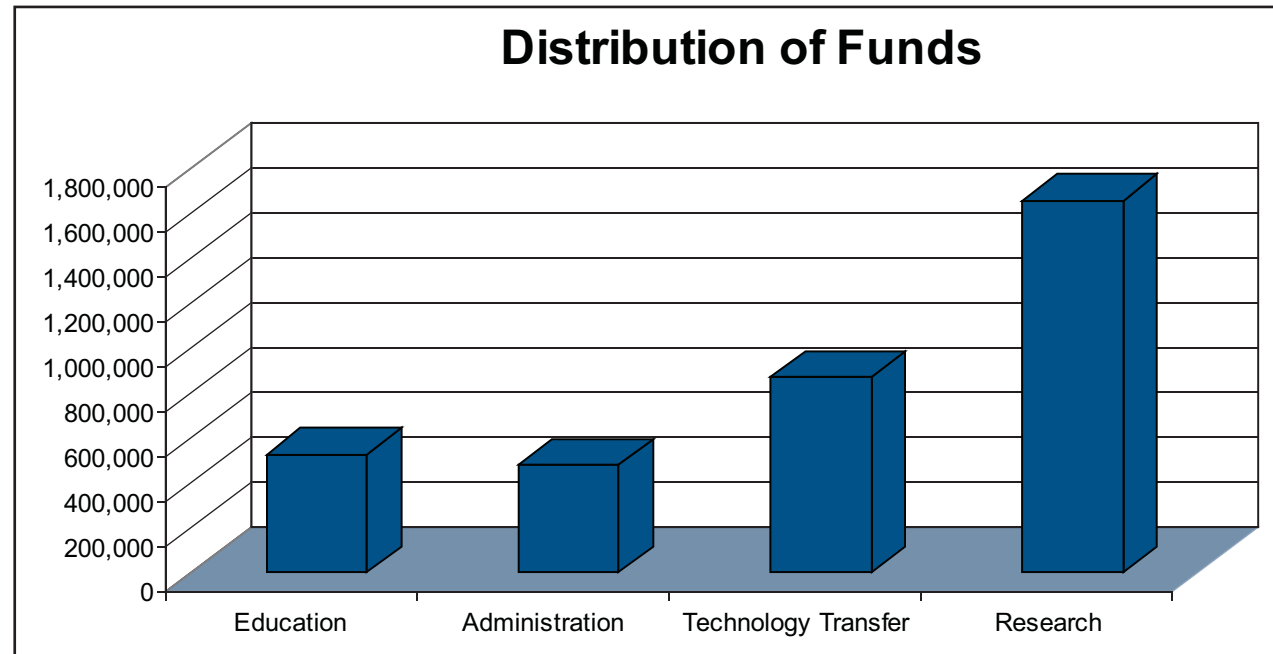


Resources and Funding

July 1, 2006 – June 30, 2007



Funding Sources

North Dakota Department of Transportation
 Utah Department of Transportation
 Wyoming Department of Transportation
 Colorado State University
 Bismarck/Mandan Metropolitan Planning Organization
 North Dakota Wheat Commission
 South Dakota Department of Transportation
 Grand Forks/East Grand Forks Metropolitan Planning Organization
 Utah Transit Authority
 North Dakota State University
 Fargo-Moorhead Council of Governments
 South Dakota State University
 University of Utah
 University of Wyoming
 Upper Great Plains Transportation Institute
 TLN Telecommunications Network (includes the NDDOT, WYDOT, MTDOT)

Contents

The Mountain-Plains Consortium Universities	1
Milestones/Historical Accomplishments	2
Management Structure	3
Executive Committee	5
Key Faculty	8
Director's Summary	17
Research	19
Education – MPC Students	24
Student Program Activities	37
Technology Transfer	43
Resources and Funding	50



Colorado State University • North Dakota State University
 South Dakota State University • University of Utah • University of Wyoming

Mountain-Plains Consortium
 North Dakota State University
 P.O. Box 5074 • Fargo, ND 58105
 (701) 231-7938 (T) • (701) 231-1945 (F)

www.mountain-plains.org



CSU Faculty Member Named to Transportation Authority Steering Committee



CSU faculty member Richard Gutkowski was recently named to the North Front Range Regional Transportation Authority Citizens' Coalition Steering Committee.

The committee, made up of two dozen people from across the region, will meet for three months to develop a regional plan for roadway and transit projects. The plan will be considered as a ballot measure later this year. The group will explore issues of equity, shareback, tax rates, maintenance and regional transit and develop intergovernmental agreements between the region's jurisdictions.

The MPC and CSU were among the sponsors for the North Front Range Transportation Choices Summit last year. The transportation authority is building on the summit's initial work to establish priorities and find resources to address the region's transportation issues.

Visiting Professor from Sweden Cooperates in MPC Bridge Projects

Elzbieta Lukaszewska, research scientist in the Division of Timber Structures at Luleå University of Technology (LUT) in Sweden is working as a visiting scientist at Colorado State University. She is cooperating with Richard Gutkowski in various MPC research projects on composite wood-concrete layered bridge deck systems.

At LUT, Lukaszewska is also completing doctoral studies involving interconnections for prefabricating stiffened wood-concrete panels. She will be at CSU for six months, focusing on rigorous computer models. Prior to her arrival, she visited the University of Canterbury in New Zealand for five weeks as part of Gutkowski's cooperation with researchers at that institution.

CSU Prof Honored for Work in Hungary

As part of the commemoration to mark the 50th anniversary of the 1956 Hungarian Revolution, Richard Gutkowski was one of four individuals named as Honorary Lifetime Members of the Hungarian Club of Colorado.

Gutkowski received the honor in recognition for facilitating cooperation at the doctoral school level between the Department of Civil Engineering at Colorado State University and the Civil Engineering Department at the Budapest University of Technology and Economics. Recipients were recognized during a memorial service at the Hungarian Park in Denver where a wreath was placed in honor of those lost in the revolution.

Colorado Governor Bill Owens keynoted the opening events at a ceremony held at the State Capitol Building. U.S. Congressman Tom Tancredo keynoted the later banquet ceremony.



UGPTI staff members Carol Wright, Gary Hegland, and Jon Mielke conducted the training which included:

- educating tribal representatives on the mandates that exist for coordination;
- giving specific examples of the benefits of coordination;
- helping to identify potential agencies and organizations with whom tribal agencies may want to coordinate;
- providing information to tribal representatives on how to initiate coordination efforts; and
- educating tribal representatives on how to monitor their results and sustain coordinating efforts into the future.

Materials for the workshop were specifically designed for transit systems that serve Indian reservations. The material took into account the challenges faced by transit operators on Indian reservations which often include poverty, remote locations, and low levels of personal mobility. The development of a coordination plan will position tribal transit operators to take advantage of expanded federal funding under the federal highway bill.

MPC Sponsors Attendance at RFID Conference

MPC sponsored a trip for several NDSU faculty and students in October to a national conference on transportation applications for radio frequency identification technology (RFID).

More than 80 experts in transportation, technology and research policy from universities, government, and private industry attended the Washington, D.C., conference. The conference was organized and hosted by the Transportation Research Board of the National Academies of Science.

“The presence of a major RFID manufacturing firm in NDSU’s Research and Technology Park as well as NDSU’s RFID research program, gives us some unique opportunities to incorporate the technology into our research and education programs,” noted MPC director Denver Tolliver. “The conference allowed us to see how RFID is being viewed on a national scale and how we can contribute to both policy discussions and research direction.”

Joseph Szmerekovsky, assistant professor of management at NDSU, attended with support from the MPC. “The best part of the conference for me was the small-group breakouts where we were able to participate in a lot more discussion and a lot more interaction,” he says. “Getting a feel for what other people were thinking and doing was very helpful, particularly the need for research on return on investment and cost-benefits. Those are the sort of things that I’m involved in.”

Participants at the conference gathered in break-out groups to discuss RFID policy and institutional issues and RFID applications in the supply chain, construction, and operations, safety and security.

The MPC provided funding to support attendance at the conference for additional NDSU faculty and students, including: Ergin Erdem, graduate student in industrial and manufacturing engineering; Jing Shi, associate professor of industrial and manufacturing engineering; David Wells, professor of industrial and manufacturing engineering; and Hai Zeng, Ph.D. student in transportation and logistics.

The Mountain-Plains Consortium Universities

MPC has a substantial set of institutional resources available to the UTC program. A description of member universities follows.

Colorado State University is a public land grant institution with an enrollment of nearly 25,000 students. Baccalaureate degrees are offered in 64 fields in eight colleges. CSU offers 39 doctoral and 62 master’s degree programs. 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. The College of Engineering houses the Engineering Research Center (ERC) which includes facilities for river mechanics and hydraulics, especially as related to major bridge construction; and wind tunnel testing. The Structural Engineering Laboratory includes an outdoor ramp facility for vehicle crash testing of safety and security barriers. A spatio-temporal test frame is available for simulating hurricane loadings and vehicle and train loadings. CSU also operates the Engines and Energy Conversion Laboratory. The Motorsport program includes topics such as racecar vehicle dynamics, advanced engines technology, fluid dynamics, and advanced materials.

North Dakota State University is a land grant institution with an annual enrollment of approximately 12,500 students. The university offers 41 doctorate and professional degree programs, 51 master’s degree programs, and 103 baccalaureate degree programs. The MPC is administered by the Upper Great Plains Transportation Institute which also administers several other related transportation research centers at NDSU. The Advanced Traffic Analysis Center focuses on traffic simulation, traffic signal control, intelligent transportation systems, and travel demand modeling. The DOT Support Center contains a highway design lab and provides experiential learning for junior and senior engineering students. The Rural Transportation Safety and Security Center focuses on identifying and characterizing rural transportation safety and security concerns. The Small Urban and Rural Transit Center works to improve the mobility of residents in rural and small urban areas through improved public transportation. The Local Technical Assistance Program fosters the exchange of technical assistance among units of government through training and educational programs. The Transportation Safety Systems Center develops and maintains software used by state and federal safety specialists nationwide at truck weigh stations and ports-of-entry for inspecting commercial vehicles.

South Dakota State University is a land grant institution with an annual enrollment of approximately 11,000 students. The university offers 104 baccalaureate degree and post-baccalaureate certificate programs, 23 master’s degree and post-master’s certificate programs, eight Ph.D. degree programs, and one professional program. Supporting programs include the newly developed 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 at SDSU houses state-of-the-art laboratory facilities. The Lohr Structures Laboratory is a high-bay structural testing facility fitted with a strong floor, modular loading frame, and a 15-ton traveling bridge crane. The asphalt laboratory is equipped to perform a broad range of tests related to performance and mix design of flexible and rigid pavement.

The University of Utah has an annual enrollment of about 29,000 students and offers 77 undergraduate degree programs, more than 80 minors and certificates, more than 45 teaching majors and minors, and 95 graduate majors. 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. It excels at modeling current and expected traffic conditions accurately and dynamically from real-time data. It links current and historical information intelligently.

The University of Wyoming has an annual enrollment of about 12,400 students and offers 85 undergraduate degree programs including eight teaching majors. The university offers 58 master's degree programs and 32 Ph.D. programs. 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 Materials Certification Program and the Wyoming Local Technical Assistance Program are hosted at the University of Wyoming. A significant number of funded research projects are regularly conducted by the transportation faculty members at the University of Wyoming.

Historical Accomplishments

The Mountain-Plains Consortium was established in 1988 in response to 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, most recently, SAFETEA-LU legislation. From 1988 through 2007, MPC produced a library of nearly 200 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.

Rural Road Safety Workshops Held in Wyoming

The University of Wyoming held several transportation safety workshops around the state in October to help rural units of government improve rural road safety.

Local Safety Tools Workshops were held in Rock Springs, Casper, and Gillette. The workshops are outgrowths of the Federal Highway Administration's Local Road Safety program. That program was developed specifically for local rural governments and is based upon the international concept called the Road Safety Audit (RSA). These workshops were presented by Eugene Wilson, consultant, and Paul Harker of the Federal Highway Administration.

"The Local Road Safety Program is a powerful tool to make local rural roads safer. It can also be adapted for local city governments as well as for state departments of transportation," says Wyoming MPC director Khaled Ksaibati. "For most local rural agencies there are fewer new projects being constructed and therefore the focus presented in these workshops was upon the existing roadways. The key to the success of the program is that safety issues are the entire focus."

As a follow up to the local safety tools workshops, the University of Wyoming organized a Low Cost Safety Improvements Workshop. This one-day workshop was held on the Transportation Learning Network. Participants from DOT's and local governments across region 8 attended the workshop. The course opened with an overview of highway safety issues with an emphasis on "do it now" solutions. Steps for identifying high-risk crash locations were then described. The rest of the workshop concentrated on learning a host of countermeasures to fix high-risk locations.

