



# MID-AMERICA TRANSPORTATION CENTER

Volume 3 Issue 2

IMPROVING SAFETY AND MINIMIZING RISK ASSOCIATED WITH INCREASING MULTI-MODAL FREIGHT MOVEMENTS

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## Student Spotlights



**MATC Student  
of the Year:  
Nathaniel  
Burnett**  
UNIVERSITY OF  
**Nebraska**  
Lincoln

Nathaniel Burnett is a master's student at the University of Nebraska-Lincoln. His research focuses on traffic operations and safety, specifically on dilemma zone boundaries and its effects on multiple vehicle crashes. He received a bachelor's degree in Civil Engineering from Colorado State University and a bachelor's degree in Physics from Fort Hays State University. After graduation Burnett plans to pursue a career in the public sector.

Among the several academic awards Burnett has received, he has also been awarded UNL's Larson Fellowship. He co-authored a paper on the effects of inclement weather on dilemma zone boundaries that was accepted for presentation at the 89th Annual TRB Meeting. He is currently president of the UNL student chapter of the Institute of Transportation

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THE UNIVERSITY  
OF IOWA

**Student Spotlight:  
Yan Zhang**

Yan Zhang is a graduate student in the Department of Mechanical Engineering at the University of Iowa. A research assistant

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MISSOURI  
**S&T**  
University of  
Science & Technology

**Student Spotlight:  
Durga Raj  
Mathur:**

Durga Raj Mathur recently graduated from Missouri S&T with a Master's of Science in Mechanical and Aerospace Engineering. As

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## Indo-US Workshop: "Emerging Trends in Intelligent Transportation Systems (ITS)"



Chennai, India: February 11-13, 2010

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# University Student Spotlights

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## Yan Zhang: University of Iowa Student Spotlight

under the supervision of Dr. Albert Ratner, she is working on the MATC project "Improving Freight Fire Safety: Analysis and Testing of Real Engine Conditions to Progress Development of Mist-Controlling Additives for Fire Mitigation." As part of this project, she has completed the calculations of the shear stress along a diesel engine fuel system. In this research project the experimental configuration is numerically simulated with FLUENT so as to enable comparison of real engine conditions to experimentally measured behavior. In Zhang's future work with this project, the model will be modified to include non-Newton fluid properties.

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## Durga Raj Mathur: Missouri University of Science & Technology Student Spotlight

a student at MS&T, he worked on a research project funded by MATC titled "Synthesis and Evaluation of Markings for Truck Mounted Attenuators." His research thesis was titled "Validation of Driving Simulator and Driver Perception of Vehicle Mounted Attenuator Markings in Work Zones." While completing his degree, he wrote several papers that are currently either in review or have been accepted for submission. He also co-presented a paper at the 88th Annual TRB conference. During his spare time he listens to Indian music, enjoys spