



2003 ANNUAL REPORT

Region 8 – The Mountain-Plains Consortium

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

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The Mountain-Plains Consortium – The Universities

Colorado State University

CSU is governed by the Board of Governors of the Colorado State University System as a public land grant institution with a rural, agricultural mission. Current enrollment is more than 23,000 students. Baccalaureate degrees are offered in 55 departments in eight colleges, including agricultural sciences, applied human sciences, business, engineering, liberal arts, natural resources, natural sciences and veterinary medicine and biomedical sciences. CSU offers 40 doctoral and 61 master's degree programs. Primary transportation graduate educational and outreach activities occur in the College of Engineering, with related activities in business, applied human sciences, and natural resources. Currently, 24 faculty have capabilities and activities pertinent to transportation. Graduate courses are available in civil engineering, mechanical engineering, earth resources, business, remote sensing and construction management. The College of Business offers an MBA degree and houses the Institute of Transportation Management, which serves public and private sector organizations. A \$12 million expansion of the University Libraries recently was completed, and access is provided to more than three million items in four facilities in a modern computerized setting.

University of Wyoming

UW is a land grant institution with an annual enrollment of about 12,000 students. The university has eight colleges and offers the master's degree in 84 fields. UW's academic program features a multidisciplinary approach that expands the educational backgrounds of its MPC graduate students, and other students studying transportation areas. Supporting courses for the program are available in statistics, computer science, and management. Included, for example, are GIS training in the Department of Geography, management training in the business college, special courses and research programs that respond to the multidisciplinary needs of statewide transportation planning, analysis of recreational travel behavior and tourism, and management systems.

North Dakota State University

NDSU is a land grant institution with an annual enrollment of approximately 11,000 students and more than 800 faculty and academic staff at the central campus in Fargo. The university offers 21 doctorate and professional degree programs, 45 master's degree programs, and 76 baccalaureate degree programs. Currently, 14 graduate faculty with doctorate degrees are associated with the graduate transportation options. Collectively, these faculty members encompass a wide range of educational experience and expertise. NDSU is also part of a tri-college system, which includes Minnesota State University-Moorhead and Concordia College in Minnesota. The network promotes educational and research interchange among faculty and allows students to take courses at more than one institution for undergraduate credit.

University of Utah

The University of Utah has an annual enrollment of about 25,000 students and offers 74 undergraduate degree programs, more than 50 teaching majors and minors, and 93 graduate majors. Students are enrolled from all 29 Utah counties, all 50 states, and 102 foreign countries. There are 16 colleges. The College of Engineering is divided into seven academic departments – civil, mechanical, chemical, electrical, bioengineering, material science, and computer science – with 115 regular faculty and 180 adjunct, clinical, and research faculty. Collectively, these departments earned \$50 million in external research funding in 1998. The College of Engineering has several well-equipped laboratories specializing in structural, geotechnical, hydraulic, environmental, traffic, and materials engineering.

Milestones / 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 a subsequent re-competition during the ISTEA era, as well as the most recent competition following the passage of TEA-21.

From 1988 through 2003, MPC produced a library of 151 research reports and 40 student theses or dissertations, while attracting new faculty to the field of transportation. During 1988-2003, MPC funded 68 different principal investigators and developed or adapted 20 transportation graduate courses for delivery over the TEL8 distance

learning network. The MPC universities also continued to teach most of their preexisting 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.

The following list of milestone achievements provides only a cursory view of the cumulative accomplishments of the Mountain-Plains Consortium. This year's accomplishments add to its history of achievement and growth in transportation education, research, and technology transfer activities in Region 8.

2003

- Inaugural class of six students admitted to the Transportation and Logistics Ph.D. program
- Coordinated National Transportation Week program involving all four campuses, including TEL8 events

2002

- North Dakota Board of Higher Education approves proposal for new interdisciplinary Ph.D. in Transportation and Logistics
- Rural Transit Center established at North Dakota State University
- Colorado State University collaborates with city of Fort Collins to establish new Transportation Planning course

2001

- First NDDOT engineer graduates from the Master of Science program after completing all courses via TEL8
- NDSU curricula committee approves program plan for minor in Logistics
- MPC initiates short course program for state DOT personnel and offers two short courses via TEL8

2000

- MPC 5-year strategic plan approved

1999

- MPC universities deliver 18 graduate courses over TEL8 network under cooperative agreement
- MPC wins TEA-21 competition for Region 8
- University of Utah joins Consortium
- Memorandum of agreement signed with Southwest University Transportation Center covering education and research exchanges

1998

- 10th year program plan is approved

1997

- 9th year program plan is approved
- Started North American Educational and Research Exchange with University of Manitoba

1996

- 8th year program plan is approved
- TEL8 research seminar series started
- Research partnership established with AAR
- Cooperative agreement signed by MPC universities for annual exchange of graduate courses via TEL8
- Joint MPC-state DOT program planning committee established

1995

- MPC wins re-competition during ISTEA era
- TEL8 used to deliver 44 hours of TRB sessions to state transportation departments in Region 8
- 7th year program plan is approved
- Partnership established with ASLRA and FRA, resulting in the establishment of a national short line railroad database
- First graduate courses exchanged among MPC universities

1994

- 6th year program plan is approved
- TEL8 telecommunications network started, connecting MPC universities with state transportation departments in Region 8 and FHWA site

1993

- 5th year program plan is approved
- Multi-disciplinary graduate transportation education program is started, with options in Civil Engineering and Agricultural Economics
- Non-residency graduate transportation option for NDDOT engineers initiated using Interactive Video Network

1992

- 4th year program plan is approved

1991

- 3rd year program plan is approved
- MPC establishes outstanding graduate student award

1990

- 2nd year program plan is approved
- Reorganization of MPC to include four Region 8 universities

1989

- Regional Conference and Planning Meetings with LTAP Center Directors
- 1st year program plan is approved

1988

- Mountain-Plains Consortium is founded and selected as Region 8 Center

Program Goals, Strategies and Focus Areas

The desired UTC program outcome is “to increase the number of Americans who are prepared to design, deploy and operate the complex transportation systems that will enhance America’s economic competitiveness in the 21st century.” MPC has developed a series of program goals and five-year strategies to help realize the desired outcome. They are detailed in the 1999 MPC Strategic Plan, which is available at our website.

Four key words help to define MPC’s strategies and programs – multi-university, multi-disciplinary, multi-modal, and multinational. We are continuing our pre-existing programs at the four universities while developing new multi-disciplinary educational, research, and technology transfer programs. Collectively, these programs coordinate and integrate concepts from many disciplines including engineering, planning, economics, business, geography, computer science, and operations research. Our educational programs feature resident and non-resident courses and use traditional and innovative delivery media. They also feature a mixture of undergraduate, graduate, and continuing education components. Our research focus areas encompass the surface modes of highway, transit, and railroad, as well as intermodal freight movements.

Our focus area in International Cross-Border Traffic addresses multinational transportation issues, as do much of our educational and technology transfer activities. One of our major strategies is to engage universities in Canada, Mexico, and the United States in a broader partnership to foster exchange and dissemination of knowledge in the midcontinent region.

This section of the report defines our focus areas and summarizes MPC’s program goals and prime strategies. These strategies are organized under the guiding UTCP goals of education, research selection and performance, technology transfer, and human resources.

Focus Areas

Rural and Intermodal Transportation provides a basic direction for the Center's activities. However, the theme is quite broad for guiding the research and technology transfer components of the program. Therefore, seven definitive focus areas have been developed, providing further guidance to MPC faculty in developing research and technology transfer projects and assisting each university in concentrating its efforts in areas of excellence and specialization. The focus areas also provide common ground for several or all universities to collaborate on joint projects.

Rural Transportation Safety

Safety is a top priority for the U.S. DOT and state transportation departments in the region. Much of MPC's previous research has focused on rural safety issues and potential solutions for state and local highways. Although several MPC focus areas encompass safety topics, an umbrella focus area has been created to emphasize the importance of rural transportation safety. MPC research will highlight emerging technologies such as rural road safety audits, which have the potential to significantly improve safety on low-volume rural highways, and potential applications of GIS and ITS technologies to highway safety. As noted earlier, many safety-related issues will be addressed by projects in other focus areas such as Low-Volume Roads and Bridges and Rural Transit.

Rural Transit

Transit plays a role in all of the market-travel segments discussed earlier. This is important, as transit may be the only travel option for households without automobiles and for elderly and handicapped residents. Critical transit planning and research issues in Region 8 include cost-effectiveness of transit systems in sparsely populated areas; transportation of economically disadvantaged and aging rural residents; access to jobs and training for people making transitions from welfare-to-work; use of ITS and other advanced technologies for rural public transit; connectivity between small towns and urban and metropolitan centers; and improved access to university campuses.

Intermodal Freight and Logistics

This focus area encompasses topics of importance to business, government, and the transportation industries. Most of the prospective research falls into one of the following categories: railroad track and bridge rehabilitation and engineering; heavier rail car weights and transloads; location and operation of intermodal facilities and terminals; railroad cost-of-service, market structure, and productivity; issues in regulatory economics (e.g., pricing, abandonment, and competitive access for shippers); commodity flow and truck traffic analysis;

farm-to-market access and critical issues in agricultural logistics; supply chain management and critical issues in manufacturing logistics; truck economics; heavy truck factors in highway and bridge design and operation; use of ITS technologies in commercial vehicle operations and truck safety; and rural plant location criteria and infrastructure demands.

Low-Volume Roads and Bridges

About 75 percent of the nation's 3.7 million miles of roadway are rural in nature. Nearly two-thirds of rural mileage is under local control. According to the National Bridge Inventory, about 80 percent of U.S. bridges are located on secondary roads, and half are local in function. Use of secondary and local roads is low, representing about 20 percent of daily traffic. However, more than half of the nation's traffic fatalities occur on rural roads and bridges.

Changes in the farm sector are impacting rural highway demands. These trends include increased farm size, mechanization and productivity, and larger trucks and farm equipment. Abandonment of light-density rail lines and longer farm-to-market trips are increasing heavy truck use. Many rural counties have hundreds of highway bridges in disrepair, but are able to address only two to three annually, as low commodity prices, declining tax bases, and reductions in the purchasing power of intergovernmental assistance limit the ability of local governments to maintain low-volume roads and bridges.

The majority of prospective research for this focus area falls into the categories of financing methods and issues; cost-effective design and maintenance practices; impacts of seasonal load restrictions and extreme weather conditions on the mobility of people and goods; impacts of rail line abandonment and other railroad system changes on rural highways; and highway and bridge safety, especially in two-lane rural roads.

Environmental Impacts

Much of the research conducted under this heading is linked to projects in other MPC focus areas such as enhancing tourism through mitigation of congestion, road and bridge management projects, and the development of master plans for recreational access. Some specific areas of environmental research that have relevance to regional planning and policy analysis are freight and hazardous materials movements; reduction of congestion-related air pollution; potential for alternate modes in heavily traveled corridors; studies of high altitude, low-emissions fuels; and safe and effective dust control. Hazardous materials issues include commodity flows and volumes; monitoring and vehicle identification procedures; routing; risk assessment and management; emergency response; and classification of new materials. Clearly, hazardous materials research has safety as well as environmental implications.

Tourism and Recreational Travel

Several of the most visited national parks and ski areas in America are located in Region 8. Many rural tourist areas are characterized by large seasonal variations in demand and congestion during peak periods. In general, the seasonal and daily traffic impacts of tourism and recreational travel must be better understood and documented. Specific research needs include travel demand characteristics, behavioral modeling, marketing effectiveness, potential roles for new technologies, and measurement of tourism output and traffic generation factors. It is also important to understand the complex relationship between tourism/recreational travel and the preservation of natural resources in the region, and the potential impacts of tourism on “edge communities.” Finally, an aging populace will demand more local transit options and alternative modes of access along corridors.

International Cross-Border Traffic

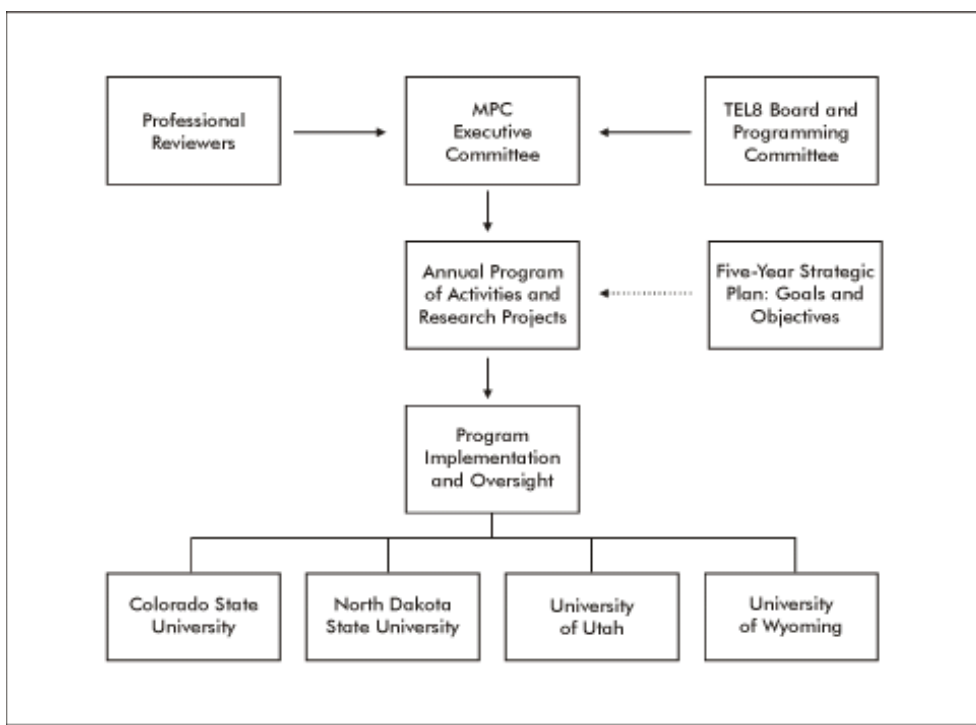
Most of the prospective research projects in this focus area fall into one of the following categories: cross-border variations in truck configurations, lengths, weights, and operational practices; cross-border variations in pavement design and management practices; application of advanced technologies such as automatic vehicle identification, electronic tolls and vehicle clearance, and advanced traveler information systems to improve efficiency of cross-border truck movements; merger and consolidation of North American railroads and interchange of cross-border freight movements; variations in rail car ownership and use among nations; international interline information systems and intermodal hubs; international tourism and cross-border recreational travel; and supporting infrastructure investments.

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 TEL8 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. The MPC Program Planning flowchart illustrates the main sources of input and process used to develop an annual program of activities and research projects.

Center Director

The Mountain-Plains Consortium is located at the Upper Great Plains Transportation Institute on the main campus of North Dakota State University. Dr. Denver Tolliver is the MPC program director. He is actively 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, not just NDSU. He administers the program in a synergistic way that takes advantage of the unique strengths and resources of each university and produces the greatest positive impact for the consortium. Kathy McCarthy of NDSU is the assistant administrator for the Center. Beverly Trittin of NDSU provides technical support and additional administrative services.



Management Structure of the Mountain-Plains Consortium

University Program Directors

Each university in the consortium has a designated *university program director*. The four university program directors perform local oversight and management of approved activities at each university and 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. Ayman Smadi, North Dakota State University; Dr. Peter Martin, University of Utah; and Dr. Khaled Ksaibati, University of Wyoming.

Executive Committee

The Center Director, the four university program directors, and a USDOT liaison form a committee to oversee program planning and administrative functions for the grant period. The six-member Executive Committee meets several times 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.

Telecommunication Support Network

The four MPC universities are members of a regional telecommunication network known as TEL8. The TEL8 network also includes five state transportation departments in Region 8: North Dakota, South Dakota, Montana, Wyoming, and Utah. The system carries a two-way interactive audio and video signal to conference and class rooms at the respective sites. TEL8 greatly enhances and improves the cost-effectiveness of the MPC administrative processes. It results in substantial travel cost savings and maximizes use of scarce faculty and administrative time.

TEL8 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 TEL8 Board of Directors. The four university program directors are members of the TEL8 board. The MPC Executive Committee and TEL8 Board hold an overlapping meeting each year. The TEL8 Executive Director and Program Director attend part of the MPC Executive Committee meeting and the Center Director attends part of the TEL8 Board meeting. The TEL8 programming committee, which meets several times each year, brings together representatives from the five state

transportation departments and the MPC universities to collectively plan a regional education and training program.

Professional Input and Review

Although TEL8 is a primary source of state transportation department input, the MPC research selection process benefits greatly from professional input and review. Each year, professionals from federal, state, and local transportation departments and private industry review MPC research problem statements. In 2002-03, 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 will provide value to our primary customers, the end users of the research.

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 four campuses are approved first by the Executive Committee. The Center Director ultimately is held 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. The site visits provide opportunities for the director and USDOT liaison to meet with principal investigators and program managers on each campus and to gauge progress toward program goals and objectives. The director also holds teleconferences 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. At least one meeting per year is scheduled with the Intermodal Transportation Institute of the University of Denver.

Executive Committee



DR. DENVER TOLLIVER is director of the Mountain-Plains Consortium and adjunct professor of agribusiness and applied economics and civil engineering at North Dakota State University. He has been involved in the University Transportation Centers program, and in the administration of the MPC since 1992. In addition, he has served

as coordinator of the NDSU graduate transportation program since 1994 and is director of the new Ph.D. program in Transportation & Logistics. He holds a doctorate degree in Environmental Design & Planning and a master's degree in Urban and Regional Planning from the Virginia Polytechnic Institute.

During his career, Dr. Tolliver has served as principal investigator for more than 30 USDOT, USDA, and state research grants, and testified before the Interstate Commerce Commission or Surface Transportation Board on 22 occasions. He has published more than 50 technical reports and journal articles, and authored a book on highway impact assessment techniques. He has developed and taught courses in Transportation Economics, Industrial Traffic Management, Rural & Non-Metropolitan Transportation Systems, Administration of Transportation Agencies, Statewide Transportation Planning, and Rural Public Transportation Systems.

Dr. Tolliver's primary research interests are freight transportation, highway planning, and environmental impact analysis. His current projects include: development of a statewide freight traffic database, development of integrated highway and land-use models for analyzing the traffic effects of large agribusiness facilities, and the benefits of increased investment in county and city roads. He currently serves on the Local & Regional Railroad Freight Committee of the Transportation Research Board and is past president of the Agricultural and Rural Transportation Chapter of the Transportation Research Forum.



DR. RICHARD GUTKOWSKI, Ph.D., P.E., is a professor of civil engineering at Colorado State University (CSU). He has B.S. and M.S. degrees in civil engineering from Worcester Polytechnic Institute and completed a Ph.D. from the University of Wisconsin, Madison. Gutkowski is director of the Structural Engineering Laboratory at

CSU's Engineering Research Center.

He is program director for CSU's membership in the Mountain-Plains Consortium where he manages research,

graduate education, technology transfer and student internship programs. He was active in development of TEL8, a nine-site regional transportation telecommunications network for research and graduate education, and manages CSU's site and is representative to the TEL8 board.

Gutkowski has participated extensively in international activities. He has been an Invited Professor at the Swiss Federal Institute of Technology (SFIT), Lausanne, Switzerland; and arranged formal university cooperation programs with the SFIT and Wroclaw Technical University in Poland. He directed a 1994 NATO Advanced Research Workshop (ARW) on "Challenges to Improving a Deteriorated Transportation Infrastructure within Poland and Its Neighboring Countries." Gutkowski was one of 20 invited participants in the NATO Symposium on "The Role of NATO in Scientific Cooperation in Central Europe." He was an invited expert at a 1986 UNIDO workshop on Timber Bridge Awareness in Latin American Countries. In 1990, Gutkowski presented a workshop on Design of Timber Bridges in Akitashi, Japan, for the Ministry of Forestry and the Japanese Society of Civil Engineers.

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 has co-edited proceedings for the above NATO Advanced Research Workshops.



DR. AYMAN SMADI is director of the Advanced Traffic Analysis Center (ATAC) at the Upper Great Plains Transportation Institute. The ATAC promotes enhancing transportation systems in small-medium size communities through the use of advanced traffic analysis and ITS solutions to safety and mobility problems. Four

major programs encompass ATAC activities: traffic operations, Intelligent Transportation Systems; transportation planning and travel demand; and training. ATAC's Traffic Laboratory supports state-of-the-art traffic analysis, including traffic simulation, traffic signal control, and traffic data collection systems. ATAC is the official provider for training on the VISSIM traffic simulation model. Training on other traffic simulation and analysis models is also provided on-demand to various partner agencies.

Dr. Smadi is also involved in North Dakota State University's graduate transportation program. As an adjunct professor in civil engineering, Smadi teaches transportation planning, advanced transportation systems, and ITS graduate courses. He also serves as NDSU's program director for the Mountain-Plains Consortium.

Smadi's research interests include traffic operations, transportation planning, ITS, and safety. He has developed and worked on federal- and state-funded projects in those areas.

