

2012 Year in Review

# Mountain-Plains Consortium Region 8



## Acknowledgements

The faculty, staff and students involved in the Mountain-Plains Consortium thank the USDOT, particularly the Research and Innovative Technology Administration for its continued support of the University Transportation Centers Program. This program has allowed us to address critical transportation infrastructure issues in the Upper Great Plains and Intermountain West through research and outreach programs. At the same time the support has allowed us to launch innovative education programs that are producing the next generation of transportation professionals. We also express our gratitude to the departments of transportation in the Mountain-Plains states of Colorado, North Dakota, South Dakota, Wyoming, and Utah. Much of our work would be impossible without their support and partnership.

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## Director's Message



This annual report provides a brief overview of the latest accomplishments of the Mountain-Plains Consortium. The work undertaken by MPC collaborators and students since the MPC was established in 1988 continues to enhance transportation in our region and across the nation.

The MPC includes has welcomed the University of Colorado Denver, the University of Denver and Utah State University as members. The addition of these new partners infuses the institute with new capabilities and a greater capacity to address the transportation research, education, and technology transfer needs of our region.

MPC faculty and staff have worked with a broad variety of stakeholders, including state and local transportation agencies, Native American agencies, businesses, associations, other universities and federal agencies, over the years on an impressive body of work focused the rural and small urban transportation challenges in the Upper Great Plains and Intermountain West. Dozens of new projects have expanded that portfolio to include transportation issues raised by energy development in the region as well as demands for improved safety and more livable communities while continuing to address topics like infrastructure maintenance and transportation planning.

Also detailed in this report are MPC efforts to maintain a viable workforce in the region's transportation industry. Recruiting and retaining qualified workers has always been a challenge in the sparsely populated areas of the Mountain-Plains region, but competition from the energy development industry has added urgency to this need.

Both the new and long-time members of the MPC share a commitment to students and transportation education. Our students put classroom lectures and discussion to work in laboratories and the field as they use emerging technology and techniques in research to address critical issues. As a result of those learning experiences, our graduates are emerging as the professionals, researchers, teachers and policy makers who will shape the transportation systems of tomorrow.

Thank you for your interest in the MPC and its work. If you have any questions about our organization or its work, please contact us.

Best regards,

Denver Tolliver

# MPC at a Glance

## The Consortium

The Mountain-Plains Consortium is one of 10 competitively selected regional University Transportation Centers Programs sponsored by the U.S. Department of Transportation. MPC is a national resource and focal point for the support of research and training concerning the transportation infrastructure and the movement of passengers and freight. The program aims to attract the nation's best talent to the study of transportation and to develop new strategies and concepts to effectively address transportation issues. The consortium is a center of excellence for rural and intermodal transportation.



## Members

**Colorado State University** is a land grant institution with an enrollment of nearly 25,000 students. Primary transportation graduate education and outreach activities occur in the College of Engineering, with related activities in business, applied human sciences, and natural resources. Transportation-related graduate courses are available in civil engineering, mechanical engineering, earth resources, business, remote sensing, and construction management.

**North Dakota State University** is a land grant institution with an annual enrollment of more than 13,000 students. The MPC is administered by the Upper Great Plains Transportation Institute, which also administers several other related transportation research centers at NDSU. Educational programs coordinated by the UGPTI include a PhD degree program in transportation and logistics and master's degree programs in managerial logistics and transportation and urban systems. A certificate program is also offered in transportation and urban systems and transportation options are available for master's level students in civil engineering and agricultural and applied economics.

**South Dakota State University** is a land grant institution with an annual enrollment of approximately 12,000 students. MPC-supporting programs include the Geographic Information Science Center of Excellence, which is a joint collaboration between SDSU and the U. S. Geological Survey's National Center for Earth Resources Observation and Sciences. SDSU houses the South Dakota Local Transportation Assistance Program—one of five technology transfer and outreach programs provided by the Engineering Resource Center. Moreover, the Civil and Environmental Engineering Department houses state-of-the-art laboratory facilities.

The **University of Colorado Denver** joins the strengths of a comprehensive campus in Denver with the health and medical programs at the Anschutz Medical Campus in Aurora to serve more than 18,000 students. UCD offers more than 130 degree programs through 13 schools and colleges. UCD's transportation emphasis is multidisciplinary, spanning departments in engineering, planning, public affairs, liberal arts and sciences, and health related professions. The Transportation Research Center (TRC) addresses local, state, national, and international issues with funding from federal, state, local, and private sources. UCD is also home to the Active Communities Transportation (ACT) group that researches the integration of alternative transportation in healthier urban communities. Students and faculty investigate new methods and technologies for analyzing the performance and safety of transportation operations and designs, and also provide services to state and local agencies through seminars, committees, and special projects.

**University of Denver**, an independent university, has an enrollment of nearly 5,500 undergraduate and nearly 6,400 graduate students. The university has 11 colleges and schools and offers 12 baccalaureate degree programs, 19 master's degree programs, and 10 doctoral degree programs. The Intermodal Transportation Institute offers a master's degree in intermodal transportation, one of the few of its kind in the world. Approximately 25 students enroll in the program each year. The programs are supported by the Daniels College of Business with faculty in finance, marketing and logistics. In addition, the Korbel School of International Studies faculty, with expertise in international transportation and transportation security policy, are also involved in the program. Faculty and staff from urban planning and the GIS Laboratory contribute to courses and research efforts. Finally, the Center for Ethical Decision Making contributes to the training and education of leaders in the field of intermodal transportation management.

The **University of Utah** has an annual enrollment of more than 28,000 students. The department of Civil and Environmental Engineering has well-equipped laboratories specializing in transportation, structural, geotechnical, hydraulic, environmental, and materials engineering. The Utah Traffic Laboratory is connected by fiber optic cable to the Utah DOT Traffic Operations Center. The lab has a state-of-the-art multimedia video conferencing studio with delivery, recording, and hosting capabilities for teaching, training, and research collaboration. The lab boasts the first North American installation of VISUM Online, which is an intelligent platform for traffic management.

**Utah State University** is a land-grant university located in Logan, UT, with an enrollment of nearly 26,000 25,767. USU offers 168 undergraduate degree programs and 143 graduate degree programs. There are eight colleges in the university with the College of Engineering being the fourth largest. It is divided into six academic departments: biological, civil & environmental, electrical & computer, engineering & technology education, mechanical & aerospace, and the aviation program. The Department of Civil & Environmental Engineering houses the Utah Transportation Center, the Utah Water Research Laboratory, Structural Materials and Structural Health Laboratory and, the Transportation Infrastructure Management & Engineering Laboratory. The transportation program at Utah State University provides learning and research opportunities for students in public transportation, traffic, safety, and planning. In addition, USU operates the Utah Local Technical Assistance Program.

The **University of Wyoming** has an annual enrollment of about 13,100 students. The Department of Civil and Architectural Engineering provides a core of basic engineering courses for its undergraduates and allows them to specialize in any one or a combination of the following technical areas: structures, water resources, environmental engineering, geotechnical engineering, and transportation. The transportation program at the University of Wyoming provides learning opportunities for students in paving materials, traffic, safety, and planning. In addition, the WYDOT Material Certification Program and the Wyoming Local Technical Assistance Program are hosted at the University of Wyoming.

## History

The Mountain-Plains Consortium was established in 1988 as a part of the University Transportation Centers Program. MPC was selected as the center for federal Region 8 in the initial competition held by USDOT. MPC won subsequent re-competitions under ISTEA, TEA-21, and SAFETEA-LU legislation. From 1988 through 2012, MPC produced a library of nearly 300 research reports while attracting new faculty to the field of transportation. MPC universities continued to teach most of their pre-existing transportation courses and exceeded the targeted maintenance of effort funding levels specified by USDOT. During this period, MPC funds were used to leverage funding from agencies such as state and local transportation departments, USDA, FTA, FRA, and the American Association of Railroads.

## Management structure

The management structure of the Mountain-Plains Consortium involves three main components – the center director and administrative staff, eight university program directors, and the executive committee. In addition, the MPC Advisory Board and the TLN board and programming committee play important roles in program planning and implementation.

### Center director

Dr. Denver Tolliver is the MPC program director. He is involved in planning and administrative activities at all levels and sites. Although the center director is an employee of the lead university, he represents all five institutions.

### University program directors & executive committee

Each university in the consortium has a designated university program director to perform local oversight and management of activities at each university. The program directors are Dr. Rebecca Atadero, Colorado State University; Dr. Kimberly Vachal, North Dakota State University; Dr. Nadim Wehbe, South Dakota State University; Dr. Wesley Marshal, University of Colorado Denver; Dr. Patrick Sherry, University of Denver; Dr. Richard Porter, University of Utah; Dr. Kevin Heaslip, Utah State University; and Dr. Khaled Ksaibati, University of Wyoming.

The center director, the eight university program directors, and a USDOT liaison form a committee to oversee program planning and administrative functions for the grant period. The 10-member committee meets each year to monitor implementation strategies, collaborate with other centers in the region, and perform other planning and administrative functions. The executive committee has final responsibility for research project selection.

## Transportation Learning Network (TLN)

The Transportation Learning Network uses technology to help people work together on transportation issues in the region. Each partner provides transportation programming, training, and technology transfer to the network. Efforts include technical training, transportation short courses, peer sessions, graduate-level classes, professional management and leadership courses and seminars. The eight MPC universities are partners in the network which also includes four state transportation departments in Region 8: Montana, North Dakota, South Dakota, and Wyoming. The system carries interactive audio and video to conference rooms and classrooms at the respective sites. TLN enhances and improves the cost-effectiveness of the MPC by reducing travel costs and maximizing use of scarce faculty and administrative time. The TLN evolved from the TEL8 telecommunications network.

## TLN board and programming committee

The state transportation departments in the region provide substantial input to the MPC director and executive committee regarding educational and research needs. Much of this interaction results from a close working relationship between the MPC executive committee and the TLN board of directors. The eight university program directors are members of the TLN board. The MPC executive committee and TLN board hold an overlapping meeting each year. The TLN executive director attends part of the MPC executive committee meeting and the center director attends part of the TLN board meeting. The TLN programming committee, which meets monthly, brings together representatives from the three state transportation departments and the MPC universities to plan a regional education and training program.

In addition, an advisory committee helps MPC directors identify key research needs within the region and develop a research program that addresses those needs. The committee plays a key role in setting the MPC's research agenda.

## Accountability for decisions

Many key decisions and actions flow from committee meetings and other deliberations. However, the MPC executive committee retains decision-making responsibilities. All UTCF-funded activities conducted on the eight campuses are approved first by the executive committee. The center director ultimately is accountable for all decisions pertaining to UTCF activities and the use of UTCF funds.

## Annual site visits

The center director and USDOT liaison visit each campus annually to meet with principal investigators and program managers on each campus and to gauge progress toward program goals and objectives. The director also holds video conferences as needed to evaluate progress and ensure that milestones are being met.

## Regional coordination

The director communicates with directors of the other centers in Region 8 on a regular basis.



# Education and Workforce Development

## Student Program Activities

### Allen and Wood named Students of the Year for MPC for 2011 and 2012

CSU graduate Doug Allen was named MPC Student of the year for 2011 and U of U graduate Jonathan Wood received the honor for 2012. The awards are presented each January at the Annual Council of University Transportation Centers Winter Banquet held in conjunction with the Transportation Research Board Annual Meeting in Washington D.C.



After a 12-year career as a carpenter, Allen chose to further his education by seeking a BS in civil engineering at Colorado State University, graduating in May 2010. He continued at CSU to earn a master's degree in civil engineering in December 2011. As an undergraduate and graduate student, Allen worked on numerous MPC research projects including "Sustainable Concretes for Transportation Infrastructure," "Low-Impact, High-Toughness Transportation Barriers," "Rapid Load Rating of Short Rural Bridges," and "Long-Term Performance of FRP Repair Materials." He co-authored reports for three of these projects. His extensive participation in MPC-related research and his outstanding academic ability were important considerations in selecting Allen for this award.

Allen has also pursued research opportunities outside the MPC. In the summer of 2009, he traveled to Japan to participate in seismic testing of a seven-story structure through the Research Experience for Undergraduates with the National Science Foundation.



Wood earned his MS in civil and environmental engineering from the U of U in December 2012. He also holds a BS in civil and environmental engineering from the same institution. He has performed research on the safety performance of road segments, particularly related to the safety effects of geometric design and maintenance decisions. His thesis, "Safety Impacts of Design Exceptions in Utah," focused on modeling the safety impacts of design exceptions on road segments in Utah. He also worked on developing performance-based

methods for making safety-based maintenance decisions, including those related to wildlife fencing, snow removal, and pavement conditions.

Wood was also a teaching assistant for the junior-level civil engineering course in transportation engineering. He was president of the U of U's student chapter of the Institute of Transportation Engineers. Jonathan coauthored two peer reviewed journal papers and one final research report during his master's program. He is now working on a PhD at Pennsylvania State University.

The Student of the Year Award was sponsored by the U.S. Department of Transportation (USDOT). The award is an opportunity for the USDOT to honor outstanding students from participating University Transportation Centers for their achievements and promise for future contributions to the transportation field.

## Students Awarded ITE Scholarship

University of Colorado Denver students Alejandro Hengo (PhD) and Max Henkle (MS) received a \$1,000 Colorado-Wyoming Section Graduate Level Scholarship from the Institute of Transportation Engineers. University of Colorado Denver master's student Rachael Bronson received the \$500 Executive Committee Award. The scholarships are intended to encourage students pursuing careers in transportation-related fields. The Colorado-Wyoming Section of the Institute of Transportation Engineers (ITE) is composed of about 500 members, students, and local affiliates who work/study in the fields of transportation and traffic engineering.

## UC-Denver students win scholarship honors

UC-Denver PhD student Kara Luckey was awarded the Helene H. Overly Graduate Memorial Scholarship by the Colorado Chapter of Advancing Women in Transportation. Each year the \$10,000 scholarship is awarded to a female student pursuing graduate studies in transportation or a related field. UC-Denver master's student Lisa Truong was recently awarded the Parsons Brinckerhoff Jim Lammie Scholarship by the American Public Transportation Foundation. The \$2,500 scholarship is awarded annually to an applicant dedicated to a public transportation engineering career.

## Ripplinger earns best dissertation award



Ripplinger

Dave Ripplinger was awarded the American Economic Association Transportation and Public Utilities Group's "Best Dissertation Award" in January at the AEA/TPUG Meetings in San Diego, CA. The award is one of the highest honors that TPUG can bestow on a young scholar. Ripplinger's dissertation was "Organizing Transit in Small Urban and Rural Communities." The paper can be found at <http://www.ugpti.org/resources/reports/details.php?id=723>. Ripplinger conducted the research for his dissertation as a PhD student at NDSU and a researcher at the Upper Great Plains Transportation Institute. He is now a researcher with the NDSU Department of Agribusiness and Applied Economics. TPUG is an international forum for people practicing and researching these topics and industries, including air and surface transportation, energy, electronic communications, water, and sewage.

## NDSU students present award-winning research at GIS-PRO Conference

Students from NDSU's Transportation and Logistics program presented papers at the GIS-PRO Annual Conference in Portland Oregon in October. The conference was sponsored by URISA, the Association for GIS Professionals. Nimish Dharmadhikari and Zijian Zheng presented "Study of the Public Transit System Accessibility Based on the Average Opportunity Accessibility Measure – a Case Study of Fargo, ND." The paper received second place in the 2012 URISA Student Paper Competition. In addition, PhD student Vu Dang presented "Impact of Distance, Traffic, and Elevation on Active Transportation to School for Children Using GIS." The paper received fourth place in the student paper competition.

## Student presents poster and paper and INFORMS conference

NDSU transportation and logistics student Luke Holt presented his research at the 2012 INFORMS Annual Meeting in Phoenix in October 2012. He presented a poster titled "Establishing the Optimal Drain Tile Network Based on Field Characteristics." In the work, he applied operations research analysis to drain tile network design. Holt also gave a presentation, "Determining the Right Buffer Strategy during Red River Floods, ND, MN." The presentation outlined his operations research analysis to determine a buffer strategy to provide appropriate protection from unpredictable flooding in the Red River region. INFORMS is a leading association for professionals in the fields of operations research, management science, and analytics.



Holt

## Students tour Fargo-Moorhead bus facilities

In October 2012, nine students in NDSU's chapter of the Association of Transportation & Logistics (ATL) met with transit officials from Fargo-Moorhead and toured the Metro Transit Garage. The focus of the tour and meeting was for ATL members to become acquainted with day-to-day operations of a transit agency. The students met with Lori Van Beek, transit manager for the city of Moorhead, and Gregg Schildberger, transit planner for MATBUS. The roundtable discussion included benefits of public transit in the Fargo-Moorhead area as well as the challenges of running a transit agency that is split between two cities, two counties and two states. Students also learned about fixed bus routes and the effort that is involved in route planning. Van Beek and Gregg Schildberger sought input from the students with regard to class studies regarding route development and the need to reach those in the community who most need services. During the tour, students saw bus maintenance facilities and talked to the MATBUS's maintenance manager. They observed buses undergoing routine maintenance checks and saw buses being washed. They also saw the routine for parking buses at the end of the day so that they were ready for the next day's service. The students also were able to see some of MATBUS' new hybrid diesel-electric buses.



## MPC sponsors undergraduate scholarships at NDSU

The MPC sponsored four scholarships presented by the Upper Great Plains Transportation Institute at its Annual Awards Banquet in October.



Stacy Engelmeyer, Melrose, Minn., and Taylor Krolak, Buffalo, Minn., both seniors in civil engineering, each received the \$1,500 Transportation Engineering Scholarship. The scholarship recognizes academic achievement and promotes the education of transportation students at NDSU.

Levi Hall, a senior majoring in agribusiness from Berthold, N.D., and Tanner Rohloff, a junior majoring in agricultural economics from Morris, Minn., each received the \$1,500 Paul E.R. Abrahamson Transportation Scholarship. The scholarship recognizes outstanding students at NDSU with an interest in the transportation and logistics of agricultural products.

The MPC provides funding for the Abrahamson and Transportation Engineering Scholarships.

Danielle Franssen, a senior in civil engineering from Cottage Grove, Minn., received the \$2,000 Charles E. Herman Scholarship, which recognizes academic achievement and promotes education of transportation students with a preference to women and minorities at NDSU. The Charles E. Herman Scholarship Endowment Fund at the NDSU Development Foundation provides funding for the scholarship.

## Recent graduates

### Colorado State University

**Doug Allen** completed his MS degree in 2011. His thesis was titled, "Evaluating the Long-Term Durability of Fiber Reinforced Polymers Via Field Assessments of Reinforced Structures."

**Feng Chen** completed his PhD in April 2011. His dissertation was "Reliability-Based Safety Evaluation of Traffic on Rural Highways. Chen is currently a post-doctoral researcher at CSU.

### North Dakota State University

**Matthew Alvarez** completed the MML program. He graduated with a B.A. in general education from Columbia College of Missouri in 2004. Alvarez plans to continue in the military for a few more years before beginning a civilian logistics career.

**Jeelong "Peter" Chen** earned his PhD. His dissertation was "The Dynamic Effects of Collaborative Transportation Management and RFID Implementation in the Railroad Supply Chain."

**Natassia Fay** completed the MML program and plans to use her logistics knowledge and skills to further her career. She holds a B.A. in philosophy from Kent State University.

**Kevin Hoffman** completed the MML program. He earned a BS in health care administration from Oregon State University. Through the MML program, Hoffman hopes to earn a promotion to major in the U.S. Army and be assigned as a support operations officer or battalion executive officer.

**Ciaran Kelly** completed the MML program. He earned a B.A. from Northumbrian University in the United Kingdom. His interest in logistics stems from an interest in business and the movement of people and goods.

**Brett Korporaal** graduated with an MS in Transportation and Urban Systems. He also holds a B.A. in organizational management from Patten University. Korporaal is interested in the planning and development of high speed rail in the United States.

**Pan Lu** earned her PhD. Her dissertation was "Modeling Pavement Performance and Preservation." She is now a research analyst with the UGPTI at NDSU.

**Ryan McDonald** completed the MML program and plans to continue in the military. He is interested in the logistical challenges surrounding earthquakes and is focusing his research on earthquakes in Chile.

**Nicholas Miller** completed the MML program. He believes earning the MML will make him a valuable logistical asset to the U.S. Army, tying together education and his military field experience.

**Preston Rutherford** completed the MML program. He holds a BS in crime and justice studies from the University of Idaho and an A.A.S. in law enforcement from North Idaho College. Upon completing the MML, he plans to continue his career in the U.S. Army.

**Joshua Smith** completed the MML program and returned to active duty in the U.S. Army. He is stationed in Ft. Leavenworth, TX.

**Robert Swearingen** completed the MML program. He holds a BS in Liberal Studies from Excelsior College and a Lean Six Sigma Master Certificate from Villanova University.

**Emmanuel Velez** completed the MML program. He previously attended the Inter American University of Puerto Rico. Velez plans to finish the MML program and return to serve in the U.S. Army to be promoted to major with an assignment to use his logistical knowledge.

**Qingqing Yin** graduated with her MS in the transportation option of the agribusiness and applied economics program at NDSU. Her thesis was "Transporting and Disposing of Wastewater from North Dakota Oil Producers." She was advised by Dr. Robert Hearne. Yin is from Xuzhou, China. She has a BA in economics and management from Nanjing Forestry University. She has returned to her home country.

**Joseph Zabaldano** completed the MML program. He holds a BS in industrial technology from Mississippi State University. Zabaldano plans to apply his logistical knowledge to his career in the U.S. Army.

## South Dakota State University

**Stephanie (Peters) Klay** earned her MS in civil engineering. Her thesis was "Mitigation of Corrosion in Continuously Reinforced Concrete Pavement." She is a structural specialist with Barr Engineering Co. in Hibbing, MN.

## University of Colorado Denver

**Krista Nordback** graduated from UC-Denver's PhD program in civil engineering with a focus on transportation engineering. Her time at the university was funded by a grant from the National Science Foundation through their Integrative Graduate Education and Research Traineeship program and scholarships from the Eisenhower Fellowship program, the Centers for Disease Control and Prevention, the American Association of University Women, and Women's Transportation Seminar. During the past year she has received awards for her research from the Institute of Transportation Engineers Colorado/ Wyoming Section and the Association of Pedestrian and Bicycle Professionals and was chosen to serve on the Transportation Research Board's Bicycle Committee. Her doctoral dissertation, "Estimating Annual Average Daily Bicyclists and Analyzing Cyclist Safety at Urban Intersections" develops a new method for estimating bicycle traffic volumes and provides the first safety performance functions for bicyclists in the United States. Nordback is currently working through the university on a project for the Colorado Department of Transportation to create a method to create factors for estimating annual average daily non-motorized traffic based on short term counts. In March she began a postdoctoral position at Portland State University, allowing her to continue her research on non-motorized transportation.

## University of Denver

The Executive Masters Program at the Intermodal Transportation Institute (ITI) at the University of Denver is designed for experienced managers and allows participants to work full-time from anywhere while earning a degree. Graduates receive a Master of Science in intermodal transportation management. The following students are the 10th cohort in the program and graduated in 2012.

**Aurthur Adams** is the director of domestic sales for CSX Transportation in Jacksonville, FL. He is responsible for the profitable growth of CSX's Rail Controlled Asset Program. Prior to joining CSX, he was a district Team Leader for Target Corporation.

**Ronald Bethmann** is a terminal superintendent for CSX Transportation in Jacksonville, FL. He has management responsibilities for five CSX Intermodal Terminals throughout the South including Jacksonville, Orlando, Tampa, New Orleans and Mobile.

**Teresa Brewer** is the freight mobility coordinator/ associate transportation planner for the Municipality of Anchorage, AK. She also leads planning projects that include all modes of transportation and provides land-use analysis for public and private development.

**William Corcoran** is the manager of automotive at TTX corp., a railcar owner and pool operator. He is based in Chicago and is responsible for the handling of shipper accounts and implements strategies and procedures necessary to manage about 57,000 railcars.

**John Cusato** is the supply chain department manager for JCPenney Company in Haslet, TX. He manages the receiving department at the JCPenney Alliance Retail Logistics Center and is responsible for operational and administrative receiving processes and associate development.

**Matthew Davies** is the managing director of Sales for FedEx Express – South America in Sao Paulo, Brazil. He is responsible for all revenue-creative activities in South America. He was previously based in Singapore as the FedEx sales managing director with responsibility for the South Pacific region.

**Drew Franklin** is the operations manager for the retail division of Linfox Logistics in Melbourne, Australia. He has operational responsibility for Linfox's largest retail customer in the state of Victoria with more than 400 employees and servicing more than 200 retail outlets.

**Keith Haskel** is the general manager for trade performance and analysis for Wallenius Wilhelmsen Logistics in Woodcliff Lake, NJ. Haskel's division provides intelligence and decision-making support to the company's ocean transportation service.

**Michael Haugh** is the national operations manager for Linfox Logistics in Melbourne, Australia. He manages the national operations for the wood business within Linfox's Industrial Division. He manages warehousing and distribution of finished wood products from 18 sites across Australia.

**Sean Kelly** is the senior account manager/chemicals for CSX Transportation in the Chicago Sales Office. He is responsible for contract negotiations, account growth and expansion, and service enhancements for several large chemical shippers.

**James Kramer** is the vice president for national accounts for ContainerPort Group Inc. in Chicago. He manages and develops the strategic relationships with the company's national accounts for both the transportation and terminal business units and manages the sales and marketing within specific regions.

**D'andrae Larry** is the director of marketing – industrial products for BNSF Railway Company in Fort Worth, TX. He supports the sales and marketing teams by assessing, making recommendations, and improving upon any structural impediments to service with customers.

**Chris Luebbers** is the group manager for international marketing for Norfolk Southern Corp. in Norfolk, VA. His team provides the support that marketing staff need to maintain and grow current customer relationships and develop new business opportunities.

**Ed Mykyten** is the senior vice president for enterprise business development with Hub Group Inc. in Duluth, GA. Within Hub, he has also served as a national account executive, regional vice president for the Southeast and the Southwest and as the president of the Atlanta operating office.

**Chris Novosad** is the terminal operations manager for Horizon Lines in Tacoma, WA. He oversees operations, regulator, finance and vessel schedule integrity for the shipping company which has terminals throughout North America.

**Lynn Ramsey** is the national supply chain analyst for Domino's Pizza LLC in Denver. He evaluates supply chain, logistics, warehousing, quality control and compliance oversight. He also manages commodity storage, processing and warehousing plus DOT and EPA reporting for 20 U.S. distribution centers.

**Steve Rhode** is the vice president for rail commercial at Schneider National Inc. in Green Bay, WI. He oversees the team that works closely with railroads on new service design, contract negotiations, issue resolution and other topics.

**Ian Strachan** is the national manager for linehaul for Linfox Logistics in Brisbane, Australia. He is involved in all aspects of the business including business, financial, operational and customer account management. He is also responsible for developing the company's steel business across the country.

**Scott Swetkovich** is the director of operations for Sounds True Inc. in Louisville, CO. He oversees all operational activities including the manufacturing process, supply chain management, purchasing warehousing, customer service and IT infrastructure of this audio, video and book publishing company.

**Sarthak Verma** is the director of intermodal operations for JB Hunt Transport Services Inc. of Lowell, AR. He is working on improving the efficiency and productivity of the JB Hunt dray fleets with a focus on reducing costs. He also heads up the IT and engineering undertakings involving intermodal operations.

**Brian Ward** is the director of sales and marketing for processed materials with CSX Transportation in Jacksonville, FL. He leads a team of four sales managers and two market managers and is responsible for developing and executing short- and long-term strategies for the processed materials business unit.

**Kimberly Yox** is the senior manager of North America intermodal operations for APL Ltd. of Scottsdale, AZ. She oversees a team that coordinates, manages and improves intermodal service schedules in concert with rail carriers to meet service needs for customers.

## University of Utah

**Piyali Chaudhuri** earned his PhD His dissertation was "ITS Loop Data Based Optimization Methods for Optimal Traffic Operations on Freeways." He is working for the University of California Los Angeles as a transportation manager.

**Muhammad Farhan** earned his PhD His dissertation was "A Practical Perspective on the Benefits of Combined Traffic Assignment and Control Models." He is working for Wasatch Front Metropolitan Planning Organization.

**James Mulandi** earned his PhD His dissertation was "Assessing Traffic Control Evaluation Strategies and Delay Estimation Procedures." He is working for a transportation consultant.

**Ivana Tasic** graduated with her MS degree and is now pursuing a PhD at the University of Utah. Tasic has been working at the Utah Traffic Lab at the University of Utah since 2010. She received her BS in traffic and transportation engineering at the University of Belgrade, Serbia. For her master's program, she reviewed advanced traveler information systems and their influence on traffic incident management.

**Jonathan Wood** graduated with his MS degree and is now pursuing a PhD at Pennsylvania State University. Wood also holds a BS degree from the University of Utah in civil and environmental engineering. He was the 2013 University Transportation Centers Student of the Year from the Mountain Plains Consortium.

**Milan Zlatkovic** earned his PhD and is now a full-time post-doctoral researcher in the Utah Traffic Lab. He holds a BS degree in traffic engineering from the University of Belgrade, Serbia, and an MS degree in civil engineering from the University of Utah. For his PhD, he evaluated and analyzed benefits and impacts of transit signal priority for bus rapid transit and light rail transit using VISSIM microsimulation software, as well as analysis of urban traffic networks.

## Utah State University

**Brandon Brady** earned his MS in the summer of 2011. His thesis was "Effects Of Cordon Pricing On Pm2.5 Production." Brady is employed at Johansen and Tuttle Engineering in Castle Dale, UT.

**Travis Evans** earned his MS in the summer of 2011. His thesis was "Development of Assessment & Evaluation Strategies for Sign Retroreflectivity." Evans is pursuing employment opportunities in Utah's transportation industry.



## New Students

### Colorado State University

**Nasser Albeiruti** is a graduate student and the financial officer in the Department of Construction Management, and he is also currently pursuing an MBA. Albeiruti has a BS in chemical engineering and an MS in accounting. His research interest is focused on alternatives to fuel tax revenue to help increase funding for highways.

**Chris Bright** earned his BS in civil engineering in 2011 from Tennessee Technological University in Cookeville, TN. He participated in TTU's cooperative education program, where he worked for a structural engineering firm in Tennessee that specializes in various mining applications, as well as a civil engineering firm in South Australia. He was also a founding member of the TTU chapter of Engineers Without Borders and has participated in a historical and international engineering study program in France. He is pursuing an MS in civil engineering and is conducting research for MPC project 408 "Exploring Unique Plastic-Reinforced Bridge Decks" under the supervision of Dr. John van de Lindt and Dr. Rebecca Atadero.

**Alex Hesse** earned his BS in civil and environmental engineering at the University of Wisconsin Madison. He is currently pursuing a master's degree in civil and environmental engineering with an emphasis in structural engineering. He has a specific interest in bridge design and repair. He is a graduate research assistant working on determining the accuracy and reliability of nondestructive evaluation techniques on bridges.

**Kirsten Peterson** received a BS in civil engineering from Embry-Riddle Aeronautical University in Daytona Beach, FL and is pursuing an MS in civil engineering with a focus in structures. She will be studying aluminum plastic composites for use in transportation infrastructure.

**Sherona Simpsonis** is an MS student in the Construction Management Master of Science Program. She obtained a bachelor of science in quantity surveying from the University of Technology in Jamaica. Simpsonis hopes to contribute to the development of quantity surveying and construction management courses at the University of Technology to include aspects of sustainable design and facilities management.

### North Dakota State University

**Raj Bridgelall** is a PhD student in transportation and logistics. He holds BS and MS degrees in electrical engineering from Stony Brook University. Bridgelall's research interests include real-time pavement condition monitoring. He is the director of UGPTI's Advanced Traffic Analysis Center.

**Martin Fowel** is studying to earn the Master of Managerial Logistics Program. He earned his bachelor's degree in Nigeria. Fowel plans to continue obtaining his PhD in transportation and logistics management. With his degrees, he wants to work within the U.S. railway system.

**Brian Gallagher** is an MS student in the transportation concentration of the agribusiness and applied economics program. He is from Ames, IA. Gallagher is working on a project with a transportation focus with Dr. Won Koo as his adviser.