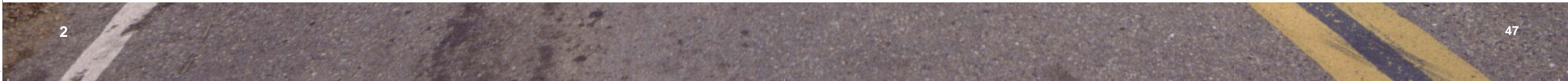
Presenting safety related workshops will increase the regional and local awareness in safety. The University of Wyoming will follow up the training with wide distribution of safety-related "Tech Briefs" in the near future.

MPC Sponsors Transit Coordination Workshop

The MPC sponsored a transit coordination workshop for tribal entities June 25-26 in Bismarck.

The idea for the workshop came from tribal representatives involved in transit management. The Small Urban & Rural Transit Center (SURTC), a part of the Upper Great Plains Transportation Institute at North Dakota State University, recently completed a transit development plan for the Turtle Mountain Indian Reservation and Rolette County in North Dakota. The plan emphasized coordination between existing transit agencies and human service providers and inspired interest among other tribes in coordination efforts.

The federal highway bill, SAFTEA-LU, mandates transit projects have coordination plans established between traditional transit providers and human services entities to extend mobility opportunities. With this workshop, MPC addressed the requirements of the federal legislation and enhanced the efficiency and effectiveness of transit systems that operate on North Dakota's four major Indian reservations.





University of Utah offers Web-Based Videoconferences

The University of Utah offered two web-based videoconferences for students and DOT professionals. The courses, “Technical Writing and Presenting for Professional Engineers” and “Statistics Made Easy,” were each two and half days long and were conducted by Peter Martin, University of Utah professor and director of the Utah Traffic Lab.

The writing and presenting course is aimed at engineers, technicians and government staff and established the fundamentals of effective technical writing and technical communication through a variety of media. The statistics course explained the fundamentals of statistical analysis in a practical way, providing insight into the correct application of basic statistical tools and providing confidence for future use.

Looking at European Universities

MPC was one of the sponsors of a guest lecture at Colorado State University, Oct. 20. The lecture, “University Educational Programs in the European Union Community” was given by György Farkas, head of the Structural Engineering Department at Budapest University of Technology and Economics.

Farkas is a frequent collaborator with faculty in the CSU Department of Civil Engineering, particularly Richard Gutkowski, the MPC program director at CSU.

The lecture outlined the primary provisions of the 1999 Bologna Treaty adopted by the European Union to harmonize European Higher Education among its 25 member states. The treaty established uniform degree structures at universities, facilitating free interstate movement of students and educators. Farkas discussed the broad changes that the treaty is prompting at universities across Europe, with a particular focus on the impact at Budapest University.

Farkas was in Colorado as part of a commemoration of events planned by the Hungarian Club of Colorado to mark the 50th Anniversary of the 1956 Hungarian Revolution.

Staff Present Papers

Papers written by MPC staff members were selected for presentation at the Transportation Research Board annual meeting in January.

University of Wyoming program director Khaled Ksaibati was coauthor of two papers presented at the TRB meeting: “Gravel Road Surface Performance Modeling” and “Recycled Glass Utilization in Highway Construction.”

Magdy Abdelrahman, an assistant professor of civil engineering at NDSU, was another TRB presenter. His paper, “Field evaluation of implementation issues for Superpave on low-volume roads,” was part of a session on pavement management for low-volume roads and identified potential issues of concern with using Superpave on low-volume roads.

Management Structure

The management structure of the Mountain-Plains Consortium involves three main components – the center director and administrative staff, four 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. The roles and responsibilities of each administrative component are discussed in this section.

Center Director

The Mountain-Plains Consortium is located at the Upper Great Plains Transportation Institute at NDSU. 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 four institutions. He administers the program to take advantage of the unique strengths and resources of each university and to produce the greatest impact for the consortium. Jody Bohn of NDSU provides administrative support for the center. Dr. Ayman Smadi of NDSU is the external programs coordinator. Beverly Trittin of NDSU provides graphics support and additional administrative services. Patrick Nichols of NDSU is the center’s website developer. He creates and maintains the MPC Web pages and helps design and implement Web-based applications for MPC faculty, staff and clients. Tom Jirik, MPC’s communication coordinator, develops communication strategy for the center and provides editorial oversight for both traditional and electronic publications. He is also located at NDSU.

University Program Directors

Each university in the consortium has a designated university program director to perform local oversight and management of approved activities at each university. They also serve as coordinators of transportation activities on their respective campuses. They implement the MPC strategic plan at each institution in a coordinated manner, which considers the vision and theme of the Center and the strategies and activities of all consortium partners. The program directors are Dr. Richard Gutkowski, Colorado State University; Dr. Kimberly Vachal, North Dakota State University; Dr. Nadim Wehbe, South Dakota State University; Dr. Peter Martin, University of Utah; and Dr. Khaled Ksaibati, University of Wyoming.

Executive Committee

The center director, the five university program directors, and a USDOT liaison form a committee to oversee program planning and administrative functions for the grant period. The seven-member executive 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 continues to use 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 five MPC universities are partners in the network which also includes three state transportation departments in Region 8: North Dakota, Montana, 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 four 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.

Professional Input and Review

In 2006-07, practicing engineers and administrators from Colorado, North Dakota, Utah, and Wyoming state transportation departments provided key input and critical review during the research selection process. Professionals from USDA, Federal Highway Administration, Federal Transit Administration, and the American Association of Railroads also review proposed problem statements. In this way, we ensure that we are researching problems of regional and national significance, which provides value to our primary customers, the end users of the research.

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.

The MPC advisory committee includes:

- Carlos Braceras, Utah DOT
- Peggy Catlin, Colorado DOT
- Loran Frazier, Montana DOT
- Anthony Giancola, National Association of County Engineers
- David Huft, South Dakota DOT
- Christine Johnson, FHWA – western region
- Grant Levi, North Dakota DOT
- Jeff Loftus, Federal Motor Carrier Safety Administration
- Delbert McOmie, Wyoming DOT
- Craig Rockey, Association of American Railroads

Structural Seminar at SDSU

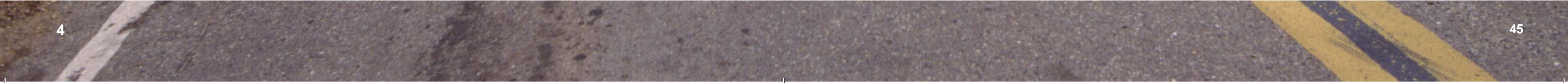
The MPC and the Federal Highway Administration sponsored the 31st Annual Structural Seminar at South Dakota State University Nov. 16. The “FHWA Self Consolidating Concrete Workshop” was intended for DOT engineers, structural engineers, civil engineers, architects, material testing technicians, concrete producers, building officials, specification writers and students.

The day-long event included information from FHWA specialists, university researchers, and private industry experts. There has been some reluctance in the engineering community to use self consolidating concrete because it is a relatively new product and information on the production, testing and performance of it is not widely known. The seminar was designed to present and discuss development, applications, proportioning, testing and economic impacts of self consolidating concrete.

Tech Transfer Bridge Workshop at CSU

A technology transfer workshop on composite wood-concrete technologies for short-to-medium span bridges was held Aug. 15 at Colorado State University. The workshop was sponsored by the MPC and the CSU Department of Civil Engineering.

The one-day program featured an overview of composite wood-concrete layered systems and an overview of their applications in Europe, Brazil, and Portugal. CSU faculty and several faculty members from European institutions involved in research applications of composite wood-concrete bridges made presentations at the workshop. Attendees also reviewed research at CSU and toured laboratories conducting related research projects. The audience included county engineers, road and bridge coordinators, public works directors from small urban and rural areas and municipalities in Colorado. The program was organized by the MPC program director at CSU, Richard Gutkowski.





North Front Range Summit Identifies Transportation Priorities

The North Front Range Transportation Choices Summit held June 13 in Windsor, CO, was a regional gathering to help identify priorities for the future transportation system of the region. Participants at the summit explored a number of choices including regional bus and rail transit service, arterial and highway widenings, interchange improvements, connections between cities and activity areas, bicycle and pedestrian mobility, system maintenance, and others. The event was designed to create a stronger understanding of regional transportation trends and funding realities; explore preferences for future transportation improvements for the region; and learn how people from the region weigh choices associated with transportation planning.

The more than 200 attendees at the summit included representatives from the business community, environmental groups, local governments, elected officials and residents from the region. Participants were divided among 27 tables to represent all parts of the region and diverse perspectives. Each group was given \$1.3 billion in resources to negotiate, spend and build their future transportation vision for the region. The activity opened a dialog among participants and was a consensus approach to regional transportation planning.

“We are still reaping the benefits of the event,” notes John Daggett, regional multi-modal planning manager for the North Front Range Metropolitan Planning Organization. “It appears that the region now has the political will to pursue a regional transportation authority that will begin to address many of the transportation problems we’ve been facing for the past several decades.”

Those challenges include rapid population growth, increased trips and travel times, increased inter-regional travel, and resulting congestion. A regional transportation authority would build on the summit’s initial work to establish priorities and find resources to address the region’s transportation issues.

The MPC and Colorado State University were among the sponsors of the summit. “Thanks to our sponsors, the event became a huge success,” Daggett said.

University of Utah Receives Software Donation

PTV America, a leading multi-disciplinary transportation software and consulting firm and a subsidiary of PTV AG in Karlsruhe, Germany, announced a new partnership with the Utah Traffic Lab which is part of the University of Utah Department of Civil and Environmental Engineering.

PTV America has donated software with a commercial value of \$560,000 for training the next generation of transportation engineers. Peter Martin of the University of Utah is working with PTV America to implement the newest PTV Vision Suite of integrated transportation planning and operations analyses software into the academic curriculum and research efforts at the university. The software is the leading tool in more than 75 countries and allows University of Utah students and faculty to work with some of the most advanced technologies in the world.

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 UTCP-funded activities conducted on the five campuses are approved first by the executive committee. The center director ultimately is accountable for all decisions pertaining to UTCP activities and the use of UTCP 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 videoconferences 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.

Executive Committee

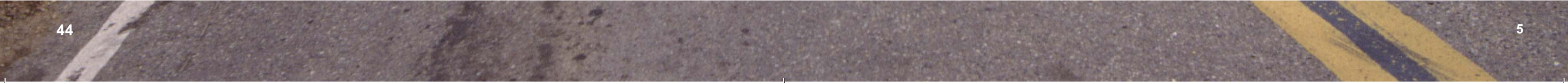


Dr. Denver Tolliver is director of the Mountain-Plains Consortium. He is also associate director of UGPTI, where he has been employed since 1980. Before joining the faculty of NDSU, Tolliver was a rail planner for the North Dakota Department of Transportation. He has been the director of the Mountain-Plains Consortium since 1997. Moreover, he is the director of the Transportation & Logistics graduate program at NDSU – which includes an interdisciplinary Ph.D. in Transportation & Logistics (TL) and a Master of Military Logistics degree. He is a member of the Interdisciplinary Program Directors group at NDSU and coordinates the TL program with the transportation degree options in Agribusiness and

Applied Economics and Civil Engineering. Tolliver holds a baccalaureate degree in geography from Morehead State University and a master of urban and regional planning and a Ph.D. in environmental design and planning from Virginia Polytechnic Institute & State University. His primary research interests are: highway economics and planning, railroad planning and capacity analysis, cross-modal impact assessment, and energy and environmental analysis.



Dr. Richard Gutkowski is a professor of civil engineering at CSU. He has B.S. and M.S. degrees in civil engineering from Worcester Polytechnic Institute and a Ph.D. from the University of Wisconsin-Madison. Gutkowski is director of the Structural Engineering Laboratory at CSU’s Engineering Research Center. He manages research, graduate education, technology transfer, summer diversity research activities, and student internship programs. He has published and presented more than 160 papers and reports and guided numerous theses and dissertations. Gutkowski



wrote “Structures: Fundamental Theory and Behavior” (two editions) and co-authored the chapter “Composite Construction in Wood and Timber” in the Handbook of Composite Construction. He also has co-edited proceedings for the above NATO workshops.



Dr. Khaled Ksaibati received a B.S. degree in civil engineering from Wayne State University. He later completed his M.S. degree and Ph.D. from Purdue University. Ksaibati has been a member of the civil engineering faculty at the University of Wyoming since 1990. He started his academic career as assistant professor and was promoted in 1997 to associate professor. He was promoted to the rank of full professor in 2001. Ksaibati is director of the Wyoming DOT Certification program at the UW. Between 200 and 250 highway professionals are certified every year in aggregate, asphalt, and concrete studies. He is a member of five Transportation Research Board committees dealing with various aspects of pavements. Ksaibati is the author or co-author of more than 29 technical refereed papers primarily in the areas of pavement design, performance, maintenance, and rehabilitation. Ksaibati also is the author or co-author of 33 other publications.



Dr. Peter T. Martin earned a B.S. degree in civil engineering from the University of Wales in 1975, an M.S. degree in transportation engineering from the University of Wales in 1987 and a doctorate in “Real-Time Transportation Modeling” from the University of Nottingham, England, in 1992. From 1975 to 1984, he practiced as a Civil Engineer in highway planning, design and construction. He has built the “Utah Traffic Laboratory,” which allows real-time connection to the Utah DOT ITS Traffic Operation Center. Currently, Martin is working on innovative funding methods through Intelligent Transportation Systems, and modeling and evaluation of Advanced Adaptive Traffic Signal Control Systems.



Dr. Nadim Wehbe is an associate professor in the Department of Civil & Environmental Engineering, the director of the Mountain-Plains Consortium Program at SDSU, and the coordinator of the J. Lohr Structures Laboratory. He earned a B.E. in civil engineering from the American University of Beirut in 1980. He earned a M.S. and Ph.D. in civil engineering from the University of Nevada – Reno in 1992 and 1997 respectively. His areas of research interest relate to reinforced and pre-stressed concrete structures, earthquake resistant bridges, and advanced composites structural systems.

Technology Transfer

TLN addresses DOT training needs

The MPC and the Transportation Learning Network have launched a four-state initiative to provide technical training to department of transportation professionals.

Gary Berreth and Julie Rodriguez have met with an executive advisory group from the departments of transportation in North Dakota, Montana, South Dakota and Wyoming to identify training needs and challenges. A report outlining strategies for addressing those needs was completed.

“We’ve already received indications from the DOTs that they want to proceed to the next level, to determine common training needs and find ways to cooperate in innovative and more cost effective ways of meeting those needs,” Berreth says.

In the beginning, that may involve looking at training in each state to determine if it can be offered via video network or the Internet to other states. The Transportation Learning Network is already tailoring its offerings to meet needs identified by the DOTs. A series of concrete seminars has been launched and several technical presentations are offered.

The MPC universities have agreed to provide additional short course offerings.

“As new training delivery technologies become available, we’ll be looking at those as well,” Rodriguez notes. For example, training may be offered via Internet video or as downloadable lessons that could be replayed on an iPod or computer. “Our goal is to help the DOTs address training needs in an environment that meets the needs of their staffs efficiently and effectively,” Rodriguez says.

Small Urban and Rural Transportation Operations Coalition

The Advanced Traffic Analysis Center launched the Small Urban and Rural Transportation Operations Coalition to focus on the transportation operation needs of rural and small communities. This initiative aims at identifying high priority small urban and rural area traffic operations needs, learning from and applying successful and tested practices, developing a resource for technical information and training opportunities, and providing a forum for professionals to network and share information. The initiative, with support from the Federal Highway Administration and the MPC, was embraced as part of the National Transportation Operations Coalition.

Key transportation organizations participating on the coalition subcommittee include: American Association of State Highway and Transportation Officials, American Public Works Association, Federal Highway Administration, Institute of Transportation Engineers, Intelligent Transportation Society of America, National Association of County Engineers, National Association of Development Organizations, and National Association of Regional Councils. Find more information at www.surto.org.

Students present papers



NDSU Ph.D. student Chris Enyinda presented “Managing value chain through lean supply chain logistics: A comparison of military and commercial organizations” to the American Society of Business and Behavioral Sciences 14th annual conference Nov. 8 in Las Vegas, NV. The paper was also published in the conference proceedings.

Enyinda returned to Las Vegas in January to present another paper at the Society of Advancement of Management’s 2007 International Business Conference. The paper, “Mitigating and managing global supply chain risks and security: Leveraging RFID technology,” was also published in the conference proceedings.

NDSU Ph.D. student Subhro Mitra’s paper, “Analyzing satellite imagery to develop freight generation data” was selected in the American Association of State Highway and Transportation Officials’ Geographic Information Systems for Transportation (GIS-T) 2007 Student Paper Contest. He presented his paper March 26, at the GIS-T Symposium in Nashville, TN. The paper was also published on the GIS-T website.

In addition to his GIS-T paper, Mitra was also selected to present his paper, “Analyzing the effects of spring highway load restrictions on North Dakota’s agricultural freight flows” at the 86th Annual Meeting of the Transportation Research Board in January in Washington, D.C.



University of Utah student Aleksandar Stevanovic presented “VISGAOST: VISSIM-based genetic algorithm optimization of signal timings” at the annual meeting of the Transportation Research Board. The paper outlined research with advanced signal control methods in both a hypothetical grid network and a real-world arterial of actuated-coordinated intersections in Park City, UT. University of Utah program director Peter Martin and student Jelka Stevanovic were coauthors.



Dr. Kimberly Vachal joined the executive committee this year as NDSU’s program director. She is an advanced research fellow for UGPTI and works with local, regional and national freight groups to identify logistical opportunities and assess policy implications. Her work focuses on promoting a competitive logistical system that will enhance the position of the region’s products in both domestic and export markets. In addition, Vachal has completed many research studies on grain and oilseed transportation issues, and she has worked on a number of projects in cooperation with the USDA. She has published more than 30 research papers and journal articles related to agricultural logistics and rural economic development. She also directs the UGPTI’s Rural Transportation Safety and Security Center. Vachal received M.S. and B.S. degrees in agricultural economics at North Dakota State University. She received her Ph.D. in Public Policy from George Mason University in 2004.



Dr. Ayman Smadi is MPC external programs coordinator. He is director of the Advanced Traffic Analysis Center (ATAC) at UGPTI. The ATAC enhances transportation systems in small-medium size communities through the use of advanced traffic analysis and ITS solutions to safety and mobility problems. ATAC’s Traffic Laboratory supports state-of-the-art traffic analysis, including traffic simulation, traffic signal control, and traffic data collection systems. As an adjunct professor in civil engineering, Smadi teaches transportation planning, advanced transportation systems, and ITS graduate courses. Smadi’s research interests include traffic operations, transportation planning, ITS, and safety. Smadi, an advanced research fellow, began his work at the UGPTI in 1993. He served as NDSU’s program director for the MPC from 1996 until 2006. He has a Ph.D. in civil engineering from Iowa State University; an M.S. from the University of Oklahoma; and a B.S. in civil engineering from Yarmouk University, Irbid, Jordan.

Dr. Christine Johnson serves on the board as the liaison from the FHWA. She is the Director of Field Services for the FHWA’s western region. The FHWA field organization delivers program services to the FHWA’s partners and customers. The western region includes Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington and Wyoming. Johnson is based in Salt Lake City, UT.



Key Faculty

Colorado State University



Dr. Jenó Balogh is an affiliate faculty member in the Department of Civil and Environmental Engineering. He has B.S. and Ph.D. degrees from Budapest University of Technology and Economics (Hungary). Presently, he is an assistant professor at Metropolitan State College of Denver, teaching in structural engineering. His research interests are computational mechanics, CAD, steel structures, and timber structures. Dr. Balogh is involved in several MPC projects including composite repair of bridge members, laboratory studies of timber railroad bridge members, and layered wood-concrete systems among others. He also teaches advanced finite element modeling using commercial software.



Dr. Antonio Carraro is an assistant professor in the Department of Civil and Environmental Engineering. He earned his B.S. and M.S. degrees from Universidade Federal do Rio Grande do Sul. He earned his Ph.D. degree from Purdue University. Dr. Carraro has extensive experience on laboratory testing of geo-materials and has served as a consultant for the Department of Public Works in Brazil. He is a member of the International Society for Soil Mechanics and Geotechnical Engineering, the American Society of Civil Engineers, and the Earthquake Engineering Research Institute. His research interests include soil behavior and experimental methods, geotechnical earthquake engineering, foundation engineering, and beneficial use of waste materials.



Dr. Suren Chen is an assistant professor in the Department of Civil and Environmental Engineering. He holds a Ph.D. degree from Louisiana State University where he earned the Michael A. Clause Memorial Outstanding Ph.D. student award. His doctoral dissertation was “Dynamic Performance of Bridges and Vehicles under Strong Winds.” His research interests include performance of transportation infrastructure and vehicles under natural hazards, natural hazards using GIS, new materials application and health monitoring, and structural control of vibrations. He has worked on projects funded by the National Science Foundation, the National Research

Council-NCHRP IDEA program, and the FHWA-IBRC program. Prior to accepting the CSU appointment, he was a civil engineer with Michael Baker Jr. Corporation, a major international firm.

Vladisavljevic Wins ITE Intermountain Section Annual Student Paper Contest



Ivana Vladisavljevic received first place in the Utah Chapter of the Institute of Transportation Engineers (ITE) Student Paper Contest. Her paper, “Impact of Cell Phone Conversation While Driving on Car Following Behavior,” examines the impact that distracted drivers have on traffic flow. The intermountain section includes students from universities in Idaho, Montana, Nevada, and Utah. Vladisavljevic received a \$400 cash reward and has been asked to present her paper at the Intermountain Section Meeting in Jackson, Wyoming. She is a research assistant at the Utah Traffic Lab and a graduate student at the University of Utah.

MPC Supports Scholarships at NDSU

Four \$1,500 scholarships are funded each year at NDSU by the MPC. The scholarships are awarded at the Upper Great Plains Transportation Institute’s Annual Awards Banquet each fall. The Paul E.R. Abrahamson Transportation Scholarship recognizes academic achievement and interest in agricultural transportation and logistics. Kimberly Spear of Fargo and Chris Duchsherer of Drake, N.D., received the award this year. They are both seniors in agribusiness and applied economics.

The University Transportation Center Engineering Scholarship recognizes academic performance and an interest in transportation. The scholarships were presented to Amy Hardy of Ellendale, N.D., and Jason Mayfield of Fargo. Hardy is a junior and Mayfield is a senior, both majoring in civil engineering. Twenty-two scholarships have been awarded since they were established in 2002.



Kimberly Spear
Chris Duchsherer



Amy Hardy
Jason Mayfield





First MPC Student in South Dakota Begins Work



Amanda Boushek of Echo, MN, is working on her M.S. degree in civil engineering. She earned her B.S. degree in civil engineering from South Dakota State University (SDSU). In the summer of 2006, Boushek became the first SDSU graduate student to work on an MPC-sponsored research project. Her research work focuses on the development and evaluation of self-consolidating concrete mix designs for structural applications in highway box culverts. The project is co-sponsored by the South Dakota Department of Transportation.

A TLN Videoconferencing Facility at SDSU

The first project to be completed by the MPC program at South Dakota State University (SDSU) was the establishment of a Transportation Learning Network (TLN) videoconferencing site. The facility, which boasts two 50-inch plasma monitors, was completed in December. The videoconferencing facility is now being used to conduct meetings with other TLN partners and to receive graduate course instruction from other MPC universities.

New Chair named to Civil and Environmental Engineering at University of Utah

Dr. Paul J. Tikalsky was named chair and professor of the Civil and Environmental Engineering Department at the University of Utah in 2006. His previous positions included professor of Civil and Environmental Engineering at Penn State University, deputy director of the Pennsylvania Transportation Institute at Penn State; senior research fellow at the Czech National Academy of Sciences, and associate professor of Civil Engineering at Santa Clara University. He is a registered professional engineer in the State of California and a Fellow of the American Concrete Institute (ACI). He received his B.S. degree in civil and environmental engineering from the University of Wisconsin at Madison and his master's and doctorate degrees in structural engineering from the University of Texas at Austin. Tikalsky's research is in the area of the development and implementation of higher durability concrete structures and the use of admixtures and supplementary cementitious materials. Tikalsky is a member of the Board of Directors of the American Concrete Institute and serves on its finance committee as well as numerous technical committees in the American Society of Testing and Materials, ACI, and the Transportation Research Board.

Molakatalla Graduates

Udit Molakatalla has graduated from NDSU with an M.S. degree in civil engineering with the transportation option. Molakatalla has accepted a position in Tallahassee, FL, with Kimley-Horn and Associates, Inc., a transportation and engineering consulting firm. The title of his thesis is "A Case Study Investigating Asphalt Film Thickness as a Superpave Mix Design Criterion." He is originally from India.