Smadi, an advanced research fellow, began his work at the UGPTI in 1993. In 1996 he became NDSU's program director for MPC and in 1998 became ATAC director. He has a doctorate degree in civil engineering from Iowa State University, Ames; a master of science degree from the University of Oklahoma, Norman; and a bachelor of science degree in civil engineering from Yarmouk University, Irbid, Jordan.



DR. KHALED KSAIBATI received a bachelor of science degree (1984) in Civil Engineering from Wayne State University. He later completed his master of science degree (1986) and Ph.D. (1990) from Purdue University. While completing his doctorate, Ksaibati worked full time for the Indiana Department of

Transportation as a pavement structural engineer between 1988 and 1990.

Ksaibati has been a member of the civil engineering faculty at the University of Wyoming (UW) since 1990. He started his academic career as assistant professor and was promoted in 1997 to associate professor. Dr. Ksaibati was promoted to the rank of full professor in 2001. In 1998, Ksaibati took a sabbatical leave from UW and joined the staff of the Florida Department of Transportation (FDOT). For a whole year, Ksaibati provided training, consulting, and technical support to FDOT. Several research papers, reports, and presentations resulted from the research work done in cooperation with FDOT.

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. In addition, Ksaibati is an executive committee member of the Mountain-Plains Consortium. He also is a member of the TEL8 board of directors.

Currently Ksaibati is a member of five Transportation Research Board committees dealing with various aspects of pavements. He also is a member of two ASTM committees related to pavement smoothness. Ksaibati also served on various ITE committees and is the faculty advisor of the student chapter of ITE at UW. In addition, he served on several NCHRP research panels.

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. His research has been supported

by the Wyoming Department of Transportation, Federal Highway Administration, PacifiCorp, and other DOTs.

Ksaibati is also involved in consulting work on several projects for the SBIR, Florida DOT, and the Wyoming Contractor Association.



DR. PETER T. MARTIN earned a bachelor of science degree in civil engineering from the University of Wales in 1975, a master of science 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 earned membership of the UK Institution of Civil Engineers (professional registration) in 1978.

Currently, Martin is supporting the development of an Advanced Traffic Management System associated with the I-15 Reconstruction project of the Salt Lake Valley, Utah. He has built the "Utah Traffic Laboratory," which allows real-time connection to the Utah DOT ITS Traffic Operations Center.

Key Faculty

Colorado State University



Dr. Bryan Hartnagel joined the Department of Civil Engineering at Colorado State University in August 1998. He has a bachelor of science, master of science and Ph.D. in civil engineering from the University of Missouri-Columbia. Hartnagel's current research interests are related to the design, analysis and rating of

steel and concrete bridges. Currently, experimental tests are being conducted on high performance steel bridge girders for strength and ductility characteristics.



Dr. Marvin Criswell is currently Professor of Civil Engineering and the Associate Department Head for Academic Affairs in the Department of Civil Engineering. He earned a B.S. degree from the University of Nebraska, Lincoln (1965) and M.S. (1966) and Ph.D. (1970) 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. Currently, Marvin advises on MPC supported research on composite wood-concrete bridge systems and timber trestle railroad bridges. He assists with graduate education activities of the TEL8 network.



Dr. Paul Heyliger has been on the faculty of the Civil Engineering Department at Colorado State University for 15 years. He was awarded his Ph.D. in Engineering Mechanics from Virginia Tech in 1986, and subsequently did a two-year National Research Council Post-Doc 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 over 60 refereed journal articles and has been presented with several teaching awards. His research

sponsors include the USDOT, National Science Foundation, NASA, the Department of Agriculture, the Army Research Office, AFOSR, and NIST.



Dr. Thomas G. Sanders is an associate professor of civil engineering at Colorado State University. He received his master's and Ph.D. in civil engineering at the University of Massachusetts. Sanders has over 125 publications and has presented 69 short courses on

hazardous waste, water quality monitoring, and activated sludge process control.



Dr. Sandra Woods is professor and department head of the Department of Civil Engineering at CSU. Woods received a B.S. degree in civil engineering from Michigan State University in 1976. She received M.S. and Ph.D. degrees in civil engineering from the University of Washington in 1980 and

1985 respectively.

While on the Oregon State University civil engineering faculty for 16 years, Woods developed a program for under-represented engineering students, led the development of an environmental engineering degree program, established a residence hall for women engineering students and helped establish an EPA Hazardous Substance Research Center. Woods served as faculty associate to the provost and interim dean of Distance and Continuing Education. Her research focuses on the bioremediation of contaminated groundwater. She was a Presidential Young Investigator and a member of the Governor's Task Force on the state of Oregon's Environment.

North Dakota State University



During his 14 years in transportation research, **Doug Benson** has specialized in the analysis of railroad operations and the development of computer systems used for transportation analysis. Currently, he is project director of the American Short Line and Regional Railroad Association's national database

system.

Since 1997, Benson has served as executive director for TEL8, a six-state videoconference network incorporating state departments of transportation and universities dedicated to transportation research.

Benson received a master of science degree in computer science from North Dakota State University. He also holds bachelor of science degrees in computer science, education, history, and psychology.



Mark Berwick has been involved in research with UGPTI since 1995, specializing in the areas of logistics and transportation management. Specifically he has worked in areas of business logistics and motor carrier economics.

Since 1999, Berwick has been the director of the Biennial North Dakota Strategic Freight Analysis Program, which examines the transportation and logistics of different sectors of the economy every two years.

Berwick received master of science and bachelor of science degrees in agricultural economics at North Dakota State University.



John Bitzan has more than 10 years of experience in economic research of transportation. His major research focus areas include railroad price and cost analysis, analysis of transportation industry structure, transport regulation and policy analysis, and railroad operations analysis. Bitzan has published numerous reports and journal articles. He has performed research for the U.S. Department of Agriculture, U.S. Department of Transportation, and the Federal Railroad Administration.

Bitzan received a Ph.D. in economics at the University of Wisconsin-Milwaukee. He received a master of arts in applied economics at Marquette University and a bachelor of arts in economics at St. Cloud State University.



Jill Hough has 12 years of experience in transportation research. Ms. Hough currently serves as the director of the Small Urban & Rural Transit Center, which focuses on research, education, and training for the public transportation industry. In addition to working in the area of public transportation, Hough has published numerous reports and articles in the areas of low-volume roads, logistics, and economic development. She has worked on several projects in cooperation with the U.S. Department of Transportation. She spent four months as interim director for the Federal Transit Administration's Transit Intelligent Vehicle Initiative in Washington, D.C.

She currently is working on a doctorate degree in Transportation Technology and Policy from the University of California-Davis. She received master of science and bachelor of science degrees in agricultural economics at North Dakota State University.

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An associate research engineer/program director for the DOT Support Center at the Upper Great Plains Transportation Institute, **Dennis Jacobson** brings over 28 years of NDDOT engineering experience and over 30 years of military engineering experience to the Institute. He worked

for NDDOT until November 2000 culminating in his appointment of East Region Engineer, responsible for construction and maintenance for the eastern half of North Dakota. Jacobson, a colonel, is also currently the Engineer Brigade Commander for the 34th Infantry Division. In this capacity he commands all engineer forces in North Dakota. Jacobson completed masters degrees in civil engineering and strategic studies from NDSU and the U.S. Army War College in 2001. He is currently a doctoral candidate in engineering.



Kellee Kruse is a research assistant with the North Dakota Department of Transportation Support Center at the Upper Great Plains Transportation Institute. Her research interests include transportation maintenance management, geographical information systems, global positioning systems and workforce productivity. Current MPC

projects are "Leveraging Technology Investments – Integration of GPS, GIS and Maintenance Management" and "Asset Management of Roadway Signs Through Advanced Technology."

Kruse received her bachelor's degree in management information systems at NDSU in May 2002.



Specializing in motor carrier economics and safety, **Julie Rodriguez** has worked with trucking companies and federal programs in performance-based management and job satisfaction within the motor carrier industry. She is also program director for TEL8, a six-state video conference network incorporating state Departments of Transportation and universities dedicated to transportation research. Julie began her professional career with the Institute in 1987.

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Kimberly Vachal has extensive background in grain production and market intelligence. Her work focuses on identifying trends in the activities of grain producers, elevators, agricultural processors and railroads. In addition to completing many research studies on grain and oilseed transportation issues, Ms. Vachal has

worked on a number of projects in cooperation with the U.S. Department of Agriculture.

Vachal received master of science and bachelor of science degrees in agricultural economics at North Dakota State University.

She is currently working on a doctorate degree in Public Policy from George Mason University.

Affiliated Faculty – NDSU

Don Andersen, Civil Engineering

Rob Arthur, Geosciences

Canan Bilen-Green, Industrial & Manufacturing Engineering

Dinesh Katti, Civil Engineering

Dave Lambert, Agribusiness & Applied Economics

Jay Leitch, College of Business Administration

William Nanja, Agribusiness & Applied Economics

G. Padmanabhan, Civil Engineering

Darsono Tjokroamidjojo, Industrial & Manufacturing Engineering

Rodney Traub, Business Administration

Amiy Varma, Civil Engineering

Bill Wilson, Agribusiness & Applied Economics

Frank Yazdani, Civil Engineering

University of Utah



Dr. Peter T. Martin earned a bachelor of science degree in civil engineering from the University of Wales in 1975, a master of science 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 earned membership of the UK Institution of Civil Engineers (professional registration) in 1978.

Currently, Martin is supporting the development of an Advanced Traffic Management System associated with the I-15 Reconstruction project of the Salt Lake Valley, Utah. He is building the “Utah Traffic Laboratory,” which will allow real-time connection to the Utah DOT ITS Traffic Operations Center.



Joseph Perrin, Ph.D., PE, PTOE, holds a faculty position as a research assistant professor with the Department of Civil and Environmental Engineering. He provides the day-to-day supervision of the MPC-funded re-

search in the lab.

University of Wyoming



Dr. Eugene M. Wilson is director of the Wyoming Technology Transfer Center and professor emeritus of civil engineering at the University of Wyoming. He was the university’s 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 bachelor and master of science degrees were earned at the University of Wyoming and his doctorate is from Arizona State University, all in civil engineering. Iowa, Wyoming, and Colorado awarded him status as a Professional Engineer.



Dr. Charles M. Dolan is professor and head of the Department of Civil Engineering at the University of Wyoming. He focuses his research on high performance materials such as glass, Kevlar and carbon fibers for reinforcing new and existing structures. He was the principal

investigator for investigation of fiber-reinforced plastics for highway structures sponsored by the Federal Highway Administration. Among his other recent work is development of anchor systems for fiber reinforced plastic tendons; time behavior of non-metallic pressuring tendons; investigating long-term performance of non-metallic materials in concrete and evaluating bridge joint sealant materials.

His civil engineering degrees are a bachelor of science from the University of Massachusetts and a master of science and doctorate from Cornell University. He is a registered professional engineer in Wyoming, Washington, and Ontario.

Dr. Larry O. Pochop, professor of civil engineering at the University of Wyoming, specializes in hydrology, microclimatology, agricultural and municipal water conservation, and management.

He earned his bachelor of science degree from South Dakota State University, and his master of science degree and doctorate from the University of Missouri, Columbia. His degrees are in agricultural engineering. He is a professional engineer in Wyoming.



Dr. Jay A. Puckett is a professor of Civil Engineering at the University of Wyoming 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.

Honored with research, graduate teaching and Most Outstanding Professor awards, his bachelor of science degree is from the University of Missouri and his master of science and doctorate degrees are from Colorado State University, all in civil engineering.

Donald E. Polson, a lecturer in the University of Wyoming College of Engineering, specializes in structural engineering with an emphasis in the design and use of temperate and tropical woods. In addition to teaching, he is a private consulting structural engineer and facilities consultant.

A Fulbright Scholar in 2000, Polson holds degrees from the University of Wyoming with a bachelor of science in civil engineering with the architectural option and a master of science with the structural concentration. Polson has also been honored with teaching awards.



Dr. John P. Turner is a professor in the University of Wyoming College of Engineering who specializes in soil and rock mechanics, foundation engineering, earth retaining structures, slope stability and innovative materials for waste containment. He has also been a field

geologist for geotechnical site investigations and an exploration geologist.

He was a visiting professor at the University of Sydney, Australia, and the University of Canterbury, New Zealand, for the 1993-94 academic year. He holds a bachelor of science degree in geology from James Madison University, both bachelor of science and master of science degrees in civil engineering from the University of Wyoming and a doctorate in civil engineering (geotechnical) from Cornell University.



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 University of Wyoming 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.

Edgar has received teaching awards. His bachelor of science degree is from the University of Colorado and his master of science and doctorate are from Colorado State University, all in civil engineering.

Dr. Gregory V. Wilkerson is an assistant professor in the University of Wyoming College of Engineering. He works with research and development of solutions to water resource problems, multi-disciplinary approaches to stream restoration, river mechanics, sedimentation and erosion, environmental hydraulics, engineering hydrology and statistics. Wilkerson has a number of research projects in these areas.

His bachelor of science is from Georgia Institute of Technology and his master of science and doctorate are from Colorado State University. His degrees are all in civil engineering.



Dr. Cenk Yavuzturk is an assistant professor of architectural engineering in the University of Wyoming College of 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 doctorate 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 Assistant Professor of Civil Engineering at the University of Wyoming. 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). Rhonda'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 PhD 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.

The Year in Review

Director's Summary

Fiscal year 2002-2003 was MPC's fourth year of the TEA-21 grant. Throughout the year, we maintained the high levels of productivity established in previous years. During 2002-2003, MPC published 24 new peer reviewed reports and offered 80 graduate-level transportation courses at the four universities. Many additional courses in civil engineering, economics, and business were offered by the participating academic departments.

In addition to continuing this strong baseline effort, several new initiatives were launched during FY 2002-2003. Moreover, two key faculty members were added.

Inaugural Year of Interdisciplinary Doctoral Program

On June 20, 2002 the North Dakota Board of Higher Education approved a new Ph.D. in Transportation and Logistics. This milestone was the culmination of a multi-year process of program development and committee and peer review.

In the Fall of 2002, the inaugural class of 6 students enrolled in the program. Six additional students are expected to enroll in the Fall of 2003. Seven new or

updated doctoral level courses were offered in 2002-2003, including Transportation Systems I, Transportation Systems II, Intermodal Freight Transportation, Quantitative Modeling, Probabilistic and Deterministic Methods, Economics of Transportation Systems, and Logistics and Distribution Management.

Regional National Transportation Week Program

Traditionally, each of the four MPC universities has sponsored National Transportation Week activities individually. For the first time, an entire week of coordinated MPC events took place during National Transportation Week of 2003. These activities included a luncheon for NDSU faculty and invited guests from transportation organizations in the Fargo-Moorhead area. In addition, a series of videoconferences were offered by the MPC universities. These videoconferences were attended by state transportation department professionals from North Dakota, South Dakota, Wyoming, and Utah, and by faculty and staff of the four universities.

New Faculty Attracted to MPC University

Two important additions were made to the MPC transportation faculty in 2002-2003. Rhonda Young joined the faculty of the Department of Civil and Architectural Engineering at the University of Wyoming. Dr. Young recently completed her Ph.D. at the University of Washington, where she also earned a Graduate Certificate in Transportation, Trade, and Logistics. Young's primary research interests are in transportation decision-making, statewide multimodal planning, and freight transportation. In addition to her research, Young teaches five transportation courses at the University of Wyoming: Highway Engineering, Geometric Design, Engineering Decision-Making, Traffic Controls, Traffic Safety, and Transportation Planning.

Darsono Tjokroamidjojo joined the graduate faculty of Industrial and Manufacturing Engineering in the Spring of 2002. Dr. Tjokroamidjojo earned BS and MS degrees from the University of Wisconsin-Madison and the Ph.D. from University of Arkansas, all in Industrial Engineering. His research centers on applications of operations research analysis techniques, including mathematical programming, optimization and simulation modeling. Dr. Tjokroamidjojo will be a major contributor to the Transportation & Logistics doctoral program. He plans to teach graduate courses in Advanced Operations Research and Supply Chain Management, and serve as faculty advisor to several doctoral students.

More details on these and other MPC activities are presented in the FY 2003 Program Highlights section of this report.

FY 2003 Program Highlights

National Transportation Week Activities

The entire week of coordinated MPC events took place during National Transportation Week, May 11-17. The events were sponsored by the Mountain-Plains Consortium.

A luncheon for NDSU faculty and invited guests from transportation organizations in the Fargo-Moorhead area was held on May 14 with about 40 people in attendance. It was an opportunity to meet with faculty who are involved with transportation issues from departments including agribusiness and applied economics, business administration, civil and construction engineering, computer science, industrial and manufacturing engineering and geosciences, as well as the UGPTI.

Guest speakers were Dan Zink of the Red River Valley and Western Railroad who gave a presentation entitled "Opportunities and Challenges for Regional Railroads;" and Keith Berndt, Cass County engineer, who talked about "County-wide Transportation Planning: Issues and Opportunities."

A series of videoconference seminars was also scheduled for the week:

On Monday, May 12, Peter Martin of the University of Utah presented "Adaptive Traffic Signal Control Systems," a comprehensive investigation of the effectiveness of adaptive signal control through simulation and modeling.

On Tuesday, May 13, Cenk Yavuzturk, University of Wyoming, reported on a study of assessing temperature fluctuations in asphalt pavements to help pavement engineers select the asphalt grade to be used in differing environmental conditions, providing a way to help control rising pavement construction costs.

Thursday, May 15, Ayman Smadi of NDSU, discussed results from a survey of traffic analysis needs in small- and medium-sized urban areas by the UGPTI Advanced Traffic Analysis Center.

On Friday, May 16, Richard Gutkowski from Colorado State University in a videotaped presentation reported on experimental and analytical studies at CSU of overlaying wood floors or decks with a concrete layer, creating composite wood-concrete systems for buildings and short-span bridges.

About 20-25 DOT personnel from North Dakota, South Dakota, Wyoming and Utah attended the sessions.

Rhonda Young Joins University of Wyoming Transportation Faculty

Rhonda Young joined the faculty of the Department of Civil and Architectural Engineering at the University of Wyoming in the fall of 2002. Dr. Young recently completed her Ph.D. at the University of Washington, where she also earned a Graduate Certificate in Transportation, Trade, and Logistics. Young brings over 10 years of professional and practical experience to her teaching career.

Young's primary research interests are in transportation decision-making, statewide multimodal planning, and freight transportation. These research interests stem from her work with the Washington State Department of Transportation in developing a computer-based tool to aid in funding decisions, called Multimodal Investment Choice Analysis (MICA). Much of her research focuses on methods to increase the efficiency of agency spending for transportation infrastructure. Young's 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. Prior to completing her doctorate, she spent six months on a research fellowship in Sweden in order to learn what Scandinavian transportation innovations could be utilized in the United States.

In addition to her research, Young teaches five transportation courses at the University of Wyoming: Highway Engineering, Geometric Design, Engineering Decision-Making, Traffic Controls, Traffic Safety, and Transportation Planning. Dr. Young can be contacted via e-mail at: rkyoung@uwyo.edu, or by phone at (307) 766-2184.

North Dakota State Launches Interdisciplinary Doctoral Program in Transportation & Logistics

In the Fall of 2002, North Dakota State University launched an interdisciplinary doctoral program in Transportation & Logistics (TL), with an inaugural class of six students. Six additional students are expected to enroll in the Fall of 2003.

The Transportation & Logistics program is a joint effort of the Colleges of Agriculture, Food Systems & Natural Resources, Business Administration, Engineering & Architecture, and the Upper Great Plains Transportation Institute. The following departments are participating in the program: Agribusiness & Applied Economics; Civil Engineering & Construction; Industrial & Manufacturing Engineering; and Management, Marketing & Finance. The program consists of three main components: a core curriculum of 25 credits, an area of concentration, and a dissertation. After completing the interdisciplinary core curriculum, students may enter one of three areas of concentration: (1) Logistics and Supply Chain Systems, (2) Transportation Economics and Regulation, and (3) Transportation Infrastructure and Capacity Planning.

The program includes 11 new or updated graduate courses, seven of which were offered in 2002-2003. These include: *Transportation Systems I*, *Transportation Systems II*, *Intermodal Freight Transportation*, *Quantitative Modeling*, *Probabilistic and Deterministic Methods*, *Economics of Transportation Systems*, and *Logistics and Distribution Management*. Additional information regarding the program and courses can be obtained at www.mountain-plains.org.

North Dakota State University Adds New Transportation/Logistics Faculty Member

Darsono Tjokroamidjojo joined the graduate faculty of Industrial and Manufacturing Engineering in the Spring of 2002. Dr. Tjokroamidjojo earned BS and MS degrees from the University of Wisconsin-Madison and the Ph.D. from University of Arkansas, all in Industrial Engineering. Prior to joining NDSU, he worked as a research development scientist for Mercari Technologies, Inc., an optimization software firm, developing new solutions for retail inventory management. He has also worked with J.B. Hunt Transport, Inc. and the U.S. Postal Service in the analysis of complex transportation logistics and materials handling systems. His research centers on applications of operations research analysis techniques, including mathematical programming, optimization and simulation modeling. Dr. Tjokroamidjojo will be a major contributor to the Transportation & Logistics doctoral program. He plans to teach graduate courses in Advanced Operations Research and Supply Chain Management, and serve as faculty advisor to several doctoral students.

Research Program

To address the Center's theme and vision, the research program seeks to identify topics important to the region by incorporating input from clients and peer reviewers. The MPC is working toward its goal of balancing its research program in rural and intermodal transportation to reflect priorities of major client groups, USDOT strategic goals and the Transportation, Science & Technology strategy. These efforts are outlined in this section of the report.

Completed Research Reports

- 137 Field Investigation of a Strengthened Timber Trestle Railroad Bridge • R. Gutkowski, A. Shigidi, A Tran; CSU (MPC 03-147)
- 138 Full-Scale Laboratory Testing of a Timber Trestle Railroad Bridge Chord (Phase 1) • J. Balogh, K. Doyle, R. Gutkowski; CSU (MPC 02-139)
- 154 An Assessment of Regional Road User Needs in Three Rural States • J. Hough, G. Hegland, C. Bahe; NDSU (MPC 03-140)
- 171 Intelligent Transportation Systems: Helping Public Transit Support Welfare to Work Initiatives • J. Hough, C. Bahe, M. Murphy, J. Swenson; NDSU (MPC 02-131)
- 181 University Transportation Survey: Transportation in University Communities • J. Daggett, R. Gutkowski; CSU (MPC 03-150)
- 182 Utilizing the Long-Term Pavement Performance Database in Evaluating the Effectiveness of Pavement Smoothness • K. Ksaibati, S. Mahmood; UWY (MPC 02-130)
- 187 Survey of the Education and Human Capital Needs of the Transportation Construction Industry • O. Salem; NDSU (MPC 02-134)
- 189 The Differential Effects of Deregulation on Rail Rates • J. Bitzan; NDSU (MPC 03-144)
- 196 Pier Moment-Rotation of Compact and Non-Compact HPS70W I-Girders • B. Hartnagel, A Tran; CSU (MPC 03-148)
- 198 Assessment of Temperature Fluctuations in Asphalt Pavements Due to Thermal Environmental Conditions Using a Two-Dimensional Transient Finite Difference Approach • C. Yavuzturk, K. Ksaibati; UWY (MPC 02-136)
- 199 Utilizing the Long-Term Pavement Performance Database in Evaluating the Effectiveness of Pavement Smoothness • K. Ksaibati, S. Mahmood; UWY (MPC 02-130)
- 203 U.S. Containerized Grain and Oilseed Exports - Industry Profile: Phase I • K. Vachal, H. Reichert; NDSU (MPC 02-132)
- 204 Strategies for Addressing North Dakota Department of Transportation Employee Retention and Motivation • L. Kalnbach, G. Griffin, D. Jacobson; NDSU (MPC 02-137)
- 205 Predicting and Classifying Voluntary Turnover Decisions for Truckload Drivers • L. Kalnbach, G. Griffin; NDSU (MPC 02-135)
- 208 Determining Surface Street LOS Using Existing Detector Infrastructure: Monitoring Commuter Congestion on Surface Streets in the Salt Lake Valley • P. Martin, J. Perrin, B. Coleman; UofU (MPC 02-133)
- 209 Real Time Measures of Effectiveness • P. Martin, J. Perrin, V. Kalyani; UofU (MPC 03-142)
- 210 Adaptive Signal Control for Downtown Salt Lake City • P. Martin, B. Chilukuri, Y. Feng, C. Jhaveri, J. Perrin; UofU (MPC 03-141)
- 220 Industry Costs and Consolidation: Efficiency Gains and Mergers in the Railroad Industry • J. Bitzan, W. Wilson; NDSU (MPC 03-145)
- 222 Strategies for Improving DOT Employee Retention and Motivation, Year 2 • L. Kalnbach, D. Jacobson; NDSU (MPC 02-137)
- 223 Evaluating the Impact of DOT's QC/QA Programs on Pavement Performance • K. Ksaibati, N. Butts; CSU (MPC 03-146)
- 224 Evaluating Moisture Susceptibility of Asphalt Mixes • E. Hunter, K. Ksaibati; UWY (MPC 02-138)
- 226 Adaptive Signal Control II • P. Martin, B. Chilukuri, Y. Feng, C. Jhaveri, J. Perrin; UofU (MPC 03-141)
- 229 Asset Management of Roadway Signs Through Advanced Technology • K. Kruse, T. Simmer; NDSU (MPC 03-149)
- 234 Simplified Impact Testing of Traffic Barrier Systems – Phase I • R. Gutkowski, D. Winkler; CSU (MPC 03-143)

Ongoing Research Reports

- 175 An Evaluation of ITS/CVO Application Technology in Logistics and Supply Chain Management • B. Lantz; NDSU
176 Road Dust Suppression: Effect on Maintenance, Stability, Safety, and the Environment • T. Sanders; CSU
177 Moment-Rotation Tests of High Performance Steel (HPS) I-Girders • B. Hartnagel; CSU
178 Experimental Wood-Concrete Railroad Bridge • R. Gutkowski; CSU
179 Full-Scale Laboratory Testing of a Timber Railroad Bridge • R. Gutkowski; CSU
190 Grain Highway Network Analysis: Use of Satellite Imagery and USDA Data to Forecast Heavy Truck Trips Generated from Rural Land Use Zones • D. Tolliver; NDSU
193 Rigorous Computer Modeling of Timber Trestle Railroad Bridges • R. Gutkowski; CSU
194 Effects of Environmental Exposure on Timber Bridge/Track Members and Connectors • R. Gutkowski; CSU
197 Road Dust Suppression: Effect on Maintenance, Stability, Safety, and the Environment (continued) • T. Sanders; CSU
201 Updating the Uniform Rail Costing System Regressions • J. Bitzan; NDSU
202 Truck Costing Model for Transportation Managers • M. Berwick; NDSU
206 Attitudinal Analysis of Bus Rapid Transit Alternative • J. Hough; NDSU
207 An Evaluation of Region 8 State Departments of Transportation and Metropolitan Planning Organizations' GIS Technology Application • D. Benson; NDSU
211 Evaluating and Improving the Safety of Pedestrian Crossing in Utah • W. Cottrell; UofU
212 Intelligent Transportation Systems Course • P. Martin; UofU
213 Paratransit Coordination for Rural Communities • P. Martin UofU
214 Pultruded Composite Shear Spike for Repair of Large Timber Members • D. Radford, B. Hartnagel, R. Gutkowski; CSU
215 Structural Modeling of Sub-structure Resistance for Timber Trestle Railroad Bridges • R. Gutkowski; CSU
216 Experimental Thick-Deck Wood-Concrete Highway Bridge Construction, Year 2 • R. Gutkowski, J. Balogh; CSU
217 Road Dust Suppression: Effect on Maintenance, Stability, Safety and the Environment (continued) • T. Sanders; CSU
218 Leveraging Technology Investments – Integration of GPS, GIS and Maintenance Management • D. Jacobson; NDSU
219 Bus Rapid Transit: An Examination of Political Feasibility Using Case Studies • J. Hough; NDSU
221 Trip Generation Rates for Grain Elevators: A Tool for State and Local Highway Planners • D. Tolliver, K. Vachal; NDSU
225 Evaluation of the I-15 High Occupancy Vehicle Lanes • P. Martin; UofU
227 Small Urban University Transit: A Case Study • J. Hough; NDSU
228 Trucking Industry Churn and Its Impact on Communities and ITS Adoption • J. Rodriguez; NDSU
230 Economics of Ride Quality on Low Volume Roads • D. Jacobson; NDSU
231 Automated Data Collection, Analysis and Archival • P. Martin; UofU
232 Detector Technology Evaluation • P. Martin; UofU
233 Evaluate Effectiveness of Dilemma Zone Advanced Signal Warning • P. Martin; UofU
235 Highly Flexible Crash Barriers • P. Heyliger; CSU
236 Evaluation of Moisture Susceptibility of Asphalt Mixtures Containing Bottom Ash • K. Ksaibati; UWY
237 Affordable Trip Feasibility Scheduling for Rural Paratransit Systems • W. Grenney; UofU

New Research Reports 2003-04 (Year 16)

- 238 Evaluation of Strategic Logistics of Rural Firms • M. Berwick; NDSU
239 Investment in Rural Roads: Willingness to Pay for Improved Gravel Road Services in Freight Transportation • T. VanWechel; NDSU
240 Evaluation of Moisture Susceptibility of Asphalt Mixtures Containing Bottom Ash • K. Ksaibati; UWY
241 Evaluation of Pavement Crack Filling Materials • K. Ksaibati; UWY
242 Wyoming Freight Movement and Wind Vulnerability • R. Young; UWY
243 Assessment of Thermal Stresses in Asphalt Pavements Due to Environmental Conditions Including Freeze and Thaw Cycles • C. Yavuzturk; UWY
244 Adaptive Signal Control III • P. Martin; UofU
245 Video Imaging System Evaluation • P. Martin; UofU
246 High Occupancy Vehicle Evaluation II • P. Martin; UofU

Human Resource Development

The MPC's goal is to increase the number of students, faculty and staff interested and involved in the undergraduate, graduate and professional programs of the Center. As outlined in our strategic plan, it is the Center's intent to increase faculty involvement in transportation, increase student participation in transportation programs, and increase participation by transportation professionals. This section highlights the Center's student and faculty activities and professional development during the past year. It also includes short biographies of our current graduate students.

GRADUATE STUDENTS

Colorado State University

Ryan Fast began as a graduate research assistant in Fall 2001. He is conducting experimental work in the area of composite wood-concrete floors and bridge decks. Prior to entering graduate school, he was a highway engineer trainee for the Federal Highway Administration, including a period of work at the Turner-Fairbank Laboratory in Virginia.

Ryan received a Special Act Award from the FHWA for work performed on Job Shadow Day during National Engineers Week. He completed an internship with Structural Reliability Technology (Boulder, Colo.) writing fatigue and crack analysis software.

He has a BS Applied Sciences degree from George Fox University and a BS Engineering – Civil Specialty degree from the Colorado School of Mines.

Misam Imam graduated from Bombay University with a BS degree (2001) in civil engineering. He has experience as an intern in consulting engineering and as a teaching assistant at Bombay University. At CSU he worked in applications of wood-concrete deck systems, including the possible adaptation to the use of bamboo, in his home country. At CSU, he also received the Shrake Culler scholarship and the Jairam Scholarship for academic excellence. He completed his MS studies in Spring 2003 and is employed as a Junior Structural Engineer at William Atlas Associates in New York City.



Mark Miller is a registered professional engineer in the states of Wyoming and Nebraska, and has more than 13 years of experience in the structural design of government administrative, production, aircraft repair and maintenance, space craft launch and assembly, and military housing facilities.

Miller currently is the director of Operations, 302D Civil Engineer Squadron, Peterson AFB and has held positions as the Regional Officer in Charge of Construction, U.S. Forces Korea; Lead Structural Engineer, Dept. of Civil Engineer, U.S. Air Force Academy, Colo.; and the Structural Engineer in Charge of Launch Facilities, Cape Canaveral AFS, Fla., where he was responsible for the structural renovation and upgrade of launch complex's 17 and 41 in support of the

Delta GPS and Titan IV launch programs.

Miller is a 1986 graduate of the University of Wyoming, 1999 graduate of Squadron Officer's School, Maxwell AFB, Ala.; and is a graduate student in structural engineering at Colorado State University. He is conducting master of science thesis work on the three dimensional, space frame modeling of open deck, timber trestle railroad bridges. This work is in conjunction with an MPC-sponsored project to examine load paths in such bridges via laboratory and field testing.



Cole Rogers is presently a graduate research assistant at CSU in the department of civil engineering. His research is on theoretical modeling of partially composite wood-concrete structural systems, including bridges. He received his BS degree in civil engineering at CSU in Spring 2001.

As an undergraduate student he worked as a research aide in the Structural Engineering Laboratory for two years. He is a member of the Tau Beta Pi and Chi Epsilon national honor societies.

He has work experience in construction of reinforced concrete foundations and residential home construction.

He was the recipient of the 2001 AISC/Rocky Mountain Steel Construction Association Fellowship, given to the top student in the Rocky Mountain region.



TJ Schilling received his BS degree in civil engineering in Fall 2001. He is presently a graduate teaching assistant, teaching in the geotechnical engineering laboratory. He has a work background as an auto mechanic (Extraditions International, Inc.) and a draftsman (Glorso Murray Surveys, LLC).

TJ is proficient in AutoCad and pursuing research studies on the use of pultruded composite shear spikes for strengthening and repairing timber bridge members. In Fall 2002, he will begin as a graduate research assistant and conduct thesis work on that topic.

He is a member of ASCE and two national honor societies, Chi Epsilon and Tau Beta. He participated in the steel bridge student design team during CSU's winning of the regional competition in Fall 2002.



An Vinh Tran has earned a masters degree in Civil Engineering (Structural and Geotechnical Engineering Program), Colorado State University, May 1999. He received a bachelor's degree in Civil Engineering in 1998 from Colorado State University.

The purpose of Tran's research is to study the pier moment-rotation behavior of compact and noncompact I-shape bridge girders fabricated from high performance steel (HPS). To accomplish the purpose, the research consists of two main objectives. The first objective is to compare experimental laboratory moment-rotation tests and corresponding numerical moment-rotation finite element analysis of four HPS70W steel girders to the current AASHTO LRFD moment rotation equations. The second objective is to compare inelastic moment-rotation post peak behavior of numerical non-composite models to corresponding numerical composite models.

Tran would like to continue his doctorate's study in Structural and Geotechnical Engineering, and work as a professional engineer in the field of structural and geotechnical engineering.

North Dakota State University

PH.D. STUDENTS:

Junwook Chi is currently conducting and supporting a project on the North Dakota Strategic Freight Analysis. The project will provide information and analysis necessary for decision makers to evaluate the viability of an intermodal facility. Future research will include intermodal transportation, Shippers' Association, and transportation economics.

Junwook received his M.Sc in Agricultural Economics and Business at the University of Guelph (Canada) in 2001. He received his B.Sc in Forestry Resource in 1998 at Konkuk University, South Korea. He received the 2002 Outstanding Masters Thesis Award (honorable mention) by the Canadian Agricultural Economics Society (CAES) Committee. He also received the Toronto Milk Producer's Scholarship and a graduate scholarship for excellent grades in 2001.

Alan Dybing is studying Transportation and Logistics with an emphasis in Transportation Economics and Regulation. His research includes issues dealing with transportation economics and regulation specifically in the railroad industry.

Alan received his M.S. in Agribusiness and Applied Economics in December 2002, his B.S. in Ag Education December 1999.

Alan received an honorable mention in the CTRF paper contest at the annual convention in Ottawa, Canada. His paper was titled "Estimation of the Demand for Grain Transportation in North Dakota."

Heather Gibb is a graduate research assistant with the Upper Great Plains Transportation Institute at NDSU. Her research focuses on the North American Mid-Continent Trade Corridor, specifically E-commerce implementation status in trucking companies throughout the trade corridor.

Heather received her BSC in Agriculture from the University of Manitoba. She plans to complete her M.S. degree in the summer of 2003 and will begin her second year of the Ph.D. Transportation and Logistics program at NDSU.

Weijun Huang is working toward a Ph.D. degree in Transportation & Logistics. Weijun received his B.E in Grain Machinery at Zhengzhou Grain University, China, and his M.S. in Agricultural Economics at NDSU.

Weijun would like to get a job in the agriculture or transportation field in the U.S. or Canada.

Sang Young-Moon earned his M.S. in Agribusiness and Applied Economics from North Dakota State University in 2002. He received his B.S. in Agriculture Economics from Korea University. The focus of his research is in international trade related to futures markets – how to manage the risks from importing wheat from the U.S. by a Korean importer using grain and exchange futures markets.

Sang would like to be a consultant for transportation problems.

Napoleon Tiapo is currently pursuing a degree in Transportation and Logistics at NDSU. His area of concentration is Transportation Economics with emphasis on Transportation and the Environment.

Napoleon received his MS degree in Agribusiness and Applied Economics from NDSU in the spring of 2002, graduating Phi Kappa Phi. He earned the degree "Ingénieur Agronome" from the University of Dschang, Cameroon. Napoleon has worked with the Ministry of Agriculture in Cameroon. He has also served as a Regional Supervisor in a World Bank-sponsored Extension Program in Cameroon. He plans to pursue a career in research at a university/research institute/international organizations.

MASTERS STUDENTS:

Mariya Burdina received both her masters and bachelors degree from Kiev National Economic University. Her research focus is in estimating the impact of transportation on business location decisions. Mariya would like to finish her thesis by December 2003.

Mohammad Farooq is completing his MA degree in Computer Science at NDSU. His research includes analyzing, designing, implementing and testing of various software applications. He is currently working on a generalized transportation network model with transshipment facilities.

Mohammad received his M.Engg degree in Civil Engineering from the National University of Singapore and his BS degree in civil engineering from Bangladesh University of Engineering and Technology. He is a member of the Phi Kappa Phi Honor Society, NDSU chapter.

Chowdhury Haider is pursuing joint Master of Science degrees in Computer Science and Transportation Engineering. His primary research interests are network modeling and GIS. He has accepted a position with a local consulting firm.

Eric Jabs is from Sheyenne, North Dakota. He attended UND-Lake Region in Devils Lake, N.Dak., in 1997-98. He then transferred to North Dakota State University in the 1998 Fall semester. Eric was an outstanding undergraduate student, achieving the Dean's List each year and graduating with honors in Spring 2001 with a degree in Agriculture Economics.

Eric has an extensive background in management, finance, marketing, and agriculture policy. He completed his M.S. degree in Agribusiness and Applied Economics at NDSU in Spring 2003. The title of his thesis was "Optimal Testing Strategies for Marketing Genetically Modified Commodities." Eric is currently employed with ConAgra in Jamestown, N.Dak., as a commodity trader.

Mark Lofgren received his MBA degree at North Dakota State University, December 2002. He received his B.S. degree in Industrial Management from Minnesota State University-Moorhead, December 1999.

As a graduate research assistant at UGPTI from 2001-03, Mark conducted research involving the analysis of North Dakota manufacturing for the Biennial Strategic Transportation Program. His current research is focused on current strategies and future trends in logistics and supply chain management. He is a member of the Fargo-Moorhead Transportation Club, and is involved with acquiring, writing, and publishing articles for the club newsletter.

Mark became a full time employee with the Upper Great Plains Transportation Institute in June 2003.

Radha Manohar is developing, analyzing and testing a new approach to database process synchronization. This approach guarantees execution correctness in concurrent access to database. Rahda received her M.S. in computer science from North Dakota State University; an M.S. in mathematics from the Indian Institute of Technology, India in 1997; and a B.S in mathematics from the University of Madras, India, in 1995.

Rahda would like to develop new techniques that could provide a database management system with greater reliability, scalability and performance.

Matthew Martimo received both his MS and BS degrees in Civil Engineering from North Dakota State University. He is currently employed with the Upper Great Plains Transportation Institute in the Advanced Traffic Analysis

Center (ATAC). His research focuses on the travel demand modeling enhancements for regional metropolitan planning organizations.

Matthew was awarded the 2001 Institute of Transportation Engineers Scholarship, the 2001 FM Transportation Club Scholarship, and took 2nd place, speaker, at the 2001 Area III Highway Engineers Exchange Program Conference.

Nicholas Osowski is from Grafton, North Dakota, where he grew up working on the family farm. He completed his undergraduate degree at the University of Minnesota-Crookston, Crookston, Minn., majoring in Ag Industries, Sales and Management. As an undergraduate, he achieved the Dean's List all four years.

In the summer of 2001, Nicholas worked for ConAgra Flour Milling to complete his internship. He used his extensive computer knowledge and organizational skills to redesign the flour mill's warehouse inventory management program, which resulted in significant cost savings for the company. Nicholas is currently a graduate student in the M.S. program in Agribusiness and Applied Economics at North Dakota State University. He is working with Dr. William Wilson on research for his thesis.

Khaled Shouman is presently a graduate research assistant at NDSU with the Upper Great Plains Transportation Institute, Advanced Traffic Analysis Center (ATAC). His research focuses on a case study of optimum detectors layout for intersections with high to moderate turning movements.

Khaled received his BS degree in civil engineering from the University of Jordan in 1999. Upon completion of his Masters degree, he plans to pursue a Ph.D. degree in transportation safety issues.

Dan Vinje received his B.S. in business administration from Minnesota State University-Moorhead. His research includes examining the impacts of deregulation on rail rates among commodities, regions and over time. This will be done with an analysis of differing levels of inter- and intramodal competition. Dan would like to complete his thesis by the end of December 2003.

University of Utah

Stephen Bryan is employed by Michael Baker Jr. Inc. A previous Traffic Lab research assistant, Bryan holds a Master of Engineering degree from the University of Utah. He graduated spring 2003.

Mark Bunnell earned a B.S. degree from the University of Utah and completed his M.S. degree in spring 2003. He is employed by Michael Baker Jr. Inc.

Yali Chen earned her M.S. degree in Civil and Environmental Engineering at Northern Jiaotong University, Beijing, China. As an undergraduate, she

earned student first level scholarship, excellent Undergraduate Thesis Award. Yali is enrolled in the Ph.D. program of Civil and Environmental Engineering. She is a Traffic Lab research assistant.