**Ken Ibold** is a master's student in the Transportation and Urban Systems Program. Ibold earned his BS in journalism at the University of Wisconsin-Madison. He is one of the few people in the nation working on the licensing and planning of commercial spaceports for horizontal launch and landing vehicles.

**Chijioke Ifepe** is a PhD student in transportation and logistics. He earned a BS in engineering polymer and textile engineering, as well as an MS in transportation. In the future, he plans to be a consultant in the logistics and supply chain industry.

**William Lyons** is studying to earn the certificate in Transportation and Urban Systems. Lyons is the president and CEO of Fort Hill Infrastructure Services in Boston, MA. He holds a BS in electrical engineering from Norwich University and a J.D. from Suffolk University Law School.

**David Massey** is enrolled to earn the certificate in Transportation and Urban Systems. He holds a BS from the Rose Hulman Institute of Technology and a master of urban planning from the University of Illinois- Urbana Champaign. Work experience with an MPO and as a transportation planner and engineer have led Massey to pursue the certificate.

**Nam Nguyen** is enrolled in the MML program. A native of Vietnam, he attended the University of Transport in Ho Chi Minh City, majoring in marine navigation engineering. Nguyen has work experience with the Hanjin Shipping Line.

**Chipo Nsereko** is enrolled in the Master of Managerial Logistics Program. He earned his BS in management information systems from Metropolitan State University in Minneapolis after attending Anoka-Ramsey Community College in Coon Rapids, MN, where he earned his AS in business.

**Yong Shin Park** is a student in the Master of Managerial Logistics Program. He holds a BS in industrial engineering from NDSU. A native of South Korea, Park is interested in logistical planning and the economic effect of integrating the railroad and highway systems of North Korea and South Korea.

**Peter Simonson** is a doctoral candidate. He holds a BS in business administration from the University of Arizona, earned an MBA from North Dakota State University and holds a JD from the University of North Dakota Law School. An adjunct professor of business at NDSU, Simonson is interested in how logistics affects businesses.

**Dale Stith** is in the master's program in Transportation and Urban Systems. He plans to use the skills and knowledge he develops in the program to become more effective in developing more comprehensive and integrated transportation plans. Stith graduated from Old Dominion University with a BS in geography.

**Napoleon Tiapo** is a PhD student in transportation and logistics. He holds a master's degree from NDSU. His future goals include teaching, research, assessments, and program management.

## South Dakota State University

**Brittney Ahrenstorf** is an undergraduate research assistant. After completing her BS degree in May 2013, she joined the graduate program in civil engineering. A native of Lake Park, IA, Brittney began her education at the University of Iowa and transferred to SDSU. Her research on the evaluation of ice loads on bridge piers in South Dakota, co-funded by MPC and the South Dakota Department of Transportation, includes development of an efficient and accurate ice load monitoring system, measurement of ice loads exerted on bridge piers, and evaluation of the applicability of AASHTO ice load equations to bridge piers on South Dakota's rivers. Brittney anticipates gaining her MS in May 2014.

**Thomas A. Druyvestein** earned his BS degree in civil and environmental engineering from SDSU in 2010. He is pursuing an MS degree in civil engineering and is a graduate research assistant working on the optimization of pavement marking performance. The project is co-sponsored by MPC and the South Dakota Department of Transportation. While he was an undergraduate student, Druyvestein assisted with another research project, titled "Jointed Plain Concrete (JPC) Design and Construction Review," that was also co-funded by MPC and SDDOT.

**Shawn Maassen**, a native of Rock Valley, IA, earned his BS degree in civil and environmental engineering in 2011 and anticipates earning his MS in civil engineering in December. Maassen is continuing research on the mitigation of corrosion in CRC pavement. The study is co-funded by MPC and the South Dakota Department of Transportation. The project was started in 2010 by former graduate student Stephanie (Peters) Klay. Maassen's research will focus on field and laboratory testing of corrosion inhibitors using half-cell potential. He will then analyze the data from his tests and from tests that have previously been completed for this project.

**Melissa McMullen** is a native of Vermillion, SD, and earned her BS in civil and environmental engineering in May 2012 from SDSU. She plans to complete her MS in civil engineering. She has acquired engineering experience by working for SDDOT as a field engineering intern and by working for SDSU as a student operator at the Brookings Wastewater Treatment Facilities. She is currently working on a research project co-funded by the MPC and SDDOT that involves the implementation of accelerated bridge construction within SDDOT. This involves the formulation of a catalog of commonly used ABC techniques and developing a method for determining if the use of ABC on specific SDDOT projects would be feasible.

**Todd Pauly**, a native of Arlington, MN, is a graduate research assistant. He began his studies at SDSU in September of 2008 and graduated with a BS in civil and environmental engineering in May of 2012. Pauly gained engineering experience while working for HDR Engineering in Sioux Falls, SD, during the summers of 2010-2012. His current research project, which is funded by the MPC, will evaluate the seismic performance of self-consolidating concrete (SCC) compared to conventional concrete. The results will help state DOTs design and construct SCC in bridge columns in seismic regions.

**Zhao Shen** is now a graduate research assistant with the Department of Civil & Environmental Engineering. He earned his BS in traffic and transportation in June 2012 from Southeast University, China. At present, his major is traffic engineering and his research focuses on traffic safety. He is involved in the Evaluation and Mitigation of Vehicle Impact Hazards for Overpasses project, which is co-funded by MPC and South Dakota Department of Transportation.

**Kai Wang**, an international student from China, is a graduate research assistant at SDSU. He began at SDSU in September of 2011 and will earn his master's degree in Civil and Environmental Engineering in August 2013. The focus of Kai's research is "Selection of Interest and Inflation Rates for Infrastructure Investment Analysis" which is co-funded by MPC and SDDOT. Following graduation, Kai plans to continue to pursue his PhD degree.

**Brett Tigges** began his undergraduate education at SDSU in September of 2008 and completed his BS in Civil and Environmental Engineering in December of 2012. Brett has been appointed as a graduate research assistant at SDSU. The focus of his research is "Evaluation and Mitigation of Vehicle Impact Hazards for Overpasses", which is co-funded by MPC and the South Dakota Department of Transportation. He began his research on the topic in September of 2012 as an undergraduate student. The work will include evaluating the overpasses in South Dakota to identify those that are susceptible to collapse from vehicular (tractor-trailers in particular) impact, as well providing mitigation solutions to protect the overpasses. He anticipates earning his MS degree in civil engineering. Brett is a native of Ringsted, IA.

## University of Colorado Denver

**Rachel Bronson** relocated to Denver from Charleston, SC, in 2012 to begin work on her masters in civil engineering. Prior to moving to Colorado, Rachel worked for four years as the executive director of the Palmetto Cycling Coalition, a non-profit organization working to make South Carolina a more safe place to bicycle. Bronson is passionate about transportation infrastructure that is sustainable and cost-effective and is interested in the policies and designs that successfully drive these innovations. At CU Denver, Bronson is secretary of the ITE student chapter and a member of the ACT Research Group. She is also the recent recipient of the ITE

CO/WY Section Executive Committee Leadership Award and the WTS Colorado Leadership Legacy Scholarship. Bronson is engaged in research exploring how multi-modal transportation options make communities more resilient when faced with catastrophic events.

**Ed Gaviria** is earning his PhD in civil engineering systems with a focus on transportation and sustainability. He holds a BS in electrical engineering from the University of Texas at Austin, an MBA in finance and marketing from the McCombs School of Business at the University of Texas at Austin, and an MS in quantitative analysis and city planning from Cornell University. He has more than 15 years of experience in engineering, finance, engineering management, consulting and market research. In the past, he has worked as an advanced engineer for Boeing, as senior financial analyst at American Airlines and as a senior manager at Deloitte Consulting, IBM Global Services and Hewlett Packard. His research interests include sustainable transportation, the economics and design of inter-city rail transit, the costs of congestion and related rail and light rail approaches to solve the problem.

**Alejandro Henao** is working on an MS and PhD in civil and environmental engineering with an emphasis on transportation. He is in his first year as an NSF-funded IGERT fellow in the Sustainable Urban Infrastructure program. Originally from Colombia, he started his studies at the Universidad del Valle in Cali, and earned a BS – Magna Cum Laude - in civil engineering from the University of Colorado at Boulder. Prior to joining the IGERT program, Alejandro worked professionally as a structural engineer at Contech Bridge and as a project intern for Opus Northwest. His research interests include sustainable urban infrastructure systems, transportation and planning and management for mega events, and bus rapid transit.

**Max Henkle** is a master's student in the transportation engineering program. He holds a BS in environmental sciences from the University of California, Berkeley, and a master's in Urban Regional Planning from the University of Colorado, Denver. He is focusing his studies on the application of GIS tools for decision making, transportation planning, multi-modal transportation, and complete streets. Henkle is a recipient of Institute of Transportation Engineers ITE CO/WY Graduate Level Scholarship.

**Kara Luckey** is a PhD student in the College of Architecture and Planning, where her work is focused on the relationship between urban infrastructure, economic and community development, and social equity. She is studying neighborhood change processes, transportation and housing equity, and the public transit's role as a community and economic development tool. Kara is the recipient of a fellowship in Sustainable Urban Infrastructure through the National Science Foundation's Integrative Graduate Education and Research Traineeship (IGERT) program. Luckey holds a BSE Advancement of Science and Art in New York City and has more than seven years of experience in planning practice. She has not only worked as a planner and project manager predominantly in transit and transportation planning but also in contexts related to urban revitalization, waterfront redevelopment, and planning for public and federal lands. Luckey's research interests include transportation and housing equity, economic and community development around urban infrastructure investment, urban and regional governance structures, and residential location decision-making.

**Jerry Ogden** is a PhD student and received his MS from the University of Colorado, Denver. Ogden plans to explore the relationships between weather-related collision incidents involving commercial vehicles in a GIS study. In the study, he will attempt to correlate geographical features, seasonal issues, and remote sensing as a means of assisting commercial carrier dispatching centers with route selection, vehicle/load configurations, and the use of mitigating equipment such as additional ballast for trailer stability in wind-prone regions, or open-shoulder tire tread designs in regions prone to ice and snow. Ogden owns a consulting firm that conducts business across the Central and Western US and Hawaii.

## University of Utah

**Arwen A. Behrends** is in her second year of the social psychology doctoral program. She earned her bachelor's degree from Brigham-Young University-Idaho. Arwen's research focuses mainly on various components and processes of decision making as well as attitudes and their impact on social interaction and physiological health outcomes. She is also assisting Dr. David Strayer on MPC Project 407, "The Effect of Multi-tasking on Self-Assessments of Driving Performance."

**Dylan Brown** holds a BS in civil and environmental engineering from the University of Utah and is currently working on his MS degree. Brown is researching repair techniques for precast bridge columns connected to footings with grouted sleeved connectors.

**Charan Kumar Chandika** is an MS student in civil and environmental engineering. His research is on oil sands, which is a mixture of sand and bitumen, to try to predict the viscoelastic behavior and critical cracking temperature of oil sands mixes under low temperature conditions.

**James Coleman** received his BS degree in psychology from the University of Utah in 2010. He is a master's student in the Applied Cognition Lab and the Center for the Prevention of Distracted Driving. He is studying individual differences in working memory capacity and how those differences dictate attention control and executive function

**Zant Dotty** is an undergraduate student in civil and environmental engineering.

**Zach Gibbs** is working on his master's degree. He earned his bachelor's degree in civil and environmental engineering at the University of Utah. Gibbs is studying surcharging of embankments and its effect on the rate of secondary settlement of the Bonneville clays, and how much more settlement can be expected if the surcharge is removed before primary settlement has completed.

**Zachary Jones** holds a BS in civil and environmental engineering at the University of Utah and is currently working on his master's degree. He is researching the low-temperature performance of pavements through bending beam rheometer testing of field and laboratory pavement samples.

**Hao Li** is a doctoral student.

**Shun Li** is currently a master's student in civil and environmental engineering. Li earned a BS in civil engineering from Changsha University in China. Li is studying the secondary consolidation settlement of foundation soils at deep clay sites that can cause damage to bridge approaches and pavements.

**Shannon M. Moore** received her BA from Elizabethtown College in Elizabethtown, PA, in 2011. She is in the social psychology doctoral program and is working with Dr. David Strayer on MPC Project 407, "The Effect of Multi-tasking on Self-Assessments of Driving Performance." Her other projects examine how aspects of the self have an impact on decision making and how knowledge of others guides our interpersonal decision making.

**Anusha Musunuru** holds a bachelor's degree in civil engineering from Jawaharlal Nehru Technology University in India and is working on an MS in civil and environmental engineering. Her research is focused on performance-based highway design that incorporates risk and reliability analysis into the process of establishing road geometric design criteria and making road design decisions.

**Joel Parks** is a graduate research assistant and masters student in civil and environmental engineering.

**Mohammed Javad Ameli Renani** is currently a PhD student in civil and environmental engineering. He also holds an MS degree from the University of Utah and a BS from Sharif University of Technology in Iran. He is a member of a research team that is currently studying the seismic performance of grouted splice sleeve bridge connections.

**Wade Stinson** is an undergraduate student in civil and environmental engineering.

**Jeffrey Taylor** holds a bachelor of science in civil and environmental engineering from the University of Utah and is working on his master's degree. His research touches on topics in transportation planning, transportation modeling and simulation, dynamic traffic assignment, transportation safety, emissions estimation, and traffic flow theory.

**Catherine Tucker** is working on an MS in civil and environmental engineering. She also holds a BA in art from Lewis & Clark College in Portland, OR, and a master of architecture from the University of Utah. She is currently evaluating the potential use of concrete-filled steel tubular columns for accelerated bridge construction.

**Jonna Turill** is a graduate student in the Cognition and Neural Science program at the University of Utah. After receiving her BA in psychology from Biola University in 2009, she moved to Utah to work in Dr. David Strayer's Center for the Prevention of Distracted Driving lab. She is examining attentional allocation and how distraction affects drivers through the use of driving simulations, an instrumented vehicle, and behavioral and EEG methodologies.

## Utah State University

**Wesley Boggs** is a master's degree student developing a sign management plan for the Utah Department of Transportation to meet new MUTCD standards. He is working on retroreflectivity deterioration forecasting. Before beginning his master's program, Boggs was an engineering intern at UDOT. He received his BS in civil and environmental engineering from Utah State in 2010.

**James Fishelson** is a master's student conducting research on capacity modeling for Automated Electric Transportation: a system of self-driving, automated vehicles electrically powered via in-motion energy transfer by the roadway itself. He did his undergraduate work at Yale University, where he was a double major in chemistry and international studies. Fishelson has had a lifelong interest in transportation and the way that its infrastructure influences societies. This interest was nurtured by his work and studies in Kazakhstan, Vietnam, Russia, and Israel.

**Derek Freckleton** is a master's student conducting research on Automated Electric Transportation (AET). A native of Bountiful, Utah, Freckleton completed his BS in civil and environmental engineering from Utah State University in 2010. While at Utah State University, he received the Institute of Transportation Engineers Intermountain Section Student Paper Competition Award.

**Luis Hidalgo** did his undergraduate work at PUCMM University in the Dominican Republic, where he was a double major in civil engineering and international business. He earned his MBA at INTEC/INCAE University in 2010. He has more than five years of experience, working as project manager and construction supervisor for multinational mining companies. He was also involved in high-level investment projects focused on the search for cleaner energies at lower cost. He is currently the president of the USU chapter of the Institute of Transportation Engineers. His master's research focuses on integrated corridor management, an initiative toward a coordination of transportation operations to improve travel management.

**Sarawut Jansuwan** is a PhD student in civil and environmental engineering. He received his bachelor's in civil engineering from Chiang Mai University, Thailand in 1999, and master's in civil engineering (transportation engineering) from Chulalongkorn University, in Thailand in 2002. Jansuwan served as a regional project engineer and construction supervisor for an intelligent transportation system company from Japan. He worked on ITS projects with government agencies and local municipalities focused on procurement, design, and installation of intelligent traffic control and traffic detector systems. He is currently a research assistant working for various transportation research projects at USU. His research interests include transportation network vulnerability and resiliency, freight planning and modeling, transportation-disadvantaged populations, and traffic simulation modeling.