Dr. Marvin Criswell is professor of civil engineering and the Associate Department Head for Academic Affairs in the Department of Civil and Environmental Engineering. He earned a B.S. degree from the University of Nebraska, Lincoln and M.S. and Ph.D. degrees from the University of Illinois Urbana-Champaign. He served as an ABET engineering accreditation visitor and has served on the ASEE Board of Directors, as geographic zone (Zone IV) chairman, and as chairman of the ASEE Civil Engineering Division. His research interests include development of buildings and design code provisions related to reinforced concrete. Marvin advises on MPC supported research on composite wood/concrete bridge

systems and timber trestle railroad bridges. He assists with graduate education activities on the TLN network.



Dr. Paul Heyliger has been on the faculty of the Department of Civil and Environmental Engineering for 15 years. He was awarded his Ph.D. in engineering mechanics from Virginia Tech and subsequently did a two-year National Research Council post-doctorate at the National Bureau of Standards. He has been a visiting faculty at the University of California at Santa Barbara, the University of Stuttgart, and the University of Hamburg. His primary research interests are in structural mechanics and analysis with special applications to highly flexible structural elements for energy absorption with application to transportation structures and crash barriers. He has more than 60 refereed journal articles and has been presented

with several teaching awards. His research sponsors include the USDOT, National Science Foundation, NASA, USDA, the Army Research Office, AFOSR, and NIST.



Dr. Juhua Liu is a research scientist in the Department of Civil and Environmental Engineering. He earned a B.S. degree in the Department of Vehicle Engineering at Juangsu Institute of Technology (China), an M.S. degree in the Department of Physics and Agricultural Engineering at Wageningen University (Netherlands) and a Ph.D. degree in Chemical and Bioresource Engineering at Colorado State University. His research interests include off-highway vehicle stability and engineering control strategies; GPS and GIS applications in engineering; and information technology and computer applications.

Dr. Don Radford is an associate professor in the Department of Mechanical engineering. He earned his B.S. in mechanical engineering and his M.S. in metallurgical engineering from the University of British Columbia. He earned his Ph.D. in materials engineering from Rensselaer Polytechnic Institute. His research interests include process induced distortion in composites, viscoelastic constitutive modeling, advanced polymer processing, and polymer foams, damage assessment and repair of composites and high temperature composites.





Dr. John W. van de Lindt is an associate professor in the structural engineering program. He earned his B.S. in civil engineering from California State University at Sacramento and both his M.S. and Ph.D. in civil engineering from Texas A&M University. His research interests include nonlinear dynamics, structural reliability, and woodframe structures subjected to seismic and wind loads. He currently chairs the ASCE Committee on the Reliability-Based Design of Wood Structures.

North Dakota State University



Doug Benson is an associate research fellow at the Upper Great Plains Transportation Institute. Benson earned B.S. degrees in psychology, history, education, and computer science from the University of North Dakota in 1978, 1986, 1987, and 1988 respectively. He earned his M.S. in computer science from North Dakota State University in 1996. Some of his recent research involvements include development of a database management system for the American short line railroad industry, software analyst for a branch line benefit/cost modeling system, and Uniform Rail Costing System (URCS) analyst for the study of time-series grain railroad revenue/cost ratios. He also served as executive director for TEL8 (now TLN) from 1997 to 2004. His research interests include computerized transportation analysis, railroad operations, transportation database, and GIS transportation applications.



Mark Berwick has been involved with the Upper Great Plains Transportation Institute since 1995, specializing in the areas of logistics and transportation management, specifically in the areas of motor carrier costing, economic development and business logistics. Most recently he has been involved in studying cross-border transportation issues and intermodal transportation challenges and issues in North Dakota and surrounding states and provinces. Additional research has focused on motor carrier economics, the logistics of the North Dakota potato industry and characteristics of the farm truck fleet in the Upper Great Plains states. Since 1999 Berwick has been the director of the North Dakota Strategic

Freight Analysis Program, which examines the transportation and logistics of different sectors of the economy every two years. Berwick holds masters and bachelors degrees in agricultural economics from North Dakota State University.

That presents important opportunities for new graduates. “As railroads devote greater and greater amounts to expansion, they’re also paying great attention to engineering, operations and strategic planning. Those are key elements for our industry to expand and reach a level that is optimal.”

“All railroads are actively involved in programs to build more capacity,” Rocky says. They are looking at new technology, recruiting and training programs, and new operating plans and joint efforts among railroads.”

During the week, railroad professionals addressed civil engineering classes and students in the Masters of Military Logistics program. Brian Lindamood of Alaska Railroad Corp. presented technical facts on railroad engineering and railroad transportation to support military logistics, as well as the uniqueness of the Alaska Railroad. “Railroads have inherent advantages to most other modes of transportation when measured in economic terms of volume and as those other means of transportation struggle with capacity and operational costs, railroads will continue to reap the growth benefits of being a viable alternative,” he said. Lindamood received an M.S. in civil engineering from NDSU.

Dan Zink, Red River Valley and Western Railroad, presented information on regional railroad operations in the northern plains and issues related to short-line and regional railroads.

MPC Sponsors NDSU ITE Field Trip to Minneapolis

The North Dakota State University student chapter of the Institute of Transportation Engineers (ITE) took a field trip to Minneapolis Nov. 17-18 thanks to MPC support. Eight civil engineering students toured transportation-related facilities and job sites, such as the Roseville Traffic Maintenance Center, the Hiawatha Light Rail System and the “Unweave the Weave” project on the interchange of Interstate Highways 35E and 694. The group also attended a “Trans Talk” at the University of Minnesota featuring 2007 ITE International president-elect Earl Newman. They also attended the 2006 North Central ITE Annual Conference.





MPC Sponsors Railroad Awareness Week Activities at NDSU

During the week of Nov. 6-10, the Upper Great Plains Transportation Institute and the Department of Civil Engineering at NDSU observed “Railroad Week” to raise awareness of the importance of railroad transportation in the United States and draw attention to potential careers in the railroad industry. Events during the week were sponsored by the MPC.

“With the continued steady growth of the railroad systems through increased global trade and movement of goods and freight from the central region to the ports, we are opening new doors for our civil engineering and transportation students by making them aware of the many benefits of this industry,” notes Dinesh Katti, chair of the Department of Civil Engineering.



During Railroad Week at NDSU, Brian Lindamood of Alaska Railroad Corp. discussed challenges of expanding and operating a railroad in Alaska.

“The railroad industry is facing a mass retirement of management personnel and is starving for engineering and management personnel to fill these voids. Awareness weeks such as this will hopefully educate students and make them aware of the great opportunities available in the railroad industry.”

The week-long event also drew attention to efforts at NDSU to increase its focus on railroad engineering. In partnership with the Association of American Railroads and a number of Class I and regional railroads, NDSU is boosting railroad-focused scholarship and internship programs and adding railroad-related material to course content and research programs.

Craig Rocky, vice president of policy and economics with the Association of American Railroads, emphasizes the need for such an event.

“One of the commonly misunderstood aspects of the railroad industry is its significance to the economy,” he said. Rocky notes that railroads account for 42 percent of all ton-miles of goods shipped in the United States. “The industry has also thrown off huge social benefits,” he says, listing congestion mitigation, pollution reduction, transportation safety and fuel efficiency.

Rocky notes that all modes of freight transportation in the United States are reaching capacity. “Historically, railroads have been looked to as a safety valve for capacity concerns, particularly in a growing economy,” he says. “Railroads are in a position unlike anything they’ve faced in the past. In certain places and in certain corridors, capacity is being reached. In the past there’s been excess capacity everywhere.”

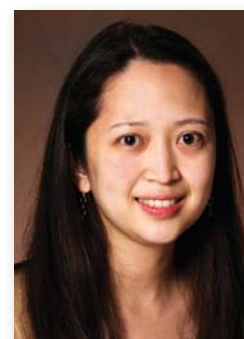
The railroad industry reinvests 40 percent of its revenues into maintaining its assets. “We’re seeing increasing increments of that investment being directed toward expansion,” Rocky notes.



Dr. John Bitzan is an assistant professor of management. He earned his B.S. degree in economics from St. Cloud State University, his M.A. in applied economics from Marquette University, and his Ph.D. in economics from University of Wisconsin – Milwaukee where he specialized in industrial organization and labor economics. Before joining the College of Business, he worked as a transportation economist with the Upper Great Plains Transportation Institute and an adjunct professor in agricultural economics.



Alan Dybing is an associate research fellow at the Upper Great Plains Transportation Institute. He is expected to earn his Ph.D. in transportation and logistics from NDSU in 2007. He earned his M.S. in agribusiness and applied economics and his B.S. in agricultural education from NDSU. He is a member of the Transportation Research Forum and has been doing research relating to the HERS-ST analysis of the North Dakota Highway System, the NDDOT rail plan update, economic impacts of transportation in North Dakota, and truck trip generation of large elevators in North Dakota.



Dr. Pannapa Herabat joined the Department of Construction Management and Engineering at NDSU in 2006 as an assistant professor. She specializes in asset management systems, bridge management systems, pavement management systems, deterioration modeling and infrastructure management. She is a graduate of Carnegie Mellon University in Pittsburgh where she earned B.S., M.S. and Ph.D. degrees in civil engineering. Before coming to NDSU she was an assistant professor in the School of Engineering and Technology at the Asian Institute of Technology in Thailand.



Dr. Jill Hough is an advanced research fellow at the Upper Great Plains Transportation Institute and the director of UGPTI’s Small Urban & Rural Transit Center (SURTC), which focuses on research, education, and training for the public transportation industry. She earned her Ph.D. in the transportation technology and policy program at the University of California - Davis. She earned B.S. and M.S. degrees in agricultural economics at NDSU. She has published more than 35 reports and journal articles in the areas of public transportation, low-volume roads, logistics, and economic development. Her primary research areas presently relate to mobility of the elderly and disadvantaged as well as transit planning and management. She currently serves on the National Academies of Science Transit Cooperative Research Program Oversight Project Selection committee and the National Transit Institute Board of Directors at Rutgers University in New Jersey.





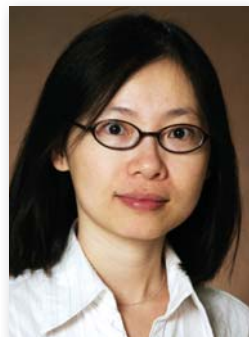
Dr. Brenda Lantz is an associate research fellow at the Upper Great Plains Transportation Institute and is the program director for the Transportation Safety Systems Center. She earned her Ph.D. in Business Administration and Supply Chain and Information Systems at Pennsylvania State University in 2006. She also received a M.S. in applied statistics and a B.S. in sociology from NDSU. She specializes in the areas of intelligent transportation systems for commercial vehicle operations, business logistics and commercial vehicle safety - subjects on which she has authored and presented numerous articles.



Mark Lofgren is an associate research fellow at the Upper Great Plains Transportation Institute. He earned his M.B.A. from NDSU and his B.S. in industrial management from Minnesota State University – Moorhead. His research interests include freight movement in North Dakota and the region, logistics and economic development, supply chain management, intermodal transportation, regional transportation issues and the effects on rural businesses and agriculture producers, transportation safety/security, and motor carriers.



Tamara VanWechel is an associate research fellow at the Upper Great Plains Transportation Institute. She works on agricultural and freight transportation. She has interests in rural freight logistics and infrastructure, bulk grain and oilseed logistics, and railroad pricing and service. As a native of rural North Dakota, she understands the fundamental relationship between economics and agriculture. She earned her B.S. and M.S. degrees from NDSU in natural resources management. Her M.S. degree emphasis area is in agribusiness and applied economics.



Dr. Jun Zhang joined the Department of Industrial and Manufacturing Engineering at NDSU in October as an assistant professor. Her research interests include: lean manufacturing and logistics; production planning and inventory control; scheduling; simulation optimization; models and methodologies of stochastic optimization; health care engineering; facility design; supply chain management; artificial intelligence; machine learning and data mining; and computer integrated manufacturing. Zhang holds a B.S. and an M.S. in mechanical engineering from Beijing Institute of Technology, China, and a Ph.D. in industrial engineering from Purdue University. Before coming to NDSU, she was a research assistant for the School of Industrial Engineering at Purdue.

Student Program Activities

Burgers Named Student of Year for Region VIII



Travis Burgers, former MPC student at Colorado State University, was named Student of the Year for Region VIII at the Transportation Research Board annual meeting in Washington in January. Each year, the U.S. Department of Transportation honors the most outstanding student from each participating University Transportation Center for achievements and promise for future contributions to the transportation field.

Students of the year are selected based on their accomplishments in such areas as technical merit and research, academic performance, professionalism, and leadership. Each student receives a certificate from the U.S. DOT and \$1,000 from the student's University Transportation Center.

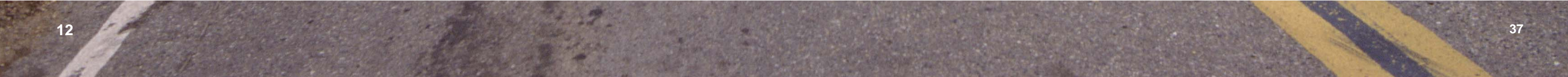
Burgers earned his M.S. degree in civil engineering from CSU in August 2005, and a B.S. degree in engineering from Dordt College, Sioux Center, IA, in 2003. He is presently a doctoral student in biomechanics at the University of Wisconsin-Madison.

Burgers held a dual appointment as a graduate teaching assistant and a graduate research assistant in the Department of Civil Engineering at CSU from 2003 to mid-2005. As a graduate teaching assistant, he was an instructor in various undergraduate laboratory-based courses. As a graduate research assistant he was supported via funds from the MPC. He worked on an innovative repair method for timber bridges adapted from an aerospace industry process termed "Z-spiking" used in making laminated composites. His study consisted of applying Z-spikes (fiberglass reinforced polymer rods) to damaged stringer members. He conducted extensive laboratory tests of a full-scale chord of an open-deck timber trestle railroad bridge that had been reinforced by Z-spiking. The work was also presented at the 2006 International Association for Bridge and Structural Engineering held in Budapest, Hungary, and published in the proceedings.

In summer 2004, Burgers served as a mentor to a student in the McNair scholars program for underrepresented undergraduate students. He helped the student integrate research and education via overseeing his designing and conducting a summer research project in transportation-related research.

Burgers was a surveying assistant in highway work with Wilsey & Associates. He also was a test lab assistant for Behr Heat Transfer, conducting burst, pressure and wind tunnel tests on oil coolers and evaluating test outcomes.

Presently, Burgers is conducting research on press-fit fixation and visco-elastic response of a bone-implant interface. This technology will contribute to improved understanding and treatment of osteoarthritis of the knee by combining 3-D computational modeling and cadaveric mechanics testing of femurs surgically treated with implants. He hopes to apply such studies to other medical conditions, physical trauma, and bone injuries.





Zoë Roberson-Zetina is from Belmopan, Belize. She earned her bachelors degree in business administration from the University of Belize, Belmopan campus, in 2006. Her research will look at the spatial shifts in the U.S. potato industry to address the effects of and the extent to which variables such as land and water availability, location, environmental regulations and transportation affect the spatial shifts and structure of processing and production in the industry. After she has completed her master's degree at NDSU, Roberson-Zetina plans to return to Belize to find a position within the government sector to assist in the development of Belize.

Masters Students – Civil Engineering



Jason Baker is an associate research fellow with the Advanced Traffic Analysis Center working in the areas of traffic operations and intelligent transportation systems. He previously worked with the center as an undergraduate research assistant. His work focuses on data collection procedures and enhanced traffic analysis through the use of advanced traffic sensors. Baker is currently working on his master's degree in civil engineering.

An additional seven students are enrolled in the transportation option in the NDSU civil engineering master's degree program. The students are: Tahsina Alam, Geas A. Bulbul, Sunil Gyawali, Scott Hagel, Amy Hardy, Jan Linnemann, and Nilesh Paliwal.

South Dakota State University

Dr. John Ball is part of the Department of Horticulture, Forestry, Landscape & Parks. He earned a B.S. in forest management from Michigan Technological University. He earned a M.S. and Ph.D. in forest entomology from Michigan State University. His areas of research interest include the influence of urban development on forest fragmentation; the influence of tree cover on residential heating and cooling cost; the competitive relationships between ornamental trees and turf grasses; and industry training opportunities such as utility line clearance electrical hazards, logger education to advance professionalism (LEAP), and plant health care for arborists.

Dr. Allen Jones is an associate professor in the Department of Civil & Environmental Engineering. He earned his B.S. and M.S. in geological engineering, geotechnical option from University of Idaho. He earned his Ph.D. in civil engineering from the University of Washington. His research interests include the following: probabilistic seismic hazard assessments, liquefaction induced ground damage, paleoliquefaction, time series analysis, probability and spatial statistics, lateral earth pressures and earth retaining structures, abandoned mine lands (AML) reclamation, AML data integration, and mine subsidence.



Dr. Hesham Mahgoub joined the Department of Civil and Environmental Engineering at SDSU as an assistant professor soon after the university became a partner in MPC. His previous research work includes virtual commercial vehicle inspection stations, sustainable infrastructure development for rural communities, pavement materials and construction, infrared technology in pavement evaluation, and recycled materials properties. Before joining SDSU in August 2006, Mahgoub was a visiting professor at the University of Central Florida in Orlando from 2001 until 2006. Dr. Mahgoub has a B.S., M.S., and Ph.D. degrees in civil engineering, all from the Cairo University, Egypt.

Dr. Arden Sigl is a professor in the Department of Civil & Environmental Engineering. He received his B.S. and M.S. in civil engineering. He earned his Ph.D. in civil engineering from Northwestern University. His research has been in areas relating to concrete materials, high performance concrete, instrumentation and assessment of the performance of full scale structures, non-linear structures, and structural stability.

Dr. Ali Selim is director of the South Dakota Local Transportation Assistance Program and professor of Civil and Environmental Engineering at South Dakota State University. In Selim's 30 years of experience, he has taught courses in highways and traffic engineering; bituminous materials; transportation engineering; highway capacity analysis; pavement management and rehabilitation; and statics. His research interests include: low-volume roads, gravel roads maintenance and design, asphalt mix technology, geometric design of roads and traffic accident investigations. Selim earned a B.S. from Ain-Shams University, Cairo, Egypt. He received his M.S. and Ph. D. from the University of Missouri-Rolla.





Dr. Francis Ting is a professor in the Department of Civil & Environmental Engineering. He earned his B.S. in civil engineering from the University of Manchester Institute of Science and Technology. He received his M.S. and Ph.D. from the California Institute of Technology. His research interests include breaking waves, fluid turbulence, sediment transport, bridge scour, and open-channel hydraulics.

University of Utah

Dr. Paul J. Tikalsky is professor and chair of the Department of Civil & Environmental Engineering. He joined the University of Utah in that position in 2006. Previously he was professor of Civil and Environmental Engineering at Pennsylvania State University, deputy director of the Pennsylvania Transportation Institute at Penn State; senior research fellow at the Czech National Academy of Sciences, and associate professor of civil engineering at Santa Clara University. He is a registered professional engineer in the State of California and a Fellow of the American Concrete Institute (ACI). He received his B.S. degree in civil and environmental engineering from the University of Wisconsin at Madison and his M.S. and Ph.D. degrees in structural engineering from the University of Texas at Austin. Tikalsky's research is in the area of the development and implementation of higher durability concrete structures and the use of admixtures and supplementary cementitious materials.

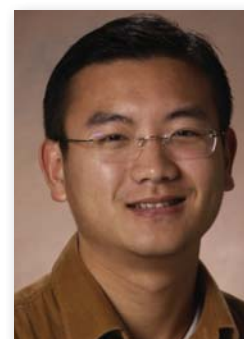
Dr. Aleksandar Stevanovic, is a post-doctoral research associate at the Utah Traffic Lab. He earned his B.S. degree in transportation and traffic engineering from the University of Belgrade in Serbia. He earned his M.S. and Ph.D. degrees in civil and environmental engineering from the University of Utah. At the University of Utah he has been involved in research on traffic management through the use of traffic signal control systems, high occupancy vehicle lanes.

University of Wyoming

Dr. Michael Barker is a professor of civil engineering. He specializes in steel bridges and bridge engineering and also does experimental and field testing. Barker's research centers on bridge serviceability and performance. Barker received his B.S. in civil engineering from Purdue University. Also at Purdue, he earned his M.S. in civil engineering. He received his Ph.D. in civil engineering from the University of Minnesota.



Dr. Thomas V. Edgar works with flow, deformation and pollutant migration in saturated and unsaturated porous media, slope stability and expansive soils. An associate professor in the College of Engineering, Edgar recently worked with soil additives for unpaved road stability and long-term maintenance, investigated effects of freeze and thaw on highway soils, studied protection of wellhead areas for public water supplies and conducted research on consolidation of partially saturated soils due to applied stress, moisture and thermal gradients. His B.S. degree is from the



Hai Zeng expects to finish his Ph.D. in 2008. Zeng does research on the use of Radio Frequency Identification (RFID) in pharmaceutical loss management, as well as research on long-term pavement performance. Zeng earned his B.S. at the Guilin University of Electronic Technology in June 2003, and went on to earn his M.S. from NDSU in 2006. Zeng hopes to work at a logistics and supply chain consulting firm dealing with logistics and supply chain design and optimization or work with the applications of RFID.

Masters Students – Agribusiness and Applied Science



Asnan Afrasiab is currently working on his M.S. in agribusiness and applied economics. He is expected to finish in 2007. He earned his B.A. in political science and mathematics from the University of Punjab in Pakistan in 2001. He earned a B.A. in economics in 2003 from Concordia College in Moorhead, MN. Afrasiab is researching the role of transportation in trade diversion and trade creation effects of regional preferential free trade agreements. He plans to pursue a Ph.D. in international trade and economics and would like to work in the area of fiscal planning and international trade.



Steven Condon is from Clara City, MN. He graduated Summa Cum Laude with his B.A. in international business and Spanish, from Buena Vista University in Storm Lake, IA. He is currently analyzing data from 124 major trucking firms from 1999-2003 to determine which firms were most efficient and identify reasons for the lacking firms' inefficiencies. Last summer, Condon worked in the U.S. Embassy in Costa Rica.



Jian Gong is working on his M.S. in agribusiness and applied economics. He received his bachelor of economics degree with a specialization in finance in 2002 from Fuzhou University in China. He worked as a marketing analyst with the China Construction Bank from 2003 to 2005 and was a junior stock analyst with Xingye Securities Exchange from 2002 to 2003. As a research assistant at NDSU since 2005 he has been involved in research to assess the impact of rising energy prices on agricultural fuel demand and the farm product cost structure in the United States.





David Ripplinger is a researcher at the Upper Great Plains Transportation Institute in the areas of community transportation systems, intelligent transportation systems, student transportation and public transportation economics. Ripplinger received his B.S. from North Dakota State University in 2001, and his M.S. from Iowa State University in 2003. Ripplinger was awarded a scholarship from the Transportation Research Forum in 2006.



Marc Scott hails from Trinidad and Tobago. He received his B.S. in business economics and an M.S. in transportation from South Carolina State University. Scott's research interests include: international logistics, supply chain management, transportation planning and policy, and strategy. In the future, he hopes to pursue a career in business, consulting, and research.



Meera Singh is researching the logistical and economic implications of increasing highway congestion. She received a B.A. in economics from Banaras Hindu University, India, in 1993 and her M.A. in economics from Ch. Charan Singh University, India, in 1995. She also received her M.S. in statistics from NDSU in 2003. Upon completion of her Ph.D., Singh plans to work as a transportation analyst and planner in transportation and logistics.



Napoleon Tiapo earned his Ingenieur Agronome (a five-year post-graduate degree with concentration in agricultural economics) from the University of Dschang in Cameroon in 1993. At NDSU, Tiapo earned his M.S. in agribusiness and applied economics in 2002. Tiapo's research interests include transportation and economic development, the environment and investments in transportation infrastructure and the impact of social and economic returns. Tiapo plans to pursue a career in research and teaching, the private industry or promoting development-related issues with an international organization.

University of Colorado and his M.S. and Ph.D. are from Colorado State University, all in civil engineering.

George Huntington works with the Wyoming T²/LTAP Center where he has taught workshops on erosion and sediment control, soils, work zone traffic control, pavement design and other topics. He has also worked extensively on the Center's asset management project. Huntington received his bachelor's and master's degrees in civil engineering from the University of Wyoming. He spent eight years with WYDOT, including five years as a materials engineer in Cheyenne and three years as a project engineer in Sundance and Rawlins.