Rodrigo Disegni earned a B.S. in Civil Engineering from the Catholic University of Chile in 2000. He graduated from the University of Utah with an M.S. in Civil and Environmental Engineering in spring 2003. Rodrigo was a Traffic Lab research assistant.

Chintan Jhaveri graduated from the S.V. Regional College of Engineering and Technology, Surat, India, with honors in Civil Engineering in 2000. He completed his M.S. in Civil and Environmental Engineering in the spring of 2003 from the University of Utah. Chintan is a former Traffic Lab research assistant.

Vikram Kalyani graduated from the Vasavi College of Engineering, Osmania University, India, with a Bachelor of Engineering in 2001. He graduated from the University of Utah in the spring of 2003 with an M.S. in Civil and Environmental Engineering. Vikram was a Traffic Lab research assistant.

Naree Kim graduated in spring 2003 with a Master of Engineering degree in Civil and Environmental Engineering. She is employed by LSC Transportation Consultants, Inc. in Tahoe City, California, as a transportation engineer.

Girish Koli received his Bachelor of Engineering degree from Mumbai University, India, in June 2000. He is pursuing his Master of Engineering in Civil and Environmental Engineering. Girish is interning with Salt Lake City Corporation.

Bhargava Rama graduated from the Indian Institute of Technology, Kharagpur, with a Bachelor of Technology with honors in Civil Engineering in summer 2000. He graduated in the Master of Science program in the Department of Civil and Environmental Engineering fall 2002. He is employed with A-Trans Engineering. Bhargava is a former Traffic Lab research assistant.

Robert Stewart graduated with a Master of Engineering degree in spring 2003.

Aleksandar Stevanovich graduated from the University of Belgrade, Yugoslavia, with a B.S. with honors in Applied Sciences and Civil Engineering in 1998. He earned his M.S. in Civil and Environmental Engineering in spring 2003. He is enrolled in the Ph.D. program for Civil Engineering. Aleksandar is a Traffic Lab research assistant.

Michael Wright earned his B.S. in Civil Engineering at the University of Utah. He is pursuing an M.S. degree. Michael earned a general science/honors degree at Weber

State University in 1995. Honors he has earned are second place overall-ITE Intermountain Section Student Paper contest in 1998, best transportation student, Western Coal Transportation Institute, 1999; Transportation Graduate Scholarship, Thornton Department of Civil and Environmental Engineering Scholarship 1996-97; Presidential Commendation Scholarship, 1991-92 and 1994-95. Michael has completed three publications. He is employed by Garner Systems.

Peng Wu earned his Bachelor of Engineering from Wuahn Institute of Urban Construction in July 1998 and an M.S. in Transportation Engineering from Southeast University, China, in March 2001. He earned another M.S. degree in Civil and Environmental Engineering. Peng was awarded the "Outstanding Traffic Engineering Student" prize. He was a Traffic Lab research assistant.

University of Wyoming

Roger Owers is a law student working toward a juris doctorate at the University of Wyoming. Owers received a master's degree in construction management from Arizona State University in 1995 and a bachelor's degree in civil engineering from the University of Arizona in 1993.

His research, to date, has focused on tort liability of transportation departments and on road safety audits. After completing his doctorate, Owers plans to work for the Transportation Department or as a transportation contractor.

Sindhu Narayan completed a B.S. in Civil Engineering from India in 1995. She started working on her master's degree at the University of Wyoming in 2001. Sindhu is currently doing research in the asphalt moisture susceptibility area.

Fane Sellers obtained a B.S. in Civil Engineering from the University of Wyoming in 1995. He has been working full time for the Wyoming DOT since then. Fane is currently working on his Master's degree part time at UW. He is expected to graduate in the fall of 2002.

Khaled Al-Tarkeet completed the requirements for a B.S. in Civil Engineering at the University of Wyoming in Fall 2001. He immediately started working on his Master's degree in spring 2002. Khaled is involved in a project evaluating the effectiveness of QC/QA programs.

Nathan Butts obtained a B.S. in Civil Engineering from the University of Wyoming in 2000. He started his Master's degree program in the Pavement Materials area in spring 2001.

Lony Sellers obtained a B.S. in Architectural Engineering from the University of Wyoming in 2001. He has been working for the Wyoming Technology Center since that time. Lony started his M.S. program at UW in spring 2002.

Student Program Activities

Awards•Honors•Scholarships

Martimo Region 8 Student of the Year

Engineer in Training is the precise definition of Matthew Martimo's education and work as associate research fellow with the Advanced Traffic Analysis Center (ATAC). His enthusiasm and experience are also why Martimo is the 2002 Region 8 Student of the Year.



The Mountain-Plains Consortium nomination came from Martimo's research on trip generation rates. His question, "Where does the traffic go?" led to specific analysis of school and university trip generation rates. Martimo collected primary data through traffic counts at schools, and short interviews with students and parents. His methodology will allow small and medium sized cities to better account for these trips without needing to process traditional survey data.

His work ties into the ATAC Travel Demand Modeling Support Program implemented by Martimo and Ayman Smadi, director of ATAC. Their goal is to develop a resource for transportation planning modeling suited for small to medium size urban areas.

Martimo leads the development of software enhancements to traffic simulation models. He recently accepted the responsibility of being the lead member of the ATAC team for teaching Synchro and VISSIM training courses.

His work has allowed him to become uniquely familiar with traffic operations and transportation planning. Integrating and linking engineering and long-range planning are challenges he embraces.

Martimo plans to continue at North Dakota State University, earning his master of science in civil engineering this summer. He holds a bachelor of science degree in civil engineering from NDSU and is registered as an Engineer-in-Training having passed his Fundamentals in Engineering exam. Continuing at ATAC will allow him to earn his license as a professional engineer. He was president of the ITE student chapter and is a member of Golden Key National Honor Society. Martimo is active in local and regional transportation organizations.

CSU Scholarships Awarded

The following Colorado State University students received scholarships through the American Council of Engineering Companies of Colorado statewide scholarship competition.

- Linda Vandamme (Civil) - Stoneman Scholarship, \$4,000
- Tim Hinerman (Mechanical) - Bruce Scholarship, \$2,500
- Joseph Kane (Civil) - ACEC/CO Scholarship, \$2,000

Paul E.R. Abrahamson Transportation Scholarship (NDSU)

- Scott Huso, Agribusiness and Applied Economics - \$1,500
- Jeffrey Olson, Agribusiness and Applied Economics - \$1,500

Transportation Engineering Scholarship (NDSU)

- Matthew Boncquet, Civil Engineering - \$1,500
- Ryan Ackerman, Civil Engineering - \$1,500

Funding for the scholarships is provided by the Mountain-Plains Consortium through a grant from the United States Department of Transportation University Transportation Centers Program. The scholarships were presented at the UGPTI Annual Awards Banquet.

F-M Transportation Club Scholarship (NDSU)

The Fargo-Moorhead Transportation Club, a local organization that provides a network for individuals in all areas of the transportation field, recently awarded five scholarships at its April 30 meeting. Jason Baker, an undergraduate research assistant at the UGPTI-ATAC, was one of the recipients of a \$500 scholarship. Scholarship applicants were chosen based on their GPA, goals and accomplishments, and community involvement. The applicants were also required to write an essay describing why they would be a worthy recipient of the scholarship, and how they would contribute to the field of transportation. Jason was accompanied by his supervisor, Matthew Martimo, who is a member of the F-M Transportation Club.

Presentations • Workshops • Conferences

TRB and Ph.D. Program

Five students in the new interdisciplinary doctoral degree in Transportation and Logistics at North Dakota State University attended the 80th annual Transportation Research Board meeting in Washington, D.C., in January. The five students were Alan Dybing, Heather Gibb, Weijun Huang, Sang Moon and Napoleon Tiapo. They are funded primarily through Mountain-Plains Consortium stipends.

They all have an agricultural economics background. This fits well with the degree program, which is a joint effort of the College of Agriculture, Business Administration, Engineering and Architecture, and the Upper Great Plains Transportation Institute. The program has a 25-credit core curriculum, an area of concentration and a dissertation.

Students may enroll in one of three areas of concentration: Logistics and Supply Chain Systems, Transportation Economics and Regulation, or Transportation Infrastructure and Capacity Planning.

Dybing found the international aspect of the TRB conference rewarding. Visiting with people from Panama, Norway and Canada gave him a broader perspective on transportation issues. Tiapo, originally from Cameroon, echoes those thoughts. Gibb centers on how the Ph.D. program underscores their professional goals.

Transportation logistics expertise is needed everywhere in the world. They see the new Ph.D. program multiplying their opportunities exponentially. The multi-disciplinary offerings at the TRB conference paralleled much of the program.

With Denver Tolliver as the lead for the Ph.D. program, the students say they are in good hands. They cite his openness to suggestions, and the opportunities he provides, as reasons they stayed at NDSU. They all had job opportunities but wanted to be part of this inaugural venture. Their esteem for Tolliver was the clincher for most of them in deciding to pursue further education. The six of them are “designing the program” together, incorporating new ideas as needed.

The core curriculum includes two courses in *Transportation Systems* and one course each in *Logistics and Distribution Management*, *Intermodal Freight Transportation*, *Spatial Analysis of Transportation Systems* (which includes a GIS-transportation lab),

Quantitative Modeling, Probabilistic and Deterministic Methods, and *Transportation and Logistics Research*. The program also includes new courses in *Economics of Transportation Systems*, *Transportation Corridor Planning*, *Public Transportation*, *Public Infrastructure Management* and *Facilities Location*.

Ph.D. Students Attend/Present Papers at Canadian Transportation Forum Conference

Several NDSU Transportation Ph.D. students attended the 38th Annual Conference of the Canadian Transportation Forum, May 11-14.

The CTRF conference included participation by carriers, shippers, government officials, consultants and academics from Canada and the United States. The theme of this year’s conference, “Crossing Borders: Travel, Trade, Security and Communication,” provided important information for updating MPC’s focus area of International Cross Border Traffic.

Three of the Logistics and Transportation Ph.D. students presented papers. Heather Gibb presented a paper on “New Technology Adoption and the Implementation of E-Commerce in the Mid-Continent International Trade Corridor Region;” Weijun Huang presented “Strategies Used by Agribusiness, Industries in the Adoption of Shuttle Train Services;” and Alan Dybing presented “Estimation of the Demand for Grain Transportation in North Dakota.” Alan’s paper was mentioned as a runner-up in conference paper prize presentations.

James Nolan of the University of Saskatchewan commented on the student’s professionalism and quality of their presentations – “*All in all, I think it was a very good use of time for the students, giving professional presentations to a receptive and constructive audience. I certainly hope we can make this a regular event.*”

Other Student Activities

Logistics Students Tour Port of Duluth

On May 16 a group of UGPTI transportation students traveled to northeast Minnesota for tours of the Minntac Iron Ore Facility and the Port of Duluth.

The group of 10 students from John Bitzan's graduate logistics class started the day with a trip to Mountain Iron, Minnesota, to tour Minntac (part of U.S. Steel). Minntac's iron ore mine and processing facilities cover 37,000 acres of land, including a mine that stretches for 10 miles along the Mesabi Iron Range. At this facility, students witnessed workers drilling holes that later would be blasted with explosives to expose large chunks of taconite for further processing. The students also saw 240-ton trucks being loaded with taconite chunks and delivered to the processing plant. In a tour of the plant, the students watched the large taconite chunks (containing 15 to 30 percent iron) being crushed into fine pieces of rock, the iron being separated from other rock with magnets, mixture of the iron with limestone and bentonite, and heating of taconite pellets to 2,400 degrees Fahrenheit. Finally, the students saw where rail cars are loaded with the finished taconite pellets for steel production to be used in appliances and automobiles.



After touring Minntac, the group went to the Port of Duluth for a presentation about the port by Ron Johnson, the port's trade development director. The students learned about the diverse array of commodities handled by the port, including iron ore, coal, grain, and lumber, and about the intra Great Lakes traffic originating in Duluth, as well as the St. Lawrence Seaway System and the importance of the Great Lakes for U.S. international trade. Unfortunately, the students were not able to tour the harbor because of another event.



The trip was an excellent learning experience for Bitzan and the students. The entire group witnessed some real-world applications of transportation and logistics. It also provided a way to integrate classroom knowledge with hands-on learning, solidifying and expanding the knowledge base of the group.

Funding for the trip was provided by the Mountain-Plains Consortium, U.S. Department of Transportation University Transportation Centers Program.

CSU Undergraduate Summer Research Program



Professor Richard Gutkowski is mentoring Misty Butler (New Mexico State University) and Charles Manu (Bowie State University) via the annual McNair-Colorado PEAKS Alliance's Undergraduate Summer Research Program. The two students are completing individual research objectives derived from ongoing MPC-supported research projects. The overall PEAKS program (funded by the NSF) is designed to recruit and retain under-represented female and minority students as future faculty members in science, technology, engineering and mathematics. The summer program is a first step - recruiting undergraduate students to graduate studies. Fifteen students are participating this year.



Faculty Activities

JOURNAL ARTICLES / CONFERENCE PRESENTATIONS

Martin, P.T. “*Graduate Students: How to Recruit the Ones you Need, Motivate & Inspire Them, and Then to Learn from Them.*” Presented at the Annual ASEE (American Society for Engineering Education) Conference, June 24, 2003. Nashville, Tennessee.

Radford, Don. “*Pultruded Composite Shear Spike for Repair of Timber Members.*” Presented at and published in the Proceedings of the Eighth International Conference on Structural Studies, Repairs, and Maintenance of Heritage Architecture, Halkidiki, Greece. May 2003.

Balogh, Jenő and Richard Gutkowski. “*Analysis and Testing of Composite Wood-Concrete Floor/Deck Systems.*” Presented at and published in the Proceedings of the Eleventh International Conference on Computational Methods and Experimental Measurements, Halkidiki, Greece. May 2003.

Bitzan, John D. “*Railroad Costs and Competition – The Implications of Introducing Competition to Railroad Networks.*” *Journal of Transport Economics and Policy*, Volume 37, Part 2, May 2003.

Martin, P.T., C. Jhaveri, H.J. Perrin. “*SCOOT Adaptive Signal Control: An Evaluation of its Effectiveness over a Range of Congestion Intensities.*” January 2003

Martin, P. “*Linking Profession and Academic Traffic Engineering Communities in the Rocky Mountain Region.*” ITS Rocky Mountain Annual Conference, Salt Lake City, October 2-4, 2002.

Gutkowski, Richard and J. Balogh. “*Mechanics Behaviour of Dowel Connectors for Partially Composite Wood-Concrete Beams*” and “*Load Test of Composite Wood-Concrete Deep Beam Specimen.*” Published in the Proceedings of the 7th World Conference on Timber Engineering, Selangor, Malaysia. September 2002.

Gutkowski, Richard. “*Design of Timber-Concrete Composite Structures According to EC5-2002 Version.*” Published in the Proceedings of 35th Meeting of Working Commission W-18 - Timber Structures (International Council for Research and Innovation in Building and Construction), Kyoto, Japan. September 2002.

Stafford, C.M. and T.G. Sanders. “*Part I, A Study in the Effectiveness of Solid Chemical De-icers.*” *Snow and Ice Management*, August 2002.

Stafford, C.M. and T.G. Sanders. “*Part II, Corrosive Properties of Chemical Deicers.*” *Snow and Ice Management*, August 2002.

Perrin, H.J., Peter T. Martin. “*Interfacing SCOOT and CORSIM: Three Salt Lake City Networks Modeled.*” Presented at the Institute of Transportation Engineers Annual Conference. August 4-7, 2002. Philadelphia, Pennsylvania.

Perrin H.J., Peter T. Martin. “*Modifying Signal Timing During Inclement Weather.*” Presented at the Institute of Transportation Engineers Annual Conference. August 4-7, 2002. Philadelphia, Pennsylvania.

Perrin H.J., Peter T. Martin, C. Jhaveri. “*Modeling Adaptive Signal Control: Software in the Loop.*” Presented at the Institute of Transportation Engineers District 6 Annual Conference. July 14-17, 2002. Palm Desert, California.

Perrin, H.J., Peter T. Martin, B. Coleman, B.W. Hansen. “*Measuring Real-Time Congestion on Surface Streets.*” Presented at the Institute of Transportation Engineers District 6 Annual Conference. July 14-17, 2002. Palm Desert, California.

Martin, Peter T. “*Real-Time Measures of Effectiveness.*” Transportation Research Board Mid-year Conference. July 2002. Park City, Utah.

Martin, Peter T. Hosted Transportation Research Board Conference for Traffic Signal and Freeway Operations Committees at Park City, Utah, for mid-year meeting. July 2002.

WORKSHOPS / SHORT COURSES

Hazardous Materials/Waste Manager Training Course

June 17-19, 2003. Sponsored by CSU, Department of Civil Engineering.

This course was designed to integrate the HSMW sections of the applicable federal regulations and help minimize liability from HSMW handling. Our goal was not to make technical experts of our students, but to increase their abilities to adequately manage HSMW.

Attendance: 28 professionals from throughout the U.S.

Design of Water Quality Monitoring Networks

June 9-13, 2003. CSU.

This course included detailed procedures for designing a water quality monitoring system. Information expectations, design criteria, network design, operating plans and procedures, and reporting formats and schedules were discussed. The material covered applied to the design of any monitoring system, regardless of the location of water in the hydrologic cycle. The information goals defined in the expectations included the determination of ambient conditions, trends, interventions, and excursions beyond a limit. Material on the design of monitoring systems for agriculture and urban nonpoint sources were included.

Attendance: 12 professionals from the U.S., Canada, and South Africa.

Leadership Course

May 2003

Taught by Peter T. Martin

Information Technology in the Civil Engineering Curriculum

April 2003

Neil Grigg, Marvin Criswell, Darrell Fontane, and Thomas Siller. NSF-sponsored workshop.

PE Review

September 27, 2002 and February 14, 2003

Peter T. Martin, WASHTO-X and TEL8

ACHIEVEMENTS

Jill Hough, program director of the Upper Great Plains Transportation Institute's Small Urban and Rural Transit Center (SURTC), has been selected to serve on the Transit Cooperative Research Program's (TCRP) oversight and project selection committee.

ASCE Press has published the new book, "Civil Engineering Practice in the Twenty-First Century: Knowledge and Skill for Design and Management" co-authored by CSU professors Neil Grigg, Thomas Siller, Darrell Fontane and Marvin Criswell. This work provides future-based skills for contemporary engineers.

Dr. David Neff, CSU researcher, was selected to serve on a National Research Council steering committee titled, "Tools for Tracking Chemical/Biological/Nuclear Releases in the Atmosphere: Implications for Homeland Security."

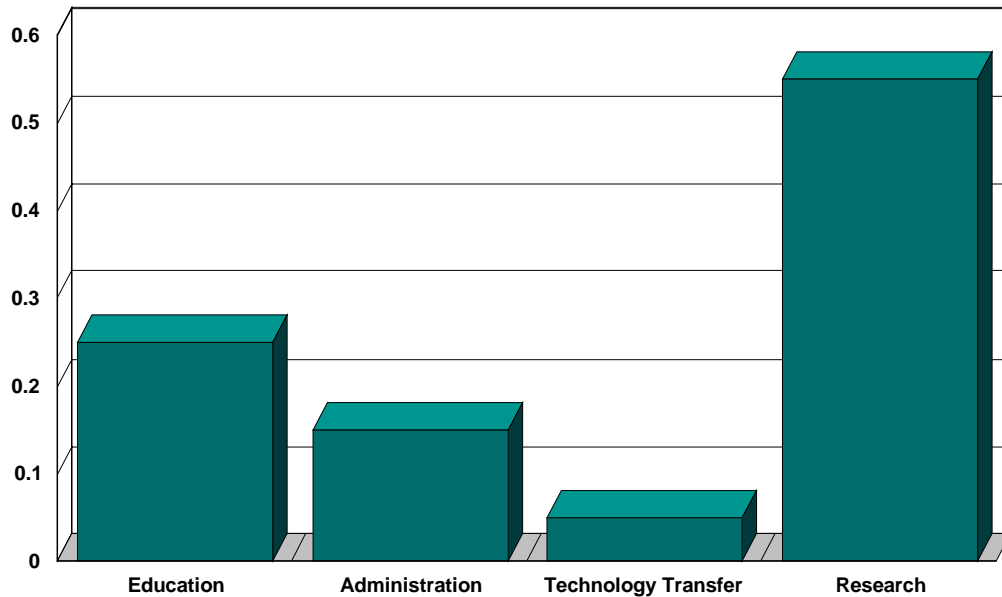
CSU Assistant Professor, Amy Pruden, received a Journal of Engineering Editor's Prize, 2002.

Emeritus Professors Everett Richardson and Daryl Simons of CSU completed an expanded edition of River Engineering for Highway Encroachments: Highways in the River Environment. This widely disseminated training and reference manual is published by the FHWA.

Resources and Funding

July 1, 2001 - June 30, 2002

Distribution of Funds



FUNDING SOURCES

North Dakota Department of Transportation

Utah Department of Transportation

Wyoming Department of Transportation

North Dakota State University

Colorado State University

University of Utah

University of Wyoming

TEL8 Telecommunications Network (*includes the NDDOT, SDDOT, MTDOT, UDOT, WYDOT*)