**Majid Khalilikhah** is a PhD student studying gender-based choice behavior in central zone pricing policy conditions. He earned his BS in civil and environmental engineering at K.N.T University in Iran and his MS at Sharif University of Technology in 2011. While there, he undertook a variety of research in travel behavior modeling, travel demand management policies, and traffic safety. Also, he managed a comprehensive parking study project

**Songyot Kitthamkesorn** is a PhD student in transportation system engineering. He earned his bachelor's in civil engineering at Kasetsart University in Thailand and his master's in structural engineering at the Asian Institute of Technology in 2000. Before attending USU, he worked as an assistant to the director general of the Office of Transportation and Traffic Policy and Planning in Thailand. His research focuses on network equilibrium under uncertainty.

**Sunil Pant** is a master's student conducting research on a resiliency measurement framework for road networks subjected to disasters of different magnitudes. Pant earned his bachelors' degree in civil engineering from Tribhuvan University in Nepal and worked for the Department of Roads in Nepal before joining Utah State University.

**Seungkyu Ryu** is a PhD student studying network modeling, traffic assignment algorithms and origin-destination estimation algorithms. Ryu received his bachelor's and master's degrees from the transportation engineering department at the University of Seoul, South Korea. His research experiences include developing shortest path algorithm, trip generation model and traffic impact studies. He is currently working on various transportation research projects including Path Flow Estimator model and Automated Electric Transportation model at USU. From that research, he has published 10 journal papers.

**Sadra Sharifi** is a PhD student and graduate research assistant studying transportation system analysis, application of operation research in transportation engineering and travel behavior modeling. Sharifi earned his bachelor's in civil engineering from Ferdowsi University of Mashhad, in Mashhad, Iran. He earned his master's from Sharif University of Technology, Tehran, Iran, where his thesis provided an introduction to network modeling, uncertainty in demand and travel time for real transportation networks.

**Ali Soltani Sobh** completed his master's in transportation engineering at Sharif University of Technology in Iran. His thesis focused on transportation network pricing. He has experience as a consultant engineering in Iran where he worked on traffic organization projects. He is a PhD student and a research assistant focusing on transportation network resiliency, reliability of transportation network and network pricing.

**Devin Squire** is a master's student who transferred from Weber State University. He plans to graduate this fall. His research involves the simplification of data collection and asset management through the use of mobile technology.

**Jia Yoa** is a visiting PhD research scholar being advised by Dr. Anthony Chen of transportation division in the Department of Civil and Environmental Engineering. He is a PhD candidate in the School of Traffic and Transportation Engineering at Central South University in China. He earned his BS in applied mathematics at Central South University and was honored as the Excellent Graduate of Central South University and Excellent Graduate of Hunan Province. He also earned his master's in transportation engineering at the Central South University. His research focuses on multimodal transportation network equilibrium analysis, transportation network optimization, and transportation system reliability.

**Donghyung Yook** is a PhD student studying the improvement of transit assignment algorithms. He was from Suwon, South Korea and earned his bachelor's and master's degrees in transportation engineering at the University of Seoul. He worked for Korea Transport Institute and Gyeonggi Research Institute for two years.

## University of Wyoming

**Dick Apronti** is from Accra, Ghana, and worked as an assistant highway engineer for a Ghanaian consultant. He is pursuing a master's degree in transportation and is a graduate assistant. He is researching base widening methods and plans to work as a professional engineer in developing countries upon graduation.

**Edward Offei** is a PhD student in civil engineering from Accra, Ghana. He obtained his BS in civil engineering from the Kwame Nkrumah University of Science and Technology in Ghana. He also earned an MS degree in civil engineering from the University of Wyoming in 2011. For his doctoral degree, he is working on the research project to "Evaluate the Base Widening Methods used in Wyoming." His teaching responsibilities involved teaching the engineering computing course for the engineering undergraduate class. He plans to work for a research institution or engineering consulting firm after graduation.

**Eric Milliken**, of Casper, WY, completed his BS in civil engineering in 2011. He is pursuing a master's degree in transportation engineering and is a graduate research assistant in transportation engineering. He is working on developing an algorithm to determine travel time and travel time reliability for rural highways during winter weather conditions. Milliken is the secretary of the University of Wyoming ITE and is a board member on the Albany County Transportation Authority.

**Abram Pearce** of Pinedale, WY, will complete a BS in civil engineering in May. He is pursuing a master's degree in transportation and plans to graduate in May 2013. Pearce is researching the effects of heavy oil and gas traffic on Wyoming's paved county roads. In the future, Abram plans to work in Wyoming as a professional engineer.

**Vijay Sabawat** of Hyderabad, India, is seeking a PhD in civil engineering under the direction of Dr. Rhonda Young in the Department of Civil and Architectural Engineering (transportation). His research is on a variable speed limit decision system for the Elk Mountain Corridor. The objective is to develop a control strategy for implementing variable speed limits on the I-80 corridor between Laramie and Rawlins. Sabawat is active in ITE and WYOCC (Wyoming Cricket Club). Sabawat plans to work in the United States for a few years to gain work experience and then return to India and assist in development there.



**Promoth Saha** earned a BS in civil engineering with an emphasis in transportation engineering from Bangladesh University of Engineering and Technology and an MS in civil engineering from the University of Wyoming. Saha worked for Sami Engineering, a structural design and detailing firm. As an undergraduate, he conducted research on road safety trends, applying quantitative risk assessment safety trends, applying quantitative risk assessment techniques and statistical analysis, and working on several design projects. His current research interests include transportation safety and accident prevention analysis, intelligent transportation systems, statistical modeling and application on transportation safety.

**Lindsay Schumaker** earned her BS in civil engineering from California State University, Sacramento. While there, she was active in the student chapter of Engineers without Borders, Tau Beta Pi, and served as president in ASCE. She worked several years as a transportation design engineer with HDR Engineering Inc. and obtained a professional engineering license from the state of California. She is an MS student in civil engineering and a graduate research assistant studying the potential use of the MEPDG for local paved roads in Wyoming.

**Debbie Shinstine** of Cheyenne, WY, earned her BS in civil engineering at the University of Wyoming and her MS in civil engineering at the University of Arizona. She is a PhD student in civil engineering and is a graduate research assistant in transportation. She has 25 years of professional experience in civil engineering both in private practice and public service and is licensed as a PE in three states. Most recently, she worked for the Virginia Department of Transportation managing maintenance, construction and land use. She is developing a methodology for identifying high-risk crash locations on the Indian reservation roads in order to implement a safety improvement program. After earning her PhD, Shinstine plans to secure a faculty position.

**Nathan Stroud** of Pinedale, WY, completed his BS in civil engineering 2011. He will become a licensed surveyor in the spring of 2012 and is currently pursuing his MS in the same field. Stroud is researching the impact of oil and gas traffic on county roads and standardizing permits for the oil and gas traffic in Wyoming. He plans to work in the State of Washington or Montana as a professional engineer and land surveyor.

**Yanfei Sui** is from China and holds a bachelor's in computer science and business administration and a master's degree in vehicle engineering. As a master student, he studied driving behavior analysis and emergency evacuation. As a PhD student in civil engineering, his research interests include traffic safety, intelligent transportation system and solving traffic problems with GIS tools.

## Faculty Activities



### Transportation analyst earns APICS CSCP designation

EunSu Lee, a transportation analyst with the Upper Great Plains Transportation Institute at NDSU, was recently recognized as an APICS Certified Supply Chain Professional (CSCP). APICS CSCP is a program offered by APICS the Association for Operations Management. As a transportation analyst, Lee contributes to several current UGPTI projects that focus on statewide transportation planning. His specialties in spatial analysis and supply chain management are especially useful while projecting oil traffic in North Dakota. In addition, Lee works on agricultural transportation projects that analyze grain movement by rail, truck and waterways. He also enjoys using humanitarian logistics to improve the lives of North Dakotans through analysis of ambulance service coverage and emergency services accessibility in rural areas. On a larger scale, Lee studies and analyzes international containerized freight movement, focusing on container imports and exports of the United States. Along with his analyst duties, Lee is currently teaching a graduate-level course, Spatial Analysis in Transportation.

Introduced in 2005, the APICS CSCP program takes a broad view of the supply chain field, extending beyond internal operations to encompass all the steps throughout the supply chain—from the supplier, through the company, to the end consumer—and provides the candidate with knowledge to effectively manage the integration of these activities to maximize a company's value chain. To qualify for the APICS CSCP designation, a candidate must complete a rigorous course of study and a comprehensive examination.

### Wehbe elected ACI Fellow

Dr. Nadim Wehbe, professor of Civil and Environmental Engineering at South Dakota State University (SDSU), was elected in October 2011 as a fellow of the American Concrete Institute (ACI). According to ACI bylaws, "a Fellow shall have made outstanding contributions to the production or use of concrete materials, products, and structures in the areas of education, research, development, design, construction, or management. In addition, a Fellow shall have made significant contributions to ACI through committees and/or local chapters." Wehbe and 27 others were formally recognized as new ACI Fellows during the ACI Spring Convention March 18, 2012, in Dallas, TX.

## SDSU researcher is invited speaker at Engineering Society Conference

Dr. Nadim Wehbe was an invited speaker at the 51st Annual South Dakota Engineering Society Conference. The conference was held on March 31-April 1, 2011 in Pierre, SD. Dr. Wehbe's presentation, entitled "Evaluation of Concrete Mixtures for Jointed Plain Concrete Pavement Applications," covered results from a portion of a study on performance of jointed plain concrete pavement. The study is co-sponsored by MPC and SDDOT.

## Former California state bridge engineer presents Seminar at SDSU

Kevin Thompson, a former State Bridge Engineer for the California Department of Transportation (CALTRANS), presented a one hour seminar at South Dakota State University (SDSU) on April 7, 2011. The seminar, entitled "AASHTO— Maintenance of Bridge Design Specifications and Technical Publications" was sponsored by the MPC program at SDSU and covered a wide array of topics including the organization and functions of AASHTO committees, development of new standards for roadway tunnels, and the importance of research in advancing the state of practice. The seminar was attended by students, faculty, and local engineers. Thompson has more than 27 years of experience with Caltrans, including bridge design, roadway tunnel and bridge seismic standards. He was State Bridge Engineer & Deputy Division Chief of Structure Design with Caltrans from February 2005 until his retirement from state service in July 2010. Thompson recently joined Arora and Associates, P.C. as Manager of West Coast Operations. He has participated on many national committees and research panels for industry organizations such as AASHTO, TRB, American Segmental Bridge Institute (ASBI) and Western Bridge Engineers, Inc.

## MPC staff present papers at TRB annual meeting

MPC staff and students participated in the Transportation Research Board's national meeting in Washington, DC, Jan. 22-26. The meeting attracted more than 11,000 transportation professionals from around the world and included more than 4,000 presentations in nearly 650 sessions and workshops covering all modes of transportation. The Transportation Research Board is one of the six major divisions of the National Research Council. The following research papers were presented by MPC staff.

### Colorado State University

A Quantitative Decision-making Framework to Evaluate Environmental Commitment Tracking Systems for Colorado Department of Transportation • Mehmet Egemen, Caroline Murrie Clevenger and Andrew Fillion

### North Dakota State University

Analyzing Investments Needed to Support Oil and Gas Production and Distribution • Denver Tolliver, Alan Dybing and Subhro Mitra (University of North Texas)

Application of Attitudinal Structural Equation Modeling to Intercity Transportation Market Segmentation • Jeremy Mattson, David Ripplinger and Del Peterson

County Road Survey for Transportation Managers • Kimberly Vachal, Mark Berwick and Jason Baker (Baker Consulting)

Marginal Cos Pricing and Subsidy of Small Urban Transit • Jeremy Mattson and David Ripplinger

Predicting Truck Crash Involvement: Commercial Driver Behavior-Based Model • Brenda Lantz and Micah David Lueck (American Transportation Research Institute)

Transportation and Health Care Use for Older Adults in Small Communities • Jeremy Mattson

Using Laws, Enforcement, and Sanctions to Increase Seat Belt Use on Rural Roads • Kimberly Vachal, Donald Malchose and Laurel Benson

### South Dakota State University

Assessment of Labor-Based Construction Methods in Egyptian Rural Roads • Hesham Mahgoub

Quantile Effects of Factors on Crash Distributions • Xia Qin

Segment Length Impact on Highway Safety Analysis • Xiao Qin and Adam Wellner

### University of Colorado Denver

Arterial Intersections vs. Gridded Street Networks: Comparing Capacities & Pedestrian Accommodations • Wesley Marshal and Brian Bern (Matrix Design Group, Inc.)

Preliminary Analysis of Light-Rail Crashes in Denver, Colorado: Implications for Crash Prediction and Hazard Index Models Based on Heavy-Rail Systems • Pamela Fischhaber and Bruce Janson

### University of Utah

Calibrating Time-Dependent Car-Following Models Based on Vehicle Trajectory Data: Dynamic Time-Warping Approach • Jeffrey Taylor, Xuesong Zhou and Nagui M. Roupail (North Carolina State University, Raleigh)

Development and Evaluation of an Algorithm for Resolving Conflicting Transit Signal Priority Calls • Milan Zlatkovic, Aleksandar Stevanovic (Florida Atlantic University) and Peter T. Martin

Drying Shrinkage Behavior of Mortars Made with Ternary Blends • Xuhao Wang (Iowa State University), Fatih Bektas (Iowa State University), Peter C. Taylor (Iowa State University), Kejin Wang (Iowa State University) and Paul Tikalsky

Dynamic Origin-Destination Demand Flow Estimation Under Congested Traffic Conditions: General Framework • Xuesong Zhou, Chung-Cheng Lu (National Taipei University of Technology, Taiwan) and Kuilin Zhang (Argonne National Laboratory)

Estimating Fuel Consumption and Emissions Based on Reconstructed Vehicle Trajectories • Zhong Chen (Tongji University, China), Chao Yang (Tongji University, China) and Anthony Chen

Evaluation of Asphalt Mixture Performance Tester: Utah Experience • Levi Roberts, Pedro Romero and Kevin VanFrank (Utah Department of Transportation)

Evaluation of Transit Signal Priority Options for Future 5600 W Bus Rapid Transit Line in West Valley City, Utah • Milan Zlatkovic, Aleksandar Stevanovic (Florida Atlantic University), Peter T. Martin and Ivana Milorad Tasic

Freeway Traffic State Estimation and Uncertainty Quantification Based on Heterogeneous Data Sources: Stochastic Three-Detector Approach • Wei Deng (Southeast University, China) and Xuesong Zhou

Geometric Design, Speed, and Safety • Richard Jon Porter, Eric T. Donnell (Pennsylvania State University) and John M. Mason (Auburn University)

Investigating Traffic Mobility Impact of Mileage-Based User Fees on Traveler Route Choice Behavior and Network Performance: Planning-Level Traffic Equilibrium-Based Approach • Anxi Jia (North Carolina State University, Raleigh), Xuesong Zhou and Nagui M. Roupail (North Carolina State University, Raleigh)

Korozeeneck: New Service Life Modeling Software for Bridge Decks • Petr Konečný (VSB-Technical University of Ostrava, Czech Republic), Pratanu Ghosh (California State University – Fullerton), Jiří Brožovský (VSB-Technical University of Ostrava Czech Republic) and Paul Tikalsky

Monitoring Travel Time Reliability from the Cloud: Cloud Computing-Based Architecture for Advanced Traffic Information Dissemination • Hao Lei, Tao Xing, Jeffrey Taylor and Xuesong Zhou

Path-Based Algorithms for Solving C-logit Stochastic User Equilibrium Assignment Problem • Xiangdong Xu, Anthony Chen, Zhong Zhou (Citilabs) and Shlomo Bekhor (Technion - Israel Institute of Technology)

Repair of Shear-Critical Reinforced Concrete Beams with External FRP Posttensioned Rods • Chris Pantelides

Safety Evaluation of Geometric Design Criteria for Entrance-Exit Ramp Spacing and Auxiliary LaneUse • Thanh Q. Le and Richard Jon Porter

Simulating Crashes for Evaluating Network-level Impact of Safety Enhancement Strategies: A Fast Dynamic Traffic Assignment Approach • Xuesong Zhou

Sometimes It Pays to Be Lazy When Responding to Freeway Incidents • Ivana Milorad Tasic, Peter T. Martin, Milan Zlatkovic and Piyali Chaudhuri

Using Asphalt Mixture Beams in Bending Beam Rheometer for Quality Control: Utah Experience • Chun-Hsing Ho (Lake Washington Institute of Technology) and Pedro Romero

## Utah State University

Alternative Planning Tool for Small Metropolitan Planning Organizations in Utah • Sarawut Jansuwan, Anthony Chen and Seungkyu Ryu

Assessment of Sign Retroreflectivity Compliance for Development of a Management Plan • Travis Evans, Kevin Heaslip, Wesley Bill Boggs, David S. Hurwitz and Kevin Gardiner

Development of Demand Uncertainty-Based Model to Estimate Network Reliability • Ali Soltani Sobh, James Fishelson, Kevin Heaslip and John El Khoury (CH2M Hill)

Development of a Sign Asset Management Plan for Retorelectivity Compliance • Wesley Bill Boggs, Travis Evans, Kevin Heaslip, William Louisell and Kevin Gardiner

Development of a Work Zone Safety Audit Risk Assessment Tool • Tomas Lindheimer, Kevin Heaslip, William Louisell and Kevin Gardiner

Enhancement of Double Projection Method Designed for Traffic Assignment • Donghyung Yook (University of Virginia), Kevin Heaslip and Anthony Chen

Evaluation of Transportation Network Resiliency with Consideration for Disaster Magnitude • Derek Freckleton, Kevin Heaslip, William Louisell and John Collura

Modeling Side Constraints in Combined Distribution and Assignment Problem • Seungkyu Ryu, Anthony Chen and Xiangdong Xu

Road Network Redundancy Measures: Route Diversity and Network Spare Capacity  
• Xiangdong Xu, Anthony Chen, Sarawut Jansuwan and Kevin Heaslip

Path-Based Algorithms for Solving C-logit Stochastic User Equilibrium Assignment Problem  
• Xiangdong Xu, Anthony Chen, Zhong Zhou of Citilabs and Schlomo Bekhor (Technion - Israel Institute of Technology)

## University of Wyoming

Developing Standards and Guidelines for Establishing Speed Limits on Unpaved Roads • Josh Jones (Wyoming Local Technical Assistance Program), Joel Meena (Wyoming Department of Transportation) and Khaled Ksaibati

Highway Patrol Enforcement Impacts on Crash Prevention in Wyoming and North Dakota • Burt Andreen, Matt Carlson (Wyoming Department of Transportation), and Khaled Ksaibati

Impacts of Economic Activities on Four Crash Rates in North Dakota and Wyoming • Burt Andreen, Matt Carlson (Wyoming Department of Transportation) and Khaled Ksaibati

Implementation of Wyoming Rural Roads Program • Bart Evans and Josh Jones (Wyoming Local Technical Assistance Program)

Methodology for Cost-Benefit Analysis of Recycled Asphalt Pavement in Various Highway Applications • Burt Andreen, Harry Rocheville and Khaled Ksaibati

Traffic Characteristics on Unpaved Roads • Josh Jones (Wyoming Local Technical Assistance Program) and Khaled Ksaibati

## Porter receives university awards

Dr. R.J. Porter, University of Utah MPC Program Director, received the Civil Engineering Department's Outstanding Faculty Award, based on student success and outstanding research projects. Porter also received the Ben Jacobsen Kingfisher Bend Ranch Award for exceptionally effective teaching in the College of Engineering at the University of Utah. This award is presented annually to one or two faculty within the College of Engineering who are exceptionally effective teachers, exemplifying the characteristics and standards for teachers set forth by the Department, the College, and the University for the prior academic year.

## SDSU faculty at 2nd National Tribal Transportation Safety Summit

The national fatal crash database, the Fatality Analysis Reporting Systems (FARS) reported that Native Americans accounted for 26% of all traffic fatalities from 2001 to 2005 in South Dakota. In fact, the motor vehicle fatality rate of Native American in South Dakota is significantly overrepresented, more than three times higher than the other South Dakotans. SDSU faculty members have been involved in multiple research projects that aim to reduce crashes and improve public health on tribal lands.

Dr. Xiao Qin from the Department of Civil and Environmental Engineering is collaborating with Dr. Haifa Samra from the College of Nursing on a MPC-sponsored research entitled Improving Rural Emergency Medical Services (EMS) through Transportation System Enhancements. Dr. Qin is also involved in two other studies; NCHRP 17-49: Guide for Effective Tribal Crash Reporting, and Evaluating Local and Tribal Rural Road Design with Interactive Highway Safety Design Model (IHSDM) in partnership with Dr. Vachal at NDSU. The 2nd National Tribal Transportation Safety Summit held at Mystic Lake, MN, August 29-30, provided an excellent opportunity for tribal safety

stakeholders to network, build capacity and knowledge and identify and prioritize needs and technologies. About 200 participants representing engineers, enforcement officers, educators, and EMS workers attended the summit, including Dr. Qin, Dr. Samra and PhD candidate Julie Hanson from SDSU.

## SDSU researchers present at national and international forums

Drs. Nadim Wehbe and Allen Jones, both of SDSU, have been presenting their MPC-sponsored research findings at prominent national and international forums.

In June 2012, Wehbe and Jones participated in the 2012 Federation for Structural Concrete Symposium on “Concrete Structures for Sustainable Communities” in Stockholm, Sweden. Wehbe presented a paper entitled “Optimization of Concrete Mixtures for Sustainable Jointed Plain Concrete Pavement.” The paper presented by Jones was entitled “Character, Extent, and Severity of Corrosion in Continuously Reinforced (CRC) Pavements for Service-Life Extension and Improved Sustainability.” The symposium attracted more than 300 abstracts of which only about 160 were accepted for presentation and publication.

In September 2012, Wehbe attended the 18th Congress of the International Association for Bridge and Structural Engineering (IABSE) which was held in Seoul, Korea. Wehbe presented a paper entitled “Pretressed SCC Bridge Girders under Monotonic and Fatigue Loading.” The Congress was followed by a special public session on load rating and assessment of bridges during which invited papers were presented by speakers from a US group of researchers and their Korean hosts. Wehbe's presentation for the public session was entitled “Calibration of AASHTO's Ice Loads Equations for Bridge Piers in South Dakota.”

The 2012 International Conference on Long-Life Concrete Pavement was held on September 18-21 in Seattle, WA. The conference was organized by the Federal Highway Administration and the National Concrete Pavement Technology Center. Jones presented a paper entitled

“Character, Extent, and Severity of Corrosion in Continuously Reinforced Concrete Pavements in South Dakota” with co-authors Dr. Nadim Wehbe and Stephanie Klay, a former graduate student now at Barr Engineering Co. in Minnesota. The research focused on an extensive field testing program that was initiated to identify factors and interaction of factors that contribute to observed levels of corrosion in CRC pavements constructed in South Dakota.



## Researcher wins TRB Best Paper Award

Richard J. Porter, assistant professor of civil and environmental engineering at the University of Utah, and his co-authors received the annual Best Paper Award in January from the Transportation Research Board's committee on geometric design. The award was presented at the board's annual meeting, which typically attracts more than 10,000 transportation professionals from around the world. Porter's award-winning paper describes the interaction of geometric design, speed, and safety on roadways. In particular, he and his colleagues addressed five critical questions about the relationships between road geometry and operating speeds, including how road geometry influences operating speeds, safety and security, and what the impacts would be for large vehicles. The researchers also discussed aspects of the speed/safety trade off. Titled "Geometric Design, Speed, and Safety," the paper was co-authored by Eric T. Donnell and John M. Mason and was recently published in the Transportation Research Record: Journal of the Transportation Research Board.

## University of Utah paper wins honors from IEEE

Dr. Xuesong Zhou, Jay Przybyla (MS '12), Jeff Taylor (MS '12), and Jason Jupe of Armstrong Forensic Engineers received the Best Paper Award at the 15th Annual IEEE Intelligent Transportation Systems Conference, held Sept. 16-19, in Anchorage, AK. Their paper is titled "Simplified, Data-Drive, Errorable Car-Following Model to Predict the Safety Effects of Distracted Driving."

## Bartlett work in spotlight

Dr. Steven Bartlett and his research were recently highlighted by the University of Utah University News Center. His research that focuses on Geofoam Technology will help reduce pressure on gas lines during an earthquake. The full news release can be found at [http://unews.utah.edu/news\\_releases/protecting-pipelines-from-earthquakes-2/](http://unews.utah.edu/news_releases/protecting-pipelines-from-earthquakes-2/).

## Bordelon receives award for younger authors

Dr. Amanda Bordelon received the Bengt Friberg Award for Best Paper by a Younger Author at the 10th International Conference on Concrete Pavements, held in Quebec City, Quebec, July 8-12, 2012. Her paper is titled, "Distribution of Fiber-Reinforcement in Thin Concrete Overlays." The award is given to the best reviewed and nominated paper, where the primary author is under the age of 35.



## Paper honored at Urban Street Symposium

Dr. R.J. Porter and student Thanh Le's paper, "Safety Effects of Cross Section Design on Urban and Suburban Roads" was selected as one of the top four papers at the 4th Urban Street Symposium, held in Chicago, IL in June 2012.

## Research presented at Transportation Research Forum

MPC students, researchers and faculty members presented research at the annual forum of the Transportation Research Forum March 15-17 in Tampa, FL. The Transportation Research Forum is an independent organization of transportation professionals, academics and practitioners.

Its annual forum each spring brings together transportation professionals to participate in research presentations, plenary panels, and discussions.

### North Dakota State University

Modeling Pavement Performance and Preservation • Pan Lu and Denver Tolliver

Pulsating Market Boundaries and Spatial Arbitrage in the U.S. Gulf • Sumadhur Shakya, William Wilson and Bruce Dahl

Impetus to Short Sea Shipping Lines through Marine Highways • EunSu Lee

Transporting Water for Hydraulic Fracturing • Christopher DeHaan and Denver Tolliver

Toxic Air Pollutants and Trucking Productivity • Yan Heng (Kansas State University) Siew Hoon Lim and Junwook Chi (Marshall University)

### University of Denver

The Reshaping of Land Use and Urban Form in Denver Through Transit-Oriented Development • Keith Ratner (Salem State University) and Andrew Goetz

Developing a Measure of Organizational Inclusiveness in a Public Transportation Company • Briana Hedman and Patrick Sherry

Women and Health: A Study of Female Shift Workers in the Transportation Industry • Patrick Sherry and Allison Bondanza

## New Faculty

### Colorado State University



Clevenger



Ozbek



van de Lindt

**Caroline M. Clevenger** is an assistant professor of construction management at Colorado State University. She has earned a PhD and BS from Stanford University, where her graduate work, “Design Guidance: Assessing Process Challenge, Strategy and Exploration,” was funded by the Precourt Energy Efficiency Center. She also holds a M.Arch and MS from the University of Pennsylvania. Clevenger’s background includes extensive work as a professional consultant in sustainable design and construction. In addition to sustainability, her research focuses on the role of multidisciplinary systems thinking and Building Information Modeling (BIM) processes in performance-based architecture, engineering, and construction practice. While studying for her doctorate, she served as a Visiting Fellow to the General Services Administration (GSA) 3D-4D BIM Program. She is currently the Mortenson Faculty Scholar at CSU and is a registered architect and licensed engineer in the State of Colorado.

**Mehmet E. Ozbek** is an assistant professor and the graduate program coordinator in the Department of Construction Management. He holds a PhD in civil engineering with a focus on construction engineering and management. Since the beginning of his graduate studies at Virginia Tech’s Center for Highway Asset Management Programs, he has been performing research related to road infrastructure asset management, performance and productivity measurement-improvement-benchmarking, performance-based contracting and specifications, warranties in contracts, public-private partnerships, condition assessment, road maintenance performance measurement/improvement, optimization models, sustainable infrastructure, project delivery, and construction contracts. His work has been published in the American Society of Civil Engineers (ASCE) Journal of Infrastructure Systems, ASCE Journal of Transportation Engineering, Transportation Research Record Journal, International Journal of Construction Education and Research, Construction Management and Economics, and an ASCE special publication on Alternative Project Delivery, Procurement, and Contracting Methods for Highways. In addition to being an active reviewer for and serving in the editorial board of ASCE Journal of Construction Engineering and Management, Ozbek is a reviewer for seven other journals. He serves in three national committees related to construction and infrastructure: the ASCE Construction Institute Management Practices in Construction

Committee, the Construction Industry Institute Academic Committee, and the ASCE Transportation and Development Institute Infrastructure Systems Committee. Dr. Ozbek teaches “Construction Contracts and Project Administration” and “Applied Sustainable Project Delivery” and advises graduate and undergraduate students. He is serving as the faculty advisor for the Construction Management Association of America Student Chapter at Colorado State University.

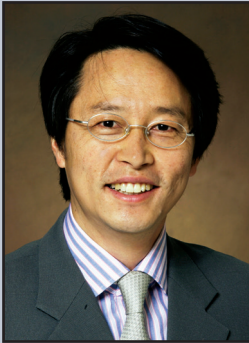
**John van de Lindt** has returned to the Department of Civil and Environmental Engineering at Colorado State University as the George T. Abell Professor in Infrastructure after serving two years as the Garry Neil Drummond Endowed Chair in Civil Engineering at the University of Alabama. His research focuses on the development of new design methodologies and application of advanced technologies to mitigate natural hazards. He has worked with the Michigan DOT and Colorado on a number of bridge and other structural projects since 2001.

## North Dakota State University



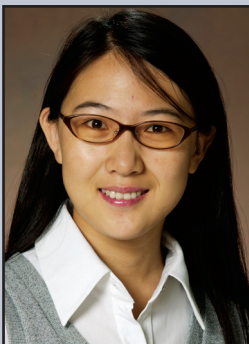
Dybing

**Alan Dybing** is an associate research fellow with the Upper Great Plains Transportation Institute where he studies the economic impacts of transportation infrastructure, transportation and rural agricultural processing, and infrastructure to support energy development. Dybing earned a BS in agricultural education and an MS in agribusiness and applied economics from NDSU. He expects to be awarded his PhD in transportation and logistics from NDSU this spring. He has been an associate research fellow since 2005. Before that he was a graduate research assistant with the UGPTI for two years.



Lee

**EunSu Lee**, an associate research fellow, first joined the UGPTI as a graduate research Assistant in 2005 while pursuing a PhD in transportation and logistics. Lee has a variety of experience in areas such as information technology, logistics, supply chain management, and transportation. Since 2005, he has been involved in projects concerning general aviation planning, bridge management, agricultural and oil transportation in North Dakota, and crash and emergency services. Lee provides his knowledge of logistics, transportation, and GIS modeling to agencies around the state to improve transportation infrastructure and quality of life. He is especially interested in the large-scale of transportation analysis, such as statewide freight analysis and global containerized freights for intermodal transportation. He is also an instructor in graduate transportation and logistics courses. Lee earned his PhD in transportation and Logistics in 2011 and his MS in industrial management and engineering in 2006, both from NDSU. He also holds an MBA in operations and service management from Hanyang University, Seoul, South Korea, and a BE in computer science and engineering from Kwandong University, Gangwon-do, South Korea.



Lu

**Pan Lu** joined UGPTI as a graduate research assistant in 2005. In 2010, Pan became a research analyst focusing in the area of asset management, freight transportation, sustainable transportation, and GIS-T applications. In 2012, Lu was named an associate research fellow focusing on road impact analysis of agricultural freight transportation, investment needs stemming from oil-related traffic, multi-mode transportation energy efficiency analysis and rural road congestion impacted by large truck transportation. In addition, she will teach graduate courses in the transportation and logistics program.



Kim

## University of Colorado Denver

**Jimmy Kim** is an associate professor in the Department of Civil Engineering at the University of Colorado Denver after spending the last five years as an assistant professor at NDSU. His current research encompasses structural rehabilitation using advanced composite materials such as carbon fiber reinforced polymer (CFRP), performance evaluation of constructed facilities, bridge engineering, concrete structures, science-based structural engineering, and intelligent structural systems.



Bordelon

## University of Utah

**Amanda Bordelon** is an assistant professor in the University of Utah Department of Civil and Environmental Engineering. She received her BS, MS, and PhD degrees in transportation from the University of Illinois. Her research interests include fiber-reinforced concrete, pavement design, thin concrete overlays, and fracture mechanics. She is a member of Transportation Research Board (TRB) committees on pavement rehabilitation and on basic and emerging technologies in concrete. She is a member of the International Society for Concrete Pavements and is active in the American Concrete Institute through involvement in international committees, as a local chapter board member, and as a student chapter faculty advisor.



Ibarra

**Luis Ibarra** is an assistant professor in the University of Utah Department of Civil and Environmental Engineering. His current research addresses the seismic behavior of different structural systems, such as high strength concrete moment resisting frames, and dry storage casks used to store spent nuclear fuel. The MPC is supporting Ibarra's research to evaluate the seismic performance of concrete filled steel tube bridge columns for potential use in emergency or accelerated bridge construction projects. Before joining The University of Utah, he was a senior research engineer at Southwest Research Institute in San Antonio, TX. As a research assistant at Stanford University and at the National Autonomous University of Mexico, Dr. Ibarra assessed the seismic performance of structural systems at different limit states. He has also designed concrete and steel buildings, factories, and urban structural facilities. Dr. Ibarra is a registered professional engineer in Texas.

## Research



### CSU researchers test highly flexible emergency barriers

If you've tried to mow an especially lush lawn, you've experienced a basic principle of mechanics: individual blades of grass are easy to tear and cut, but enough of them together can stop a sharpened steel blade.

Colorado State University researchers Michael Lebsack, Thomas Wilson, and Paul Heyliger used that principle in a recently completed study on flexible emergency barriers and escape ramps that relied not on arrestor beds or heavy barriers, but on an array of flexible, small diameter rods that deform elastically to absorb kinetic energy of moving vehicles. These arrays can be placed on paths regardless of slope and have the advantage of being durable, inexpensive, reusable, and can be recycled after the materials have seen enough use.

Both numerical predictions and experimental measurements showed the potential for these sorts of systems, with prototypical tests being completed at CSU's ramp facility. As an example of what can be accomplished, a 400 pound test cart moving at about 15 miles per hour can be stopped within 14 feet with less than \$100 of materials with little or no post-maintenance required. Extensions to larger vehicles are possible.

### Research shows misinformation contributing to safety issues in vehicular restraints for children

Despite laws requiring the use of child safety seats in all 50 states, many children still do not travel safely in vehicles. A study at the Upper Great Plains Transportation Institute at NDSU shows that healthcare providers in rural areas are less likely to ask and provide information about child safety seats than their counterparts in urban areas.

Recent studies show that lack of parental knowledge of proper child restraints and misinformation are two main reasons that children were not properly restrained in vehicles. This lack of information and dissemination of misinformation could be the result of a general lack of child passenger protection knowledge among groups who should be well-informed (i.e. pediatricians, family practitioners).

If used properly, child safety seats can reduce the risk of death by up to 54 percent for children aged 1 to 4 and by as much as 71 percent for infants. Fatality risks for children aged 12 or younger properly restrained in the rear seat of a vehicle are 38 percent lower than for children restrained in the front seat. Also, although child restraint use in rural and urban areas is fairly comparable, children aged 14 or younger who are involved in motor vehicle crashes in rural areas are two to five times more likely to be seriously or fatally injured than children involved in crashes in urban areas. Health care providers are ideally placed in society to be on the front-lines of prevention education regarding these issues.

UGPTI researcher Andrea Huseth-Zosel surveyed health care providers in several Midwest states to determine:

- The extent to which health care providers (specifically pediatricians and family practitioners) are providing anticipatory guidance regarding child safety seats and proper child occupant restraint within a vehicle.
- Whether health care providers are providing accurate anticipatory guidance regarding child safety seats and proper child occupant restraint within a vehicle.
- Barriers to discussing child passenger safety during well-child checkups.
- If there are differences in anticipatory counseling practices regarding child vehicle occupant safety between rural and urban health care providers.

Also, parents in the same Midwest states were surveyed to determine if there is a difference in the knowledge of child occupant protection between parents whose health care provider discussed this topic with them versus parents whose health care providers did not discuss the topic. Huseth-Zosel also wanted to learn if there is a difference in the knowledge of child occupant safety between parents whose health care providers are located in a rural area versus those located in an urban area.

According to Huseth-Zosel, preliminary results indicate health care providers of rural parents are less likely than urban parents' health care providers to ask about the type of restraint used by their child when riding in a vehicle. In addition, the health care providers of rural parents are less likely than the health care providers of urban parents to provide information about the type of restraint their child should be using when riding in a vehicle. Also, rural parents are less likely than urban parents to keep their children rear-facing between the ages of 1 and 2. Recently, the American Academy of Pediatrics raised the suggested age to keep children rear-facing from age 1 to 2 years of age.

Preliminary results of the health care provider survey show that rural health care providers are less likely than urban health care providers to state they "Frequently" or "Always" provide child passenger safety advice to parents of children aged 17 or younger. Also, urban health care providers were more confident than rural health care providers of their ability to adequately address parents' questions/concerns regarding selecting a car seat/ booster seat appropriate for the age and weight of a child and in determining the appropriate age/ weight for the use of a car seat or booster seat.

## University of Utah research examines safety impacts of design exceptions in Utah

Meeting established design standards for highways is not always practical or cost effective, but little is known about the safety consequences when exceptions are made to those standards. University of Utah researcher Richard J. Porter and graduate student researchers Jonathan Wood, Thanh Le, and Yunqi Zhang will compare safety, measured by expected crash frequency and severity, on road segments where design exceptions were approved to similar road segments where no design exceptions were approved.

Construction and reconstruction projects on state facilities are usually designed to conform to state agency-adopted geometric design criteria. The Utah Department of Transportation (UDOT) has adopted the AASHTO “Green Book” as its standard for roadway design with some differences noted in the UDOT Roadway Design Manual of Instruction.

Deviating from design criteria requires documentation and approval. This generally occurs at two levels in Utah: design exceptions and design waivers.

Design exceptions are prepared when a road design deviates from one or more of the Federal Highway Administration (FHWA) 13 controlling design criteria for a construction or reconstruction project on the National Highway System (NHS) or the Strategic Highway Network (STRAHNET). The FHWA Federal-Aid Policy Guide states that an “exception should not be approved if the exception would result in degrading the relative safety of the roadway.” Predicting the safety consequences of design exceptions is difficult, and attempts to track safety of road segments where design exceptions have been approved are rare.

University of Utah researchers collected data in Utah for this study using design exception documentation, project databases, online mapping software and images (e.g., Google Maps and Google Earth), traffic counts, and electronically coded crash data. Negative binomial regression was used to model the relationships between expected crash frequencies and various traffic and roadway characteristics, including the presence of one or more design exceptions. The research team is currently estimating multinomial logit models to explore relationships between design exceptions and crash severity. Research results will provide insights into the effectiveness of the current design exception preparation and approval process as well as whether deviations from some controlling criteria have different safety impacts than others. A final report will be available in 2012.

## Wyoming researchers study performance of reclaimed asphalt pavement on unpaved roads

Researchers at the University of Wyoming examined the performance of reclaimed, recycled asphalt pavement (RAP) on unpaved roads at three sites, one each in Wyoming’s Laramie, Johnson and Sweetwater Counties. They found that RAP could be an effective surfacing material for unpaved roads when blended with other aggregates, however its most economical use is as an additive to hot plant mix asphalt.

Health and equipment durability are both compromised by dust emissions. In addition, maintenance and regravelling costs increase as binder in the form of dust is lost from unpaved roads. The ability of RAP to reduce fugitive dust emissions is of considerable interest as both environmental and economic factors encourage local agencies to minimize the loss of dust from their unpaved roads and streets.

In this study, 15 material and dust suppression treatment combinations were examined. Materials included three RAP sources from Wyoming interstate millings and one milled cement-treated base (CTB) from Interstate 80. These were blended with other aggregate sources to provide an unpaved road surface. Dust suppressants included calcium chloride flakes, magnesium chloride brine, and brines made from blends of magnesium chloride with either lignin sulfonate or a proprietary polymer.

Three different construction methods were used: RAP was placed with haul trucks and shaped and blended with a motor grader; RAP was placed with haul trucks and blended with a reclaimer and shaped with a motor grader; and RAP was blended with virgin aggregate at the stockpile, then the blend was hauled to the roadway, shaped with a motor grader, and compacted with a single steel drum roller. The most critical element of placing, blending and shaping the RAP blends was the method’s ability to provide complete blending, thereby avoiding segregation that led to several distresses including loose aggregate, dust and rutting.

Performance was assessed using Colorado State University's dustometer, the unsurfaced road condition index (URCI), and a variety of other materials tests and performance evaluations. The following conclusions can be drawn based on the analyses performed

- CTB is not recommended as a surfacing material on unpaved roads.
- RAP was an effective surfacing material for unpaved roads when blended with other aggregates. Dust was reduced. Further reductions were, in most cases, achieved by adding a dust suppressant to the RAP and aggregate blends. However, dust suppressants increased the RAP-blend surfaces' vulnerability to rutting and other surface distortions when compared to the RAP blends alone.
- Economic analyses indicate that RAP should not be used when the alternative use is as an additive to hot plant mix asphalt. However, if the alternative use is as road base material, it is likely that using the RAP as an additive to an unpaved road's surface is the most economically advantageous use of the RAP.

## Students evaluate bridge options in oil country

Traffic and road issues related to oil development in North Dakota became part of the curriculum for students in an advanced transportation and logistics class last semester.

For a class project, students in TL 752: Transportation Planning and Environmental Planning were asked to help assess possible location for a new bridge across the Little Missouri River between Medora and Teddy Roosevelt National Park. Engineers from KLJ Engineering presented the challenge to the class: investigate possible bridge locations by assessing the possible environmental impacts of each. Key components of the assessment were to be fuel consumption and likely emissions as well as dust created.

KLJ came to NDSU and the students because they have access to a western North Dakota traffic model developed by the NDSU's Upper Great Plains Transportation Institute. "The UGPTI's model is the best information out there right now with regard to traffic projects," KLJ engineer and NDSU alumnus Troy Ripplinger told the class. The traffic model had been developed by UGPTI staff to assess road infrastructure investment needs for the state, counties and townships when existing models could not account for the rapid growth and development there.

Currently no bridge exists across the Little Missouri River from the I-94 bridge near Medora to the Long X Bridge on Highway 85 at the entrance to the North Unit of Theodore Roosevelt National Park – some 70 miles. Billings County attempted to find a location for a bridge in the 1980s and 1990s, but abandoned the project in the face of opposition. Oil development and the resulting traffic and congestion have prompted renewed calls for a bridge. Local officials say the bridge is necessary to alleviate congestion on area highways and to improve accessibility for emergency services. Others argue the bridge and resulting traffic will have a negative effect on surrounding properties and could impact the National Park.

In early October, Ripplinger and KLJ planners Kayla Torgerson and Jennifer Turnbo presented background information to the class. They described potential bridge locations and outlined state and federal environmental assessment requirements that had to be met. By early December the student teams had run analysis on various potential bridge locations, prepared a formal presentation, and addressed the class and a representative from KLJ with their findings.

Students Vu Dang, Ciaran Kelly, and Yognshin Park presented "Fuel Consumption Based on 20 – Year Vehicle Miles Traveled Forecast: A Study of the Little Missouri River, North Dakota." Students Brett Korporaal, Chippo Nsereko, and Stephen Seifert presented "Fugitive Dust Emissions on the Little Missouri River Bridge Alternatives."



“This project provided students with real-world experience on issues facing our region,” noted course instructor EunSu Lee. “At the same time we were able to provide some specialized expertise that was of value to the engineering firm.”

## Researchers examine seismic retrofit of spliced sleeved connections for precast bridge piers

Researchers at the U of U are studying the use of splice sleeved connections for connecting precast concrete elements in accelerated bridge construction (ABC) and their ability to withstand significant stresses and deformations in large earthquakes.

Researchers Chris P. Pantelides, M.J. Ameli, Joel Parks and Dylan Brown note that there is a great need to be able to retrofit bridge piers that will use spliced sleeved connections. Specifically, the objectives of this research are to:

- Quantify the tensile capacity of splice sleeved connections.
- Perform quasi-static cyclic tests of a retrofitted damaged precast concrete column to footing splice sleeved connection, and a retrofitted damaged precast concrete column to bent cap beam connection using mechanical sleeves; the retrofits will be accomplished by using traditional construction materials and carbon fiber reinforced polymer (CFRP) jackets.
- Evaluate to what extent the retrofitted sleeved connections behave in a manner consistent with the earthquake resisting elements that would be expected with traditional construction methods, as described in the AASHTO Guide Specification for LRFD Seismic Bridge Design.

Air tests of the two spliced sleeved connections have been carried out. Two different spliced sleeved connections are being tested connecting two #8 bars. The research team has investigated the performance of the individual components of both connection types, including tension tests on the dowel rebar extending out from both sleeved ends (sleeve tests) and rebar tension tests. Compressive tests of the two different grout types for the NMB sleeve and Lenton Interlock have also been carried out. These tests were conducted to obtain the properties of the various components of the substructure, including rebar tensile yield strength and strain and ultimate tensile strength and strain, grout compressive strength, the strength of the spliced-sleeved individual NMB and Lenton Interlock connections, and their failure modes.

Half-scale tests were designed to represent actual bridge details regarding spliced-sleeved column-to-footing connections using NMB and column-to-cap beam connections using Lenton Interlock. Cyclic quasi-static tests have been conducted on the column-to-footing connection using NMB (see figures 1-4). The following parameters are being evaluated: lateral load capacity, displacement ductility, and damage failure modes. The research team has begun the seismic retrofit of the subassembly shown in the figure using conventional materials and CFRP jackets. In the next stage the retrofitted NMB column-to-footing subassembly will be tested, along with the retrofitted Lenton Interlock column-to-cap beam subassembly.

Expected outcomes of the research include the evaluation of the seismic retrofit of two types of systems for ABC construction of bridges. Specifically the NMB Splice Sleeve and the Lenton Interlock will be evaluated for column to footing and column to cap beam connections using precast concrete elements. Design recommendations for the seismic retrofit will also be developed.



## Examining transportation resiliency

The aftermath of catastrophic events such as Hurricane Sandy suggests that cities such as New York return to normalcy more quickly due to the abundance of multi-modal transportation options.

This research project at the UC-Denver is investigating the resiliency value of such modal options for a second-generation mass transit light rail system in Denver, a region that was, and still is in many cases, extremely auto-dependent. The project is titled, Building a Framework for Transportation Resiliency and Evaluating the Resiliency Benefits of Light Rail Transit in Denver, CO.

Principal investigator Wesley Marshall notes that justification for transportation infrastructure and major transit investments are often measured in terms of mobility improvements, congestion relief, environmental benefits, operating efficiencies, cost effectiveness, and/or economic impacts. Calculating such measures is an important step in alternative analysis, but these same measures – even in combination – fail to properly illustrate the added resiliency provided by a diversity of mode options and compact, mixed-use, mixed-income, transit-rich developments.

So far, the research team has delved into the resiliency literature (including that of Kevin Heaslip at USU) and is working with the Denver Regional Council of Governments to run a number of resiliency-related scenarios in their new activity-based transportation model (i.e. the Focus model).

In the next stage, these scenarios will be analyzed across a number of dimensions to not only help assess the value of the light rail transit system, but to also better understand the interdependence of land use and non-motorized transportation with respect to various socioeconomic and socio-demographic groups as well as toward increasing the overall resilience of a city.

## CSU researchers improve traffic risk prediction models

Researchers at CSU are developing improved state-wide traffic risk prediction models for state highways to help traffic managers and state patrol officers plan for accidents.

Like many other states in the nation, Colorado experiences high accident numbers and serious injuries on highways. With highways located in different counties and cities across the state, several GIS-based interactive maps are developed to demonstrate the application of the prediction models. However, specific weather, terrain, traffic characteristics, highway conditions, population and economic development

conditions are different from one another. As a result, the mechanisms of traffic crashes and associated injury severity can vary significantly.

For individual state patrol officers or traffic managers working in the different regions, it is crucial to know to which extent the crash and injury situations may look like for a given scenario, which requires more refined traffic accident prediction models. In this 2-year study supported by the Colorado State Patrol, researchers are developing state-wide traffic risk prediction models with refined scales on major highways in Colorado. The research team is led by professor Suren Chen and also includes postdoctoral fellow Feng Chen and PhD student Xiaoxiang Ma.

As a first step in the project, researchers conducted a comprehensive investigation of traffic crashes, injury and related law enforcement issues by considering the site-specific weather, terrain, highway and driving conditions as well as their inherent relationships in Colorado. Based on the findings, the study team further developed the traffic accident frequency prediction models in both refined tem

Based on the findings from this project, MPC has sponsored a new study to continue investigating the interactions between law enforcement and traffic safety.

## Researchers study effect of low-cost safety improvements on rural roads for older drivers

Researchers at Upper Great Plains Transportation Institute at NDSU are studying the effects of low-cost safety improvements for older drivers on rural roads.

A primary focus of the study was to test safety improvements using NDSU's DriveSafety driving simulator, UGPTI researcher Kim Vachal said. She noted that if the driving simulator can be used to identify effective low-cost safety improvements, they could be promoted and implemented much faster than longer-term infrastructure improvements.

The driving simulator is located in NDSU's Center for Visual and Cognitive Neuroscience in the Department of Psychology. That's why faculty from collaboration with researchers from those facilities is essential, Vachal said. The research team includes Linda Langley, Mark McCourt, Robert Gordon and Mark Brady, all faculty members in the NDSU Department of Psychology and the NDSU Center for Visual and Cognitive Neuroscience. Undergraduate research associates and computer programmers were also involved in the project.

Vachal, who is director of the UGPTI's Transportation Safety and Security Center, helped define the project objectives; design, create, and test the driving scenarios; and review the interim project findings. She noted that the North Dakota Department of Transportation has identified a need for improvements that will increase the safety of older drivers, particularly in rural areas of the state.

Baby boomers are aging, increasing the population of older drivers. Seniors ages 65 and older will contribute to 23% of the ND population in 2020, with the highest concentration in rural areas. More than half of seniors choose driving over other forms of transportation. "Unfortunately, the fatality rate from car crashes is higher in seniors than in any other age group except teenagers," Vachal said.

With the driving simulator, researchers were able to manipulate the distance and presence of signs on a simulated rural highway and examine the resulting driving performance of older adults under alternative advance warning scenarios where road signage was used to alert the driver to an upcoming driver maneuver such as making a turn. Simulations included 18 day-time driving scenarios and 18 at night. Participants included 19 middle-aged adults (ages 40-58) and 19 older adults (ages 60-84.) Participants

drove down a rural highway and turned right or left at the target intersection. The target intersection was preceded by 0, 1, or 2 intersections, each with destination road signs placed different distances from the intersections. Collisions and accidents, traveling speed, braking, turning speed, turn accuracy, and speed at the destination sign were all noted metrics used in understanding driver response.

Some of the Mountain-Plains Consortium critical issues this research addresses include high-risk rural roads, human factors, effective safety management, and low-cost safety improvements.

The researchers found that both driving safety and preparatory turn behaviors in middle-aged and older drivers can be increased by low-cost changes in rural areas such as using warning signs and moving the destination road sign farther from the intersection.

## Evaluation of ice loads on bridge structures in South Dakota

A research study to measure ice loads on bridge piers in South Dakota is well under way. Since the study was initiated in late 2011, the research team at SDSU has selected two bridge structures for instrumentation and designed, fabricated, calibrated, and installed two transducers for measuring ice loads on piers of two bridge structures.

One of the instrumented bridges is located in Huron, SD on Highway 14 over the James River. The other instrumented bridge is located south of Brookings, SD on Interstate 29 over the Big Sioux River. The data loggers at the two sites have been activated to start collecting and storing data streams from the sensors. The stored data can be downloaded remotely by means of a cellular digital modem. Data collection is anticipated to span over two winters.

The research team is comprised of Dr. Shiling Pei, Dr. Nadim Wehbe, and graduate student Brittney Ahrenstorff. The study is co-sponsored by MPC and the South Dakota Department of Transportation.

# Research Project Status

## On-going Research Projects

MPC-207	An Evaluation of Region 8 State Departments of Transportation and Metropolitan Planning Organizations' GIS Technology Application (NDSU, D. Benson)
MPC-248	Wyoming Freight Movement System Vulnerabilities and ITS (UWY, R. Young)
MPC-250	Interactive Effects of Traffic- and Environmental-Related Pavement Deteriorations (NDSU/UWY, D. Tolliver/K. Ksaibati)
MPC-268	Accessing International Container Markets from the Northern Plains (NDSU, K. Vachal)
MPC-277	Safety Factor Increase to Fatigue Limit States through Shear Spiking for Timber Railroad Bridge Rehabilitation (CSU, J. van de Lindt)
MPC-278	Bus-Stop Shelters - Improved Safety (CSU, W. Charlie)
MPC-281	The Assessment of Chloride Injury from De-Icing Salts in Trees Along State Highways in the Black Hills (SDSU, J. Ball)
MPC-287	Effectiveness of Using Recycled Asphalt Materials and other Dust Suppressants in Gravel Roads (UWY, K. Ksaibati)
MPC-293	Development of GIS Multimodal Capacity Model for Northern Tier Freight Corridor (NDSU, S. Mitra)
MPC-294	Indian Reservation Roads (IRR) and Local Roads Modeling and Management Databases (NDSU, D. Benson)
MPC-297	Understanding Influence of Transportation and Other Factors on the Economic Growth on Non-metropolitan Cities (NDSU, K. Vachal)
MPC-300	Demand Estimation for Corn Transportation: A North Dakota Case Study (NDSU, A. Dybing)
MPC-305	Jointed Plain Concrete (JPC) Design and Construction Review (SDSU, N. Wehbe)
MPC-306	Optimization of Pavement Marking Performance (SDSU, N. Wehbe)
MPC-309	Rural Road Signage: Simulated Driving to Evaluate Low-Cost Safety Improvements for Older Drivers (NDSU, K. Vachal)
MPC-310	Evacuation Modeling for Small to Medium Sized Metropolitan Areas (NDSU, S. Birst, M. Lofgren)
MPC-315	Analysis of Compound Channel Flow with Two-Dimensional Models (SDSU, F. Ting)
MPC-316	Mitigation of Corrosion in CRC Pavement (SDSU, N. Wehbe, D. Medlin)
MPC-318	Investigating Crashes and Geometric Conditions in the State of Wyoming (UWY, K. Ksaibati)
MPC-325	Fatigue Testing of Wood-Concrete Composite Beams (CSU, J. Balough, R. Atadero)
MPC-327	Seismic Risk Assessment for the (-25/I-70 Corridor in the Mountain Plains Region of the U.S. (CSU, J. Lindt)
MPC-330	Integrate Supply Chain Model in Urban Freight Planning (NDSU, S.Mitra, D. Tolliver)
MPC-332	Estimation of the Generalized Truck Freight Elasticity of Demand: Case Study of the Seattle-Tacoma to Chicago Corridor (NDSU, A. Dybing)
MPC-333	Implementing Traffic Safety Evaluations to Enhance Roadway Safety (NDSU, J.Baker, K. Johnson, M. Berwick, K. Vachal)
MPC-334	Proper Seat Placement of Children Aged 4 to 12 within Vehicles (NDSU, A. Huseth)
MPC-335	Misinformation Contributing to Safety Issues in Vehicle Restraints for Children (NDSU, A. Huseth)
MPC-336	ND Wheat Transportation Knowledge for Market Enhancement (NDSU, K. Vachal, D. Benson)
MPC-339	MEPDG Analysis of ESR Subgrade Stabilized with Off-Specification Fly Ash (CSU, A. Carraro)
MPC-340	Long Term Performance of FRP Repair Materials (CSU, R. Atadero)
MPC-341	Off-grid MEMS Sensor Configurations for Transportation Structures (CSU, P. Heyliger)
MPC-342	Seismic Vulnerability Analysis of Bridges in Mountainous States (CSU, S. Chen)
MPC-343	Laboratory Testing of Innovative Steel Bridge Designs (CSU, R. Atadero)
MPC-344	What Can We Learn About Making Driving Safer for Teen Drivers from Crashes in Three Rural States? (NDSU, K. Vachal)
MPC-345	Systems Analysis to Improve Local Road Safety; Phase I (NDSU, K. Vachal)
MPC-347	Misinformation Contributing to Safety Issues in Vehicular Restraints for Children (NDSU, A. Huseth-Zosel)
MPC-349	Modeling, Analysis and Evaluation of Urban Arterial Work Zone (NDSU, A. Varma)

MPC-350	Modeling and Evaluation of Traffic Signal Preemption near Railroad Crossings in Small Urban Areas (NDSU, A. Varma)
MPC-351	Concrete Structure Design Alternatives for Rural State and Local Roads (SDSU, N. Wehbe)
MPC-352	Evaluation of Ice Loads on Bridge Piers in South Dakota (SDSU, S. Pei)
MPC-353	Comparing Crash Trends and Severity in the MPC Region (UWY, K. Ksaibati)
MPC-354	Geotechnical Limit to Scour at Spill-Through Abutments (UWY, R. Ettema)
MPC-355	Quantifying the Impact of Very High Heavy Vehicle Proportion on Rural Freeways (UWY, S. Boyles)
MPC-356	Truck Size and Weight Education (NDSU, M. Berwick)
MPC-357	Freight Railway Track Maintenance Cost Model (NDSU, D. Tolliver)
MPC-358	Connecting Supply Chain Interregional Freight Flow (NDSU, D. Tolliver)
MPC-359	Regional Roadway Surface Management Guidance Documents (NDSU, D. Tolliver)

## MPC Completed Research Projects

MPC-175	An Evaluation of ITS/CVO Application Technology in Logistics and Supply Chain Management (NDSU, B. Lantz) <b>MPC Report No. 06-186</b>
MPC-176	Road Dust Suppression: Effect on Maintenance, Stability, Safety and the Environment (CSU, T. Sanders) <b>MPC Report No. 04-156</b>
MPC-177	Moment-Rotation Tests of High Performance Steel (HPS) I-Girders (CSU, B. Hartnagel) <b>MPC Report No. 03-148</b>
MPC-178	Experimental Wood-Concrete Railroad Bridge (CSU, R. Gutkowski) <b>MPC Report No. 04-165</b>
MPC-179	Full-Scale Laboratory Testing of a Timber Railroad Bridge (CSU, R. Gutkowski) <b>Project closed, letter on file</b>
MPC-180	North Front Range Transportation Research Internships (CSU, R. Gutkowski) <b>MPC Report No. 01-124</b>
MPC-181	University Transportation Survey (CSU, R. Gutkowski) <b>MPC Report No. 03-150</b>
MPC-182	Evaluating the Long Term Pavement Performance Data (UWY, K. Ksaibati) <b>MPC Report No. 02-130</b>
MPC-183	Defining a Road Safety Audit Program for Enhancing Safety and Reducing Tort Liability (UWY, E. Wilson) <b>MPC Report No. 00-113</b>
MPC-184	Accident Data Availability (UofU, P. Martin) <b>MPC Report No. 01-118</b>
MPC-185	Incident Detection Algorithm Evaluation (UofU, P. Martin) <b>MPC Report No. 01-122</b>
MPC-186	Evaluation of Road Weather Information System Data & Dissemination of Data to the Public (UofU, P. Martin) <b>MPC Report No. 01-119</b>
MPC-187	Survey of Educational and Human Capital Needs of the Transportation Construction Industry (NDSU, O. Salem) <b>MPC Report No. 02-134</b>
MPC-188	An Evaluation of the Impacts of ITS/CVO Technologies Throughout the Supply Chain (NDSU, B. Lantz) <b>MPC Report No. 01-117A</b>
MPC-189	The Differential Effects of Deregulation on Rail Rates (NDSU, J. Bitzan) <b>MPC Report No. 03-144</b>
MPC-191	Transportation and Logistics Characteristics of the Potato Industry: Implications for Highway Planning (NDSU, M. Berwick) <b>MPC Report No. 01-123</b>
MPC-192	Biennial Strategic Transportation Analysis (NDSU, G. Griffin) <b>MPC Report No. 01-127.1-5</b>
MPC-193	Rigorous Computer Modeling of Timber Trestle Railroad Bridges (CSU, R. Gutkowski) <b>Project closed, letter on file</b>
MPC-194	Effects of Environmental Exposure on Timber Railroad Bridge/Track Members and Connectors (CSU, R. Gutkowski) <b>MPC Report No. 04-167</b>
MPC-195	North Front Range Transportation Research Internships (CSU, R. Gutkowski) <b>MPC Report No. 01-124</b>
MPC-196	Moment-Rotation Tests of High Performance Steel I-Girders (CSU, B. Hartnagel) <b>MPC Report No. 03-148</b>
MPC-197	Road Dust Suppression: Effect on Maintenance, Stability, Safety and the Environment (CSU, T. Sanders) <b>MPC Report No. 04-156</b>
MPC-198	Predicting the Fluctuations in Temperatures of Asphalt Pavements (UWY, C. Yavuzturk/K. Ksaibati) <b>MPC Report No. 02-136</b>
MPC-199	Low Volume Roads and Bridges (UWY, K. Ksaibati) <b>MPC Report No. 02-130</b>

MPC-200	Defining a Road Safety Audit Program for Enhancing Safety and Reducing Tort Liability (UWY, E. Wilson) <b>MPC Report No. 02-129</b>
MPC-201	Updating the Uniform Rail Costing System Regressions (NDSU, J. Bitzan) <b>Terminated 8/31/03</b>
MPC-202	Truck Costing Model for Transportation Managers (NDSU, M. Berwick) <b>MPC Report No. 03-152</b>
MPC-203	Containerized Grain & Oilseed Exporters - Industry Profile and Survey (NDSU, K. Vachal) <b>MPC Report No. 02-132 and MPC Report No. 03-151</b>
MPC-204	Strategies for Improving DOT Retention and Motivation among Professional Staff (NDSU, G. Griffin) <b>MPC Report No. 02-137</b>
MPC-205	Predicting and Classifying Voluntary Turnover Decisions for Truckload Drivers (NDSU, G. Griffin) <b>MPC Report No. 02-135</b>
MPC-208	Surface Street Level of Service Using Existing Detector Infrastructure (UofU), P. Martin) <b>MPC Report No. 02-133</b>
MPC-209	Advanced Traffic Management System Evaluation Data Collection Methodology (UofU, P. Martin) <b>MPC Report No. 03-142</b>
MPC-210	Adaptive Signal Control for Downtown Salt Lake City (UofU, P. Martin) <b>MPC Report No. 03-141</b>
MPC-211	Evaluating and Improving the Safety of Pedestrian Crossing in Utah (UofU, W. Cottrell) <b>MPC Report No. 04-157</b>
MPC-213	Paratransit Coordination for Rural Communities (UofU, P. Martin) <b>MPC Report No. 04-161</b>
MPC-214	Pultruded Composite Shear Spike for Repair of Large Timber Members (CSU, D. Radford) <b>MPC Report No. 04-163</b>
MPC-215	Support Motion Effects in a Timber Trestle Bridge: Physical and Analytical Modeling (CSU, R. Gutkowski) <b>MPC Report No. 06-184</b>
MPC-216	Experimental Thick-Deck Wood-Concrete Highway Bridge Construction Year 1 and 2 (CSU, R. Gutkowski) <b>MPC Report No. 04-165</b>
MPC-217	Road Dust Suppression: Effect on Maintenance, Stability, Safety and the Environment (CSU, T. Sanders) <b>MPC Report No. 04-156</b>
MPC-220	Costs, Pricing, and Regulatory Alternatives for Mergers (NDSU, J. Bitzan) <b>MPC Report No. 03-145</b>
MPC-221	Trip Generation Rates for Grain Elevators: A Tool for State and Local Highway Planners (NDSU, D. Tolliver) <b>MPC Report No. 06-185</b>
MPC-222	Strategies for Improving DOT Employee Retention and Motivation (NDSU, L. Kalnbach) <b>MPC Report No. 02-137</b>
MPC-223	Evaluating the Impact of DOTs QC/QA Programs on Pavement Performance: Year 2 (UWY, K. Ksaibati) <b>MPC Report No. 03-146 and MPC Report No. 04-160</b>
MPC-224	Utilizing the GLWT in Evaluating Moisture Susceptibility of Asphalt Mixes (UWY, K. Ksaibati) <b>MPC Report No. 02-138</b>
MPC-225	Evaluation of the I-15 High Occupancy Vehicle Lanes (UofU, P. Martin) <b>MPC Report No. 04-158</b>
MPC-226	Adaptive Signal Control for Downtown Salt Lake City, Part II (UofU, P. Martin) <b>MPC Report No. 03-141</b>
MPC-227	Small Urban University Transit: A Case Study (NDSU, J. Hough) <b>MPC Report No. 05-169</b>
MPC-228	Trucking Industry Churn and Its Impact on Communities and ITS Adoption (NDSU, J. Rodriguez) <b>MPC Report No. 08-193</b>
MPC-229	Asset Management of Roadway Signs through Advanced Technology (NDSU, Kellee Kruse) <b>MPC Report No. 03-149</b>
MPC-231	Automated Data Collection, Analysis, and Archival (UofU, P. Martin) <b>MPC Report No. 03-153</b>
MPC-232	Detector Technology Evaluation (UofU, P. Martin) <b>MPC Report No. 03-154</b>
MPC-233	Evaluate Effectiveness of Dilemma Zone Advanced Signal Warning (UofU, P. Martin) <b>MPC Report No. 03-155</b>
MPC-234	Simplified Impact Testing of Traffic Barrier Systems (CSU, R. Gutkowski) <b>MPC Report No. 03-143 &amp; 05-172</b>
MPC-235	Highly Flexible Crash Barriers (CSU, P. Heyliger) <b>MPC Report No. 04-162</b>
MPC-236	Evaluation of Moisture Susceptibility of Asphalt Mixtures Containing Bottom Ash (UWY, K. Ksaibati) <b>MPC Report No. 04-159</b>
MPC-237	Affordable Trip Feasibility Scheduling for Rural Paratransit Systems (UofU, W. Grenney) <b>MPC Report No. 05-171</b>
MPC-238	Evaluation of Strategic Logistics of Rural Firms (NDSU, M. Berwick) <b>MPC Report No. 05-177</b>