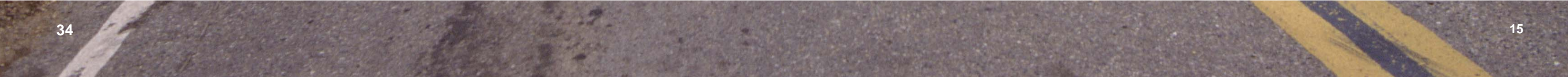
Dr. Jay A. Puckett is a professor of civil engineering and a licensed engineer who has worked in research and development for 22 years. He was a subconsultant in the development of the LRFD Bridge Design Specification. Puckett has conducted numerous research projects in the area of software development and physical testing of bridges and bridge components ranging from lightly reinforced bridge decks, fiber-reinforced approach embankment fills, asphalt joints, temperature effects and wood girders. Software development efforts include analysis, design and rating tools for steel, concrete, pre-stressed concrete and wood. He has been honored with research, graduate teaching and Most Outstanding Professor awards. His B.S. degree is from the University of Missouri and his M.S. and Ph.D. degrees are from Colorado State University, all in civil engineering.



Dr. Eugene M. Wilson is professor emeritus of civil engineering and past program coordinator for the Mountain-Plains Consortium – Rural Transportation Research Program. Since 1975 he has been a traffic engineering consultant working with both private and public sectors. Wilson is nationally certified as a Professional Traffic Operations Engineer. Named the 59th honorary member of ITE's international board of directors, he also earned the ITE Lifetime Achievement Award for the Colorado-Wyoming section. His B.S. and M.S. degrees were earned at the University of Wyoming and his Ph.D. is from Arizona State University, all in civil engineering. Iowa, Wyoming, and Colorado awarded him status as a professional engineer.



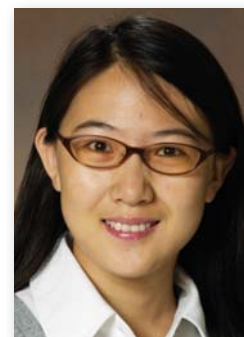
Dr. Cenk Yavuzturk is an assistant professor of architectural engineering. His research interests are in HVAC-R equipment and systems, thermal systems modeling and simulation, ground source heat pumps, building energy analysis and energy management and building thermodynamics. He holds a Ph.D. in mechanical engineering from Oklahoma State University and a Diplom Ingenieur in energy and processing engineering from the Technical University of Berlin, Germany.





Dr. Rhonda K. Young is an assistant professor of Civil Engineering. Her research interests include transportation decision-making, statewide multimodal planning, and freight transportation. Her research efforts in transportation decision-making and multimodal planning stem from her work with the Washington State Department of Transportation in developing a computer-based tool to aid in funding decisions entitled Multimodal Investment Choice Analysis (MICA). Young's general interests in this area focus on methods to increase the efficiency of agency spending towards transportation infrastructure. Her work in the area of freight transportation deals with freight mobility issues and how freight

transportation stakeholders can be brought into the statewide planning process. She received her bachelor degree in civil engineering from Oregon State University, masters and Ph.D. degrees in civil engineering from the University of Washington, and has a graduate certificate in transportation, trade, and logistics (GTTL) from the University of Washington.



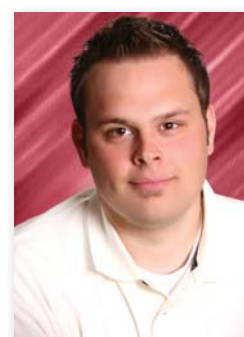
Pan Lu earned her B.S. at North China Electric Power University in 2002. Her research focuses on transportation and logistics and snow removal.



Subhro Mitra has been working as a graduate research assistant at the Upper Great Plains Transportation Institute since 2003. He received his B.S. in civil engineering at North Bengal University in India in 1993 and an M.B.A. at the Indian Institute of Social Welfare and Business Management in India in 1997. Currently, he is working on his Ph.D. in transportation and logistics at North Dakota State University. In his research at UGPTI, Mitra focuses on the development of statewide freight modeling, optimizing logistics networks for the agricultural industry and capacity assessments for the railroad network.



Diomo Motuba of Buea, Cameroon, earned his M.S. in agribusiness and applied economics from North Dakota State University, and may pursue a career in teaching or research. Motuba received his B.S. in botany from the University of Buea in Cameroon in 2000. At the UGPTI, Motuba researches freight transportation planning and the development and incorporation of freight into transportation planning models. In addition, he researches the use of GPS technology and logistics in improving planning models.



Jamie Paurus of Frazee, MN, is researching supply chain management. Paurus earned his B.S. in university studies in 2003 at NDSU. In 2005, Paurus received his master's of business administration also from NDSU. In the future, Paurus will continue teaching at Valley City State University, Valley City, ND, in the Business and Information Technology Division.





Thomas Flanagan received his B.S. from the United States Air Force Academy in Colorado Springs, CO. He also received a M.B.A. from Chapman University in Orange, CA. He earned an M.S. in global supply chain management from the University of Alaska at Anchorage. Flanagan does research at the UGPTI on remote logistics, remote disaster response, business development, military logistics and global air logistics. In the future, Flanagan hopes to research the impacts and implications of transportation and logistics availability on the quality of life of remote arctic communities. In addition, he would like to help the development of Alaskan businesses by lowering rural logistic costs. Finally, by teaching he hopes to help students reach their full potential.



Weijun Huang of Zhangjiagang, China, received his M.S. from North Dakota State University in 2004. Prior to that, Huang studied at the University of Oklahoma City, where he received his M.B.A. In China, Huang received his B.S. in engineering at Zhengzhou Grain University. Huang is interested in researching motor carriers, logistics and economic development, grain logistics and regional economic development. His goal is to be a researcher or consultant in transportation or logistics.



Poyraz Kayabas of Ankara, Turkey, received a B.S. in mathematics and computer science and another B.S. in industrial engineering from Cankaya University in Ankara, Turkey, in 2003. He moved to Fargo, ND, in 2004 and in 2007 completed his M.S. in industrial engineering and management at NDSU. Kayabas is interested in supply chain management and optimization.



EunSu Lee received his B.S. in computer engineering from Kwandong University in South Korea in 1996. Lee received his M.B.A. from Hanyang University, also in South Korea, in 1999. Currently, Lee is working on his M.S. in industrial engineering. Lee conducts research at the UGPTI in the areas of multimodal routing, logistics network simulation and aviation planning. After graduation, Lee plans to work as a consultant to enhance business or work for other institutions as a researcher.

Director's Summary

Fiscal-year 2006-2007 was MPC's first year of the new federal highway bill, SAFETEA-LU and marked our successful recompetition within the University Transportation Centers Program. This success is both an endorsement of our past success and a challenge to continue to build effective education, research and technology transfer programs.

Our MPC program was strengthened this year by the addition of South Dakota State University. The addition of the program at SDSU will add substantially to our ability to address transportation problems and opportunities in our region.

A significant effort during this year was the drafting of our strategic plan. With the input of our Advisory Board and review from the USDOT, we are confident this document will be an effective guide for our efforts during the rest of the SAFETEA-LU grant period. The plan outlines specific plans under MPC's theme and vision established last year with input from the new advisory committee. The consortium's theme is "Safe, Mobile, and Sustainable Freight and Passenger Transportation Systems in the Mountain-Plains Region." The theme reflects USDOT's strategic goals as well as the unique characteristics of the region. The stated vision of the consortium is "To be a leader in transportation by promoting its critical importance to economic viability and quality of life through research, distance learning, and interdisciplinary education, while serving the unique and critical needs of the Mountain-Plains Region."

The strategic plan is a roadmap for our efforts in the coming years. The goals and benchmarks of the plan will make certain that our efforts are aligned with the goals of the USDOT as well as the needs of our region as expressed by our advisory board. The strategic plan was reviewed and approved by the USDOT's Research and Innovative Technology Administration. The review team gave the plan excellent reviews, especially in relation to research selection and performance processes. The strategic plan is available on the MPC website at www.mountain-plains.org/pubs/pdf/strategicplan.pdf.

As always, faculty and staff involved in MPC programs will continue to be our key strength. This report documents their efforts in researching innovative ideas, reaching out to industry and educating the transportation professionals of tomorrow. We expect that they will continue to meet and exceed the goals and benchmarks outlined in our strategic plan.

MPC published 11 new peer-reviewed reports and offered 57 graduate level transportation courses at four universities. Additional courses in civil engineering, economics and business were offered by the participating academic departments.





Some additional highlights from the past year include:

- The MPC and the Transportation Learning Network have launched a four-state initiative to provide technical training to department of transportation professionals. The Transportation Learning Network is already tailoring its offerings to meet needs identified by the DOTs. A series of concrete seminars has been launched and several technical presentations are offered.
- The Wyoming T² Center, in cooperation with the Local Government office of the Wyoming Department of Transportation and the MPC, is providing assistance to several counties experiencing considerable impacts from drilling activities, particularly coal bed methane drilling. This three-year project will develop an asset management program that would quantify the damage being done by the influx of drilling traffic, as heavy trucks associated with the drilling are damaging many of the county roads in the state.
- MPC was a sponsor of the North Front Range Transportation Choices Summit held June 13 in Windsor, CO. The regional gathering helped identify priorities for the future transportation system of the region. A regional transportation authority would build on the summit's initial work to establish priorities and find resources to address the region's transportation issues.
- An MPC-funded project at North Dakota State University will give road planners for the nation's Indian reservations tools for assessing and planning their road systems. Researchers are taking the database of the IRR network and converting it into a format that is compatible with the analytical tools used by state and federal agencies to evaluate their roads.
- PTV America, a leading multi-disciplinary transportation software and consulting firm announced a new partnership with the Utah Traffic Lab. PTV America has donated software with a commercial value of \$560,000 for training the next generation of transportation engineers. The software is the leading tool in more than 75 countries and allows University of Utah students and faculty to work with some of the most advanced technologies in the world.
- Colorado State University researchers are exploring whether wood or other biomass materials may be used in crash barriers. They are evaluating, constructing and testing crash barriers composed of low-diameter wood or biomass elements that are inexpensive, easily replaced, and that yield significantly under external loads.



Junwook Chi's research interests include economic characteristics of the airline industry and strategic freight analysis. Chi's work at the Upper Great Plains Transportation Institute has included a study on airfare differences between small and metropolitan areas and a study on the evaluation of the viability of intermodal facilities. Chi received his B.S. in forest resources from Kon-kuk University in South Korea in 1998 and an M.S. in agricultural economics and business from the University of Guelph in Ontario, Canada, in 2002. Also in 2002, he received the Outstanding Master's Thesis Award from the Canadian Agricultural Economics Association.



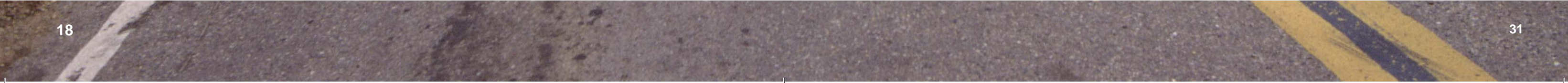
Alan Dybing is a researcher at the Upper Great Plains Transportation Institute focusing on the areas of regional economic impacts of transportation infrastructure investment in North Dakota and on modeling intermodal facility locations. Dybing received his B.S. in agricultural education from North Dakota State University in 1999, followed by his M.S. in 2002. Currently, Dybing is working on his doctoral dissertation.



Chris Enyinda of Huntsville, AL, is finishing his second Ph.D. Enyinda received his M.S. in economics with an option in management and an M.B.A. in management both from Alabama A&M University, Huntsville. Enyinda then went on to receive his first Ph.D. in applied agricultural economics with primary concentration in marketing and price analysis and secondary concentration in logistics and transportation in 1995 from the University of Tennessee, Knoxville. Enyinda's research focuses on "Modeling Risks Management in the Global Pharmaceutical Supply Chain Logistics." Enyinda hopes to provide insight to better understand the risks and vulnerabilities that can disrupt global pharmaceutical manufacturing supply chain logistics. Upon completing the Ph.D. program, he will return to teaching, research/publishing, and consulting in the area of transportation, logistics and supply chain management for Alabama A&M University.



Lei Fan is working to finish his Ph.D. in transportation and logistics. In addition, Fan researches material handling, warehousing and grain terminal engineering. He is interested in modeling border crossing, port terminal trip generation and strategic planning for supply chain systems. He earned his B.S. in engineering at Zhengzhou Grain College, now known as Henan University of Technology, in China. In 2005, Fan received his M.S. in engineering from the University of Manitoba in Canada. In the future, Fan wants to conduct consulting work in transportation and logistics engineering with a focus on research, design and evaluation of engineering projects.

