national priorities for improved traffic safety and mobility. These programmatic areas of research rely on the analysis of the “human factor” in the transportation system.
Human Factors Research

Human factors research analyzes driver-related crash factors such as competency (novice driver, elderly driver) and impairment (alcohol, fatigue, distraction) to support the design of advanced technologies and safety management policies to mitigate high-risk driving behaviors. The research adopts a driver-centered perspective to design interfaces for vehicle- and infrastructure-based driver support systems. This approach supports a systems-based perspective that considers the hierarchical layers of factors that influence driver cognition and behavior. The research process includes visualization, demonstration and evaluation in order to assess overall system effectiveness and social acceptance for future deployment.

Human Factors

- Dr. Mike Kelly, C.P.E., (WTI Senior Research Scientist, Safety and Operations) is a senior human factors engineer and project manager with over 30 years of post-doctoral experience managing, directing and performing human factors research and development on advanced transportation systems, communication systems and centers, aviation systems and industrial facilities.
- Dr. Laura Stanley, Ph.D., (WTI Research Associate, Systems Engineering) has nine years of experience in computer programming and systems administration. She has been the principal investigator on several transportation management and safety projects, including the Transportation Research Applications and Instrumentation Lab (TRAIL), Facilitating Special Event Congestion Management in The Human Factors and Traffic Safety Research at Montana State University

Civil Engineering

Dr. Pat McGraw, P.E. (Assistant Professor) conducts research on rural Intelligent Transportation Systems, transportation impacts on wildlife, traffic safety, travel and tourism. He is also the founder and co-chair of the TRB subcommittee on Animal-Vehicle Collisions (ANB20-2).

Computer Sciences

Dr. Rafal Angryk (Assistant Professor) conducts research on computer modeling and data mining including time series, fuzzy logic, and neural net applications to support the quantification and statistical analysis of human factors research data.

Economics

Dr. Douglas Young (Professor) has a background in economics and alcohol in relation to traffic safety. He has conducted research and published on the effects of alcohol advertising, taxation, and pricing on traffic fatalities. This has included funding from the National Institute on Alcoholism and Alcohol Abuse. Most recently, Dr. Young has been involved in research on commercial vehicle safety.

Dr. Richard Block (Professor and Department Chair) conducts research on individual differences examining the interplay between attention and memory in terms of automatic and controlled processes.

Dr. Michelle Meade (Assistant Professor) conducts research on the effects of aging on such functions as attention and human memory and the interplay of cognition and social processes.

Sociology and Anthropology

Dr. Steven Swiftfeld (Associate Professor) studies social science methodologies including surveys and conducts research on the application of social theory for the modification of anti-social behaviors.

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