- MPC-239 Investment in Rural Roads: Willingness-to-Pay for Improved Gravel Road Services in Freight Transportation (NDSU, T VanWechel) **MPC Report No. 04-168**
- MPC-240 Evaluation of Moisture Susceptibility of Asphalt Mixtures Containing Bottom Ash (UWY, K. Ksaibati) **MPC Report No. 06-179**
- MPC-241 Evaluation of Pavement Crack Filling Materials (UWY, K. Ksaibati) **MPC Report No. 06-180**
- MPC-242 Wyoming Freight Movement and Wind Vulnerability (UWY, R. Young) **MPC Report No. 05-170**
- MPC-243 Assessment of Thermal Stresses in Asphalt Pavements Due to Environmental Conditions Including Freeze and Thaw Cycles (UWY, D. Yavuzturk) **MPC Report No. 06-181**
- MPC-245 Video Imaging System Evaluation (UofU, P. Martin) **MPC Report No. 04-166**
- MPC-246 High Occupancy Vehicle Evaluation II (UofU, P. Martin) **MPC Report No. 04-164**
- MPC-247 Utilizing Recycled Glass in Roadway (UWY, K. Ksaibati) **MPC Report No. 07-192**
- MPC-249 Pultruded Composite Shear Spike for Repair of Timber Bridge Members (CSU, R. Gutkowski) **MPC Report No. 05-173**
- MPC-251 Adaptive Signal Control IV (UofU, P. Martin) **MPC Report No. 06-182**
- MPC-252 High Occupancy Vehicle Lanes Evaluation III (UofU, P. Martin) **MPC Report No. 05-174**
- MPC-253 Effectiveness of Traveler Information (UofU, P. Martin) **MPC Report No. 05-175**
- MPC-254 Utah Intersection Safety: Issues, Contributing Factors and Mitigations (UofU, W. Cottrell) **MPC Report No. 05-176**
- MPC-255 Network Planning Model for Local and Regional Railroad Systems (NDSU, D. Tolliver) **Published in the State Rail Plan (2005)**
- MPC-256 Legal Establishment of County Roads in Wyoming (UWY, K. Ksaibati) **MPC Report No. 07-191**
- MPC-257 Legal Establishment of County Roads (UWY, K. Ksaibati) **MPC Report No. 07-191**
- MPC-258 Utilizing Recycled Glass in Roadways (UWY, K. Ksaibati) **MPC Report No. 07-192**
- MPC-259 Relating Vehicle-Wildlife Crash Rates to Roadway Improvements (UWY, R. Young) **MPC Report No. 07-189**
- MPC-260 Impact Performance Testing of Roadway Safety & Security Barriers - Phase 3 (CSU, R. Gutkowski) **Formal Report, Letter on File Jun10**
- MPC-261 Time-Dependent Loading of Repaired Timber Railroad Bridge Members (CSU, R. Gutkowski) **MPC Report No. 07-190** *New Title: Durability and Ultimate Flexural Loading of Shear Spike Repaired, Large-Scale Timber Railroad Bridge Members*
- MPC-262 Cambering of Wood-Concrete Highway Bridges (CSU, R. Gutkowski) **Project closed, letter on file**
- MPC-263 Traffic Operations in Small Urban and Rural Areas (NDSU, A. Smadi) **Website: [www.surtoc.org](http://www.surtoc.org) with on-line survey 11/1/07**
- MPC-264 Evaluation, Definition, and Identification of the Criteria for Establishing Freight Corridors (NDSU, M. Berwick) **MPC Report No. 08-201**
- MPC-265 Design/Build vs. Traditional Construction User Delay Modeling: An Evaluation of the Cost Effectiveness of Innovative Construction Methods for New Construction (UofU, P. Martin) **MPC Report No. 07-187A and MPC Report No. 07-187B**
- MPC-266 Small Urban and Rural Transportation - Phase II (NDSU, A. Smadi) **Web Page established at <http://www.surtc.org>**
- MPC-267 Estimating Local Economic Impacts of Rail Investments and Rail Capacity Constraints in the HRS Wheat Market (NDSU, K. Vachal) **Project Terminated 2/7/08**
- MPC-269 Economic and Environmental Implications of Alternative Fuel Use and Regulations in the Mountain-Plains Region (NDSU, M. Berwick) **MPC Report No. 08-203**
- MPC-270 Serviceability Limits and Economical Steel Bridge Design (UWY, M. Barker) **MPC Report No. 08-203 (I)**
- MPC-271 A Comprehensive Transportation Safety Evaluation Program in the State of Wyoming (UWY, K. Ksaibati) **MPC Report No. 09-215**
- MPC-272 Use of Wind Power Maps to Establish Fatigue Design Criteria for Traffic Signal and Variable Message Structures (UWY, J. Puckett) **MPC Report No. 08-201**
- MPC-273 Low-Cost Soft Crash Barriers (CSU, P. Heyliger) **MPC Report No. 08-198**
- MPC-274 Beneficial Use of Waste Tire Rubber in Low-Volume Road and Bridge Construction (CSU, J. Carraro) **MPC Report No. 08-202**
- MPC-275 Z-Spike Rejuvenation to Salvage Timber Railroad Bridge Members (CSU, R. Gutkowski) **MPC Report No. 08-208**



MPC-276	Use of Salvaged Utility Poles in Roadway Bridges (CSU, R. Gutkowski) <b>MPC Report No. 08-197</b>
MPC-279	Structural Applications of Self-Consolidating Concrete (SDSU, N. Wehbe) <b>MPC Report No. 11-194</b>
MPC-280	Bridge Scour in Cohesive Soils (SDSU, F. Ting) <b>MPC Report No. 08-195</b>
MPC-282	Express Lane Genetic Algorithm Microsimulation Modeling (UofU, P. Martin) <b>MPC Report No. 09-210</b>
MPC-283	Seismic Vulnerability and Emergency Response of UDOT Lifelines (UofU, P. Martin) <b>Project Postponed until further discussion 6/7/07</b>
MPC-284	Adaptive Signal Control Evaluation V (UofU, P. Martin) <b>MPC Report No. 08-200</b>
MPC-285	Structural Performance of Self Consolidating Concrete Made with Limestone Aggregates (SDSU, N. Wehbe) <b>MPC Report No. 08-186</b>
MPC-286	Developing System for Consistent Messaging on Interstate 80's Dynamic Message Signs (UWY, R. Youngs) <b>MPC Report No. 09-211</b>
MPC-288	Utah Department of Transportation Traffic Operations Center Operator Training (UUT, P. Martin) <b>MPC Report No. 10-229C, 10-229D, 10-229E, 10-229F</b>
MPC-289	Evaluation of Optimal Traffic Monitoring Station Spacing on Freeways (UUT, P. Martin) <b>MPC Report No. 09-214</b>
MPC-290	A Comprehensive Transportation Safety Evaluation Program in the State of Wyoming (UWY, K. Ksaibati) <b>MPC Report No. 09-215</b>
MPC-291	A New Generation of Emergency Escape Ramps (CSU, J. van de Lindt) <b>Merged and combined with MPC-328</b>
MPC-292	Traffic Safety Vulnerability Information Platform for Highways in Mountainous Areas Using Geospatial Multimedia Technology (CSU, S. Chen) <b>MPC Report No. 08-209</b>
MPC-295	Integrating Security into Small MPO Planning Activities (NDSU, M. Lofgren) <b>MPC Report No. 08-199</b>
MPC-296	Phase II, Driver Knowledge, Attitude, Behavior and Beliefs: Focus Group - Young Male Drivers (NDSU, T. VanWechel) <b>MPC Report No. 08-204</b>
MPC-298	Generating Public Involvement in Transportation Policy and Funding Decision Making Process (NDSU, J. Mielke) <b>Report on file with NDDOT due to confidentiality of data.</b>
MPC-299	Integrating Planning and Operations Models to Predict Work Zone Traffic (NDSU, A. Smadi) <b>MPC Report No. 08-205</b>
MPC-301	Sustainable Concretes for Transportation Infrastructure (CSU, R. Atadero) <b>MPC Report No. 10-220</b>
MPC-302	Enabling Innovate Steel Plate Grider Bridges: Simple Made Continuous (CSU, J. van de Lindt) <b>MPC Report No. 11-234</b>
MPC-303	Seed Project- Beneficial Use of Off Specification Coal Combustion Products to Increase the Stiffness of Expansive Soil-Rubber Mixtures (CSU, A. Carraro) <b>MPC Report No. 11-235</b>
MPC-304	Feasibility Study of Mobile Scanning Technology for Fast Damage Detection of Rural Bridges Using Wireless Sensors (CSU, S. Chen) <b>MPC Report No. 10-219</b>
MPC-307	Maximum Velocity and Shear Stress in Flow Fields around Bridge-Abutments in Compound Channels (University of Wyoming, R. Ettema) <b>MPC Report No. 11-237</b>
MPC-308	Phase I: Pilot Project to Develop Rural Youth Occupant Protection Education Platform (NDSU, T. VanWechel) <b>MPC Report No. 11-230</b>
MPC-311	Forecasting Bridge Deterioration Rates and Improvement Costs (NDSU, S. Mitra, D. Tolliver, K. Johnson) <b>JTRF, Summer 2011</b>
MPC-312	A GIS Model for Bridge Management and Routing (NDSU, S. Mitra, A. Dybing, K. Johnson, D. Tolliver) <b>JTRF, Summer 2011</b>
MPC-313	Evaluation of LRT and BRT Impact on Traffic Operations in Salt Lake City Metropolitan Region (University of Utah, A. Stevanovic, P. Martin) <b>MPC Report No. 09-213, 09-213B</b>
MPC-314	Assessing the User Impacts of Fast-Track Highway Construction (ABC) (University of Utah, P. Martin) <b>MPC Report No. 10-228A, 10-228B</b>
MPC-317	Development of Safety Screening Tool for High Risk Rural Roads (SDSU, X. Qin) <b>MPC Report No. 11-231</b>
MPC-319	Gravel Roads Management: Developing a Methodology (UWY, K. Ksaibati, G. Huntington) <b>MPC Report No. 11-238</b>
MPC-320	Pricing Strategies for Rural Freeways (UWY, S. Boyles) <b>MPC Report No. 12-246</b>
MPC-321	Salt Lake City Internship (UUT, P. Martin) <b>Project terminated, unable to secure match funding.</b>

- MPC-322 Driver Simulation (UUT, P. Martin) **MPC Report No. 12-247**
- MPC-323 Risk-based Advisory Prevention System for Commercial Trucks Under Hazardous Conditions (CSU, S. Chen) **MPC Report No. 11-242**
- MPC-324 Reliability-based Safety Risk and Cost Prediction of Large Trucks on Rural Highways (CSU, J. Balough, R. Atadero) **MPC Report No. 11-243**
- MPC-326 Rapid Load Rating of Short Rural Bridges (CSU, J. Lindt) **MPC Report No. 11-236**
- MPC-328 Low-Impact High-Toughness Transportation Barriers (CSU, P. Heyliger) **MPC Report No. 12-249**
- MPC-329 Traffic Safety: Pilot Study to Assess Sustained and Multifaceted Activity on North Dakota's Rural Roads (NDSU, K. Vachal, A. Huseth) **MPC Report No. 11-233**
- MPC-331 Using ND Traffic Records to Identify Higher Risk Teen Drivers (NDSU, K. Vachal, D. Malchose) **MPC Report No. 11-232**
- MPC-337 Analysis of Freight Fuel Efficiency with Comparisons to Waterways and Truck Transportation (NDSU, D. Tolliver, D. Benson, P. Lu) **MPC Report No. 12-250**
- MPC-338 Use of Wind Power Maps to Establish Fatigue Design Criteria for Traffic Signal and High Mast Poles-Phase II (UWY, J. Puckett, M. Barker) **MPC Report No. 11-240**
- MPC-346 Marginal Cost Pricing and Subsidy of Transit in Small Urbanized Areas (NDSU, J. Mattson) **MPC Report No. 11-241**
- MPC-348 Transit Ridership and the Built Environment (NDSU, D. Peterson) **MPC Report No. 11-239**
- MPC-360 Safety Impacts of Design Exceptions in Utah (UUT, R. Porter) **MPC Report No. 11-248**

**(Before TEA21 Funding)**

- MPC-042 Dynamic Impact Load Tests on a Moderate-Weight Bridge Guardrail (CSU, R. Gutkowski) **MPC Report No. 07-188**
- MPC-125 Factors Affecting Rail Car Supply (NDSU, K. Vachal) **MPC Report No. 01-121**
- MPC-137 Railroad Bridge Strengthening Needs - Year 2 (CSU, R. Gutkowski) **MPC Report No. 03-147**
- MPC-138 Full Scale Laboratory Testing of a Timber Trestle Railroad Bridge (CSU, R. Gutkowski) **MPC Report No. 02-139**
- MPC-140 Shear Key for Strengthening Bridges (CSU, R. Gutkowski) **MPC Report No. 01-126**
- MPC-149 ATM for Non-Metro Communities During Special Events and Severe Weather Conditions Using Remote Weather Information Systems (USU, B. Grenney) **MPC Report No. 01-120**
- MPC-154 An Assessment of Rural Road Needs in the Mountain-Plains Region (NDSU, J. Hough) **MPC Report No. 03-140**
- MPC-156 Short Line Railroad-Factors Contributing to Success (NDSU, J. Bitzan, D. Tolliver, P. Fisher) **MPC Report No. 01-128**
- MPC-162 Field Evaluation of Cement Treated Bases (UWY, K. Ksaibati) **MPC Report No. 00-115**
- MPC-164 Refining the Road Safety Audit Process for Local Rural Roads (UWY, E. Wilson) **MPC Report No. 00-114**
- MPC-169 County Road Planning Workbook (NDSU, J. Hough) **MPC Report No. 06-183**
- MPC-171 An Evaluation of ITS Transit Applications Used to Facilitate the Welfare to Work Program (NDSU, J. Hough) **MPC Report No. 02-131**
- MPC-174 Assessing Agriculture's Long-Term Rail Needs (NDSU, J. Bitzan) **MPC Report No. 01-116**