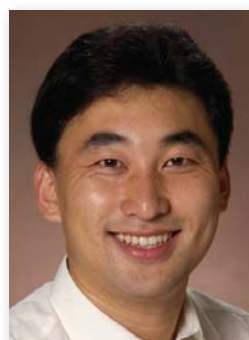




North Dakota State University – Ph.D. Students



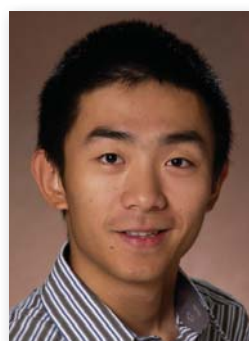
Charles Briggs of Abonnema, Nigeria, is pursuing a concentration in transportation economics and regulation, and a possible second concentration in logistics and supply chain management. His research will primarily focus on the challenges facing the multinational petroleum industry supply chain. He received his B.B.A. in international business from Schiller International University in London, England. In 1986 he received his M.S. in economics from Alabama A&M University, with a concentration in finance. Upon graduation, Briggs was employed by the university to teach in the Department of Economics. Upon completing the Ph.D. program in transportation and logistics, Briggs will return to Alabama A&M University to continue his teaching career.



Hua Chen is a graduate student researching logistics and supply chain management and intermodal freight transportation planning. Chen earned his B.S. in economics at Renmin University of China, Beijing, in 1999. He earned an M.S. in management from Northern Jiaotong University, Beijing, in 2002.



Ieelong (Peter) Chen of Kaoshiung City, received his M.B.A. from California State University in Carson, CA, in 1999. Chen became interested in supply chain management when he noticed the distribution system in Taiwan suffering great changes due to manufacturing firms moving their production lines to other countries, where the labor cost is low. He is interested in how to apply radio frequency identification (RFID) technology and integrate it with the current information system to improve the efficiency of the distribution. He is especially interested in studying new supply chain management theories.



Xianzhe Chen is working to finish his Ph.D. and expects to graduate in 2007. Chen received his B.S. in automation and business administration from the Wuhan University of Technology in China in 2003. He came to NDSU, earning an M.S. in industrial engineering in 2006. Chen is interested in researching quality, logistics and supply chain management, forecasting, and time series. Chen and Dr. Canan Bilen-Green presented their findings on the “Evaluation Methods for Autocorrelated Processes” at the 2006 Industrial Engineering Research Conference in Orlando, FL.

Research

Wyoming Research Helps Counties Determine if Roads are Legally Established

With MPC support, the University of Wyoming is helping Wyoming county officials determine if rural roads were legally established.

By one estimate, Wyoming county road and bridge supervisors know only 30 percent of the time whether rural roads were legally established. Addressing that question requires that two issues be addressed: First, when and how was the road established? Second, what were the legal requirements for establishing a county road at the time and were those procedures followed?

The University of Wyoming received research funding from MPC and the Wyoming Department of Transportation to explore those issues. This project provides information to all county road programs on how to legally establish a county road in Wyoming and also how the laws have changed over the years. The history of Wyoming laws is important for Wyoming counties because the roads that were established in past years must have been created according to the laws in that year or they were not legally established.

The research was completed by Stacey Obrecht, a UW law student with an interest in rural transportation issues. She collaborated with UW College of Law professor, Alan Romero and T²/LTAP Director Khaled Ksaibati. She conducted research on the designation and development of county roads in Wyoming during the 20th century. As part of this research, UW distributed a statewide survey and received excellent feedback from all counties. In addition, UW updated and distributed a report entitled “Important Wyoming State Statutes Relating to County Highways.” The report is available online at the T²/LTAP Center’s website: www.eng.uwyo.edu.

Half of the funding for the project was provided by the Local Government Coordinator Office of the Wyoming Department of Transportation. In addition, this project has received support from the University of Wyoming College of Law.

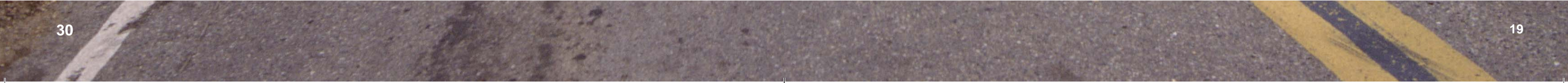
Workshops on the topic were held Feb. 28, March 1 and March 2 in Douglas, Riverton and Rock Springs.

Asset Management for Local Agencies

The Wyoming T² Center, in cooperation with the Local Government office of the Wyoming Department of Transportation and the MPC, recently initiated an effort to provide assistance to several counties experiencing considerable impacts from drilling activities, particularly coal bed methane drilling.

This three-year project will develop an asset management program that would quantify the damage being done by the influx of drilling traffic, as heavy trucks associated with the drilling are damaging many of the county roads in the state. The Wyoming counties of Johnson, Sheridan and Carbon are cooperating in the project.

The program is a GIS-based system that stores information about county road networks. Road surface conditions are kept for one-mile segments of all roads maintained by the counties. In





addition, the organizations inventoried and evaluated signs, culverts, cattleguards, approaches, and bridges.

The GIS software allows the organizations to plot various features of the road network. By comparing conditions and maintenance expenses on roads carrying drilling traffic with other roads, the damage done to county roads can be quantified.

Beyond evaluating the effects of drilling activities, the system provides the counties with a system similar to those developed for asphalt and concrete roads. These systems allow managers to predict the overall road network condition at various funding levels. A related project developing performance curves for gravel roads will provide the models needed for these predictions.

Simple applications might include generating a map identifying all the culverts that need to be cleaned; mapping all the 36-inch stop signs; or providing a count of 16-foot cattleguards with timber bases. More sophisticated analyses will allow for better decision making, such as evaluating the initial cost of higher quality gravel compared to the long-term costs of maintaining gravel roads built with lower quality gravel.

Data is collected by teams driving county roads with a laptop computer and a global positioning system (GPS) receiver. The teams generate maps of the county roads. In subsequent years the condition of one-mile segments will be entered into the GIS database.

For example, gravel roads are rated for their overall condition, top width, crown slope, loose aggregate, potholes, gravel quality and sufficiency, washboards, rutting, drainage and dust. In addition, digital photos are taken at each segment and of each feature. With this information, county employees are provided with a comprehensive and flexible view of their county road network.

Some findings of this project were presented at the Transportation Research Board Meeting (TRB) early in 2007. At the conclusion of this pilot study, the University of Wyoming will work with WYDOT to transfer the knowledge learned from this project to other interested counties.

NDSU Work Will Help Indian Reservation Road Planning

An MPC-funded project at North Dakota State University will give road planners for the nation's Indian reservations tools for assessing and planning their road systems.

Indian reservations in the United States have a road network of about 50,000 miles. About half of those miles are under the jurisdiction of state, federal and local highway agencies. The remaining 25,000 miles are controlled by the U.S. Bureau of Indian Affairs and are referred to as the Indian Reservation Roads (IRR) network.

“We are taking the database of the IRR network and converting it into a format that is compatible with the analytical tools used by state and federal agencies to evaluate their roads,” notes Doug Benson, the Upper Great Plains Transportation Institute researcher leading the effort. “Our goal is to make those analytical tools available to tribal highway planners so they can use them to evaluate and plan their highway networks.”



Steven Vander Giessen began work on his master's degree in 2006 after completing his bachelor's degree in civil engineering at the University of Wyoming. As an undergraduate, Vander Giessen worked for the Wyoming Department of Transportation in its Laramie Design Squad. While at Wyoming, he worked on several research projects including studying the impacts of the Togwotee Pass construction project on local businesses and a project to determine the effectiveness of a wildlife detection and driver warning system at Trapper's Point. Steven completed his master's degree in the summer of 2007 and has recently started a position for CH2M Hill in Honolulu, HI.



Chris Vokurka began his master's program in 2005. Vokurka graduated from Colorado State University with his B.S. in civil engineering in the spring of 2004 and came to the University of Wyoming after working as a consultant. Vokurka's research topic was in the area of animal-vehicle crashes and his work focused on determining the affects that roadway reconstruction projects have on animal-vehicle and total crash rates. He completed his master's work in the spring of 2007 and has since taken a position with Drexel, Barrell & Co. in Boulder, CO, in the Transportation and Traffic Engineering Division.

Benjamin Weaver is studying the implementation of asset management systems in three Wyoming counties as part of his M.S. degree program. He earned a B.S. in civil engineering from the University of Wyoming in 2004 and an A.S. in engineering from Laramie County Community College in 2002. He is a member of Tau Beta Pi honor society and was named to the UW Dean's Honor Roll.

Christopher Wolffig earned his B.S. in civil engineering from the University of Wyoming in 2003. He is pursuing his M.S. in civil engineering. He is studying highway construction impacts on Wyoming businesses, focusing on traffic volume, tax revenue, commercial property data and data from surveys of business owners and engineers. He is comparing actual economic data to perceived data from surveys. Wolffig served as the ITE student chapter vice president and plans to pursue a career in civil engineering.



Cheng Zhong started his master's program in 2006. He graduated from Nanjing University of Technology, China, with his bachelor's degree in computer science and technology in the summer of 2004. In 2006, Zhong worked on a Wyoming county roads survey of roadway classification systems and minimum geometric standards. His research will focus on traffic volume data collection and estimation for rural roads in Wyoming.





Michelle Edwards will begin her master's program in January of 2008 after completing her B.S. degree in civil engineering at the University of Wyoming in December 2007. As an undergraduate, Edwards worked for the Wyoming Department of Transportation in its Laramie Design Squad for two years. Her research will focus on developing a decision-support system for dynamic message signs for the I-80 corridor between Laramie and Cheyenne.

Vinod Kumar Sunchu Keshava received his B.E. degree in chemistry from the Regional Engineering College in Tiruchirappalli, India. He ranked first in his class in the chemistry curriculum. He worked as a research student at the University of North Carolina in Charlotte on the Duke Power Project studying the leachability of fly ash. At the University of Wyoming he is working as a graduate researcher studying Wyoming freight movement and wind vulnerability. He plans to pursue a career that will use his knowledge and skills in the fields of design, planning and transportation.

Joel S. Liesman is investigating freight movement and commodity flows in Wyoming while pursuing his M.S. degree in civil engineering. He will also analyze accidents involving trucks and will identify infrastructure critical to freight movement. He earned his B.S. in civil engineering from Colorado State University in 2003, graduating cum laude. He is a member of the Tau Beta Pi and Chi Epsilon honor societies. He received the CSU Civil Engineering Achievement Award in 2003. He is planning a career in design and planning improvements to the transportation infrastructure.



Richard Price began in the Quick Start Master's program at the University of Wyoming in January of 2007, while completing his bachelor's degree. As an undergraduate, he assisted in testing laminar wood joists and led the design and construction of the AISC-ASCE student steel bridge. Price's research topic is to establish a link between wind power maps and fatigue design of traffic signal and variable message structures, and then suggest specification modifications from the results of the findings. Price should complete his master's program in the spring of 2008.

Shiva Rama Krishna Sayiri is studying moisture susceptibility of bottom ash asphalt mixes using bottom ash from power plants. He earned his B.E. degree from Muffakham Jah College of Engineering and Technology near Hyderabad, India, in 2002.

The data used in the effort includes numerous engineering specifications including information on road and shoulder width, road surface and condition as well as strength. Additional data on safety issues and the amount of traffic are also considered.

"Currently we're completing the preliminary analysis of the IRR database and comparing it to the data requirements of HERS-ST (Highway Economic Requirements System – state version), one of the primary analytical tools used by highway planners," Benson says. That comparison will help the researchers identify the data adequately supplied by the IRR database as well as data that are inadequate for use by HERS-ST. The next step in the project will be to develop software to address those inadequacies and convert the IRR data to data usable by HERS-ST and other tools.

"The asset management capabilities provided by these tools is critical to having a road network that meets needs in a cost-effective manner and allows for growth and planning," Benson says. Road planners use analytical tools to evaluate remaining life of roads, to prioritize repair and reconstruction projects, to assess safety concerns and to develop plans for road and highway investment.

The project was launched last summer and a prototype of the conversion software was completed in 2007. The project is being conducted with guidance from the USDOT's Asset Management Division, Federal Lands Highway Division, and Federal Highway Administration.

CSU Researchers Examine Flexible Guardrails

Colorado State University researchers are exploring whether wood or other biomass materials may be used in crash barriers.

The overall objective of the project is to evaluate, construct and test crash barriers composed of low-diameter wood or biomass elements that are inexpensive, easily replaced, and that yield significantly under external loads.

Most existing crash barriers perform well, providing good overall protection, but often exert large forces on both the vehicle and occupants. The CSU research will examine prototypes of three-dimensional "soft" wood element networks that will provide the necessary impact resistance while undergoing large deformations to soften the impact on vehicles and their occupants.

The project is directed by Paul Heyliger, CSU professor of civil engineering, and C.J. Riley, a Ph.D. student in structural mechanics. Riley earned his M.S. from CSU and spent two years with the Wyoming Department of Transportation developing design software for transportation structures.



Jordan Jarrett and David Sawahata use an Instron testing machine to test a wood-dowel-based model to failure in compression. The models are a preliminary examination of using wood or biomass materials as flexible bending or compression members.





Research assistants on the project include two civil engineering undergraduate students: Jordan Jarrett and David Sawahata. Jarrett is a senior who plans to go to graduate school at CSU to study structural and mechanics engineering. Sawahata is also a senior and participated in an internship coordinated by the MPC where he worked with the Wold County Public Works department.

University of Wyoming Launches Transportation Safety Evaluation

The University of Wyoming recently secured funding for a new study entitled: “A Comprehensive Transportation Safety Evaluation Program in the State of Wyoming.” The main objective of the research is to develop and evaluate transportation safety techniques that can help Wyoming agencies reduce crashes and fatalities on rural roads. The MPC is providing half of the funding while matching funds were obtained from the Wyoming Department of Transportation (WYDOT).

The federal transportation bill, SAFETEA-LU, requires state department of transportation agencies to address safety on local and rural roads. It is important for state, county, and city officials to cooperate in producing a comprehensive safety plan to improve safety statewide. The new legislation provides an opportunity to implement a more cohesive and comprehensive approach to local road safety in Wyoming. The University of Wyoming supports road safety efforts through its existing activities which include: training classes, newsletter publication, information dissemination, and technical assistance. The University of Wyoming can provide additional services to help WYDOT, as well as Wyoming counties and cities, in identifying low-cost safety improvements on high-risk rural roads statewide.

In this project, safety techniques and methodologies will be developed to identify and then rank high-risk locations on all rural roadways in Wyoming. What makes this project unique is the high percentage of gravel roads at the local level in Wyoming. The evaluation procedure developed will be based on roadway classification as well as surface type (paved versus unpaved).

As part of this study, a Local Road Safety Advisory Group has been established. The group includes representatives from: WYDOT, Wyoming LTAP, Wyoming Association of County Engineers and Road Superintendents, Wyoming Association of Municipalities, and FHWA. The group met in February and approved the general outline for this study. Three counties will be included in the first phase of this study. All other counties will be invited to participate in future safety evaluations. A transportation safety engineer, Jim McGrath, has been hired to help in performing the study. McGrath will communicate with all the project partners across the state while he performs the tasks associated with this project. The findings of the study will be presented at regional and national meetings and conferences.

systems, the reliability of macroscopically optimized timing plans through microsimulation, and is developing a forecasting model for managed lanes using data from Utah’s high occupancy vehicle (HOV) lanes.

Jelka Stevanovic is investigating traffic control signal settings optimization using genetic algorithms and is working on modification of the program so that it can be applied to a real network rather than a model network. She is a student at the University of Utah in civil and environmental engineering and is working on her M.S. degree in transportation. She graduated with her B.S. degree in 2003 in mathematics and informatics, at the University of Novi Sad, Serbia. Stevanovic is a research assistant at the Utah Traffic Lab.



Ivana Vladislavljevic received her B.S. degree at the Department of Transportation and Traffic Engineering at the University of Belgrade, Serbia and Montenegro. She began her graduate studies at the Department of Transport and Traffic Engineering, at the University of Belgrade where she was awarded a scholarship for “young talents.” She is continuing her graduate work at the University of Utah and is currently a research assistant at the Utah Traffic Lab. She is investigating the impact of the cell phone conversation on traffic flow using microsimulation software VISSIM, and has won the Intermountain Section Student Paper Contest and the District 6 Student Paper Competition for her research in this area.

University of Wyoming

Kamrul Ahsan is working toward his second M.S. in civil engineering. The first he earned from the Bangladesh University of Engineering and Technology. He also holds an M.S. in computer science from Montclair State University in New Jersey. He is studying soil stabilization of the subgrade and the effect of different agents on that process. He is also studying dust control. He plans to work as a transportation engineer in design or research. He was recognized for excellent performance as a teaching assistant at Montclair State.

Steven Carter received his M.S. in civil engineering in 2004. He helped the Wyoming Department of Transportation study the effectiveness of crack surfacing material for asphalt pavements including the performance of thermal stress restrained specimen test, data collection and statistical analysis. He also earned his B.S. in civil engineering from the University of Wyoming. He is a member of the Tau Beta Pi Engineering Honor Society and is a registered engineer-in-training for the state of Wyoming.





Giang Lam To is a graduate research assistant in civil engineering, pursuing a doctoral degree. His research interest is in advanced structural modeling of layered composite wood-concrete systems. To is studying time dependent behavior and rheological phenomena under structural loading, including creep, shrinkage, swelling, humidity, mechano-sorptive effects, etc. He completed his M.S. degree in 2001 at the University of Transport and Communications in Hanoi, Viet Nam. His thesis was “Programming to Analyze Girder System with Arbitrary Boundary under Lateral Load by Finite Element Method.” He is attending CSU in part because of a competitive based funding from his government for gifted, outstanding students.

University of Utah

Daniel Hadley graduated from the University of Utah, Salt Lake City in Middle Eastern studies in 2006. He has won various awards including the Louis and Ethel Zucker Memorial Award for excellence in the study of Hebrew, and The Marion Farouk Sluglett Paper Competition Prize for “Catholicism, France and Zionism: 1895-1904”. He will continue his education at Harvard University working towards a MTS (Master of Theological Studies) degree. Before leaving the Utah Traffic Lab, he was a research assistant and provided technical support.

Lisa Hadley attended Brigham Young University in Hawaii and earned her B.A. in English from the University of Utah. She is working toward her master of fine arts degree in creative writing. Before leaving the Traffic Lab, she was an editor.

Venkateshwar S. Jadhav was a research assistant at the Utah Traffic Lab. He received his B.S. at the National Institute of Technology in Surathkal Mangalore, India. He has left the university.

Dejan Jovanovic completed his B.S. degree at the Department of Transport and Traffic Engineering at the University of Belgrade, Serbia and Montenegro in 2005. He is working on two projects: VISUM Online and Fast Track IV (I-15 and 11400-new Interchange; I-80 State Street to 1300 East). VISUM-Online is a mesoscopic traffic flow simulation software used for prediction. It computes traffic conditions and travel times used for dynamic route guidance. The Fast Track IV project researches the impact of construction on traffic flow. Jovanovic is a research assistant for the Utah Traffic Lab.

Megan Sessions attended the University of Utah and has earned bachelor’s degrees in both mass communication and English. She is working towards her M.A. in education. She was an editor for the Utah Traffic Lab.

Aleksandar Stevanovic graduated from the University of Belgrade, Yugoslavia. He received a B.S. with honors in applied sciences and civil engineering in 1998. He earned his M.S. in civil and environmental engineering in 2003. He earned his Ph.D. from the University of Utah in civil and environmental engineering in 2005. Stevanovic is a post-doctorate research assistant professor in the Traffic Lab and has researched the deterioration of adaptive traffic control

CSU Research Evaluates Tire Rubber for Road and Bridge Construction

Researchers at Colorado State University will study the beneficial use of waste tire rubber in low-volume road and bridge construction.

As part of the effort, researchers are evaluating the mechanical properties of expansive soil-rubber (ESR) mixtures required for the mechanistic design of low-volume road embankments. Experiments are being carried out at the recently renovated Geotechnical Graduate Research Laboratory at CSU.

Information generated during this stage of the project will be used to design a typical low-volume road embankment cross-section using a computer model and provide guidelines for the construction of a pilot road section in the field.

The research is being directed by assistant professor Antonio Carraro. He has been on the faculty of CSU’s Department of Civil Engineering at Colorado State University since 2004. He specializes in experimental methods and behavior of geomaterials, geotechnical earthquake engineering, foundation engineering, and beneficial use of waste materials.

Gabriel Iltis, a Ph.D. student in the CSU Geotechnical Engineering Program, is a research assistant working with Carraro on the project. Jesus Higuera Seda is also a research assistant on the project. He is an undergraduate student in the CSU Geotechnical Engineering Program.

A paper based on part of the research, “Beneficial Use of Waste Tire Rubber for Swelling Potential Mitigation in Expansive Soils,” was presented at the American Society of Civil Engineering Geo-Denver Conference in February and will be printed in the conference proceedings. Authors are undergraduate students J.H. Seda, J.C. Lee, and professor Antonio Carraro.



Research assistants Gabriel Iltis (left) and Jesus Higuera Seda (right) working on the preparation of specimens of expansive soil-rubber (ESR) mixtures for swell-consolidation testing.

Shear Spike Research Presented

Colorado State University civil engineering professor Richard Gutkowski presented a technical paper, “Shear Spike Repair of Timber Railroad Bridge Chord Members” at the conference, Responding to Tomorrow’s Challenges in Structural Engineering. The event was Sept. 13-15 in Budapest, Hungary and was organized by the International Association of Bridge and Structural Engineers. A written paper, co-authored with Travis Burgers (former M.S. student) and colleagues Jen Balogh and Don Radford, was published in the Proceedings of the conference. The paper detailed a recently completed phase of research sponsored by MPC.



Education - MPC Students

Colorado State University



Susan Balogh is pursuing doctoral studies and research in the area of mechanics of solid wood deck systems and connections for interfacing with concrete in layered composite deck bridges. She earned an M.S. in civil engineering in 1995 from Budapest University of Technology and Economics. Presently, she is assistant professor at Metropolitan State College of Denver where she serves as program coordinator for the Civil Engineering Technology academic program. Following her M.S. degree, she was Principal Engineer and a professional structural designer for BALO, LTD., in Budapest, Hungary. Following that, she was coordinator of the testing group for INTER-CAD, LTD., a structural software development company, also located in Budapest.



John Boulden is presently conducting research on the time-dependent behavior of cambered wood-concrete beams as a predecessor to examining short span bridge system. He is an M.S.-level graduate student and was supported as a research assistant by MPC funding. Presently, he is employed at the firm of CTL Thompson Structural Consulting Engineers as a Staff Engineer, after previous experience as a field technician with that firm. Before his experience with CTL he was a Pavement Management Intern with the City of Fort Collins, CO. John was the recipient of a Computer Science, Math and Engineering Scholarship from CSU in 2002.



Thang Dao earned his B.S. in Vietnam and his M.S. from CSU in 2005 related to genetic algorithms applied to structural optimization. He is studying spatio-temporal load control on structures such as railroad bridges and has been funded by the MPC. His anticipated graduation date is 2009.

Jesse Dunham-Friel is a research assistant working with Dr. Antonio Carraro on the Expansive Soil-Rubber stabilization project at the Geotechnical Engineering Laboratory at CSU. He is pursuing an M.S. degree in civil and environmental engineering and earned a B.S. degree in civil engineering at the University of Vermont in 2007.



Henrik Forsling is an M.S. student in civil engineering. He earned his B.S. degree in civil engineering at Colorado State University in 2004 and is a member of Chi Epsilon, the civil engineering honors society. The research area for his thesis is shear spike rejuvenation of timber railroad bridge members. He is conducting full-scale laboratory tests to examine durability of the method under repeated loading. He is a graduate research assistant. In 2001-2002 he was awarded the Engineering Scholars Scholarship and in 2002-2003 the George T. Abell Scholarship from CSU. In 2003-2004 he was selected as a member of the President's Leadership Class at CSU. In 2001 he was an engineering intern with Water and Wastewater Works in Malmo, Sweden. In addition, he served as battle tank commander in the Swedish Army from 1998 to 1999.



Matthew LeBorgne is a research assistant working on various projects at the Structural Engineering Laboratory. He is pursuing an M.S. degree in civil engineering. He earned a B.S. degree in manufacturing engineering at Cal Poly State University in 2004. From 2004 to early 2006 he was general manager/design engineer for Precision on Demand, LLC, a small design and manufacturing company. He has a variety of work experience in construction ranging from apprentice to project manager positions.

Fernando Ramirez is a Ph.D. student and instructor at CSU. He earned a bachelor's degree in civil engineering from the School of Engineering of Antioquia (Colombia), and has an M.S. in civil engineering from Colorado State University. After receiving his bachelor's degree, Ramirez worked as a structural design engineer for almost ten years. His research interests are focused on the area of computational structural mechanics. Some of his current projects include low-density fibrous composites, smart materials and adaptive structures, and the mechanics of inorganic nanotubes. He was the recipient of the 2004 Chi Epsilon Gold Key Award for Excellence in teaching.



C.J. Riley received his B.S. in engineering from Swarthmore College in Pennsylvania in 2001. He came home to Colorado to obtain his Master's from CSU in 2003. After two years working with the Wyoming DOT developing design software for transportation structures Riley returned to CSU to complete a Ph.D. in structural mechanics with a focus on the numerical analysis of flexible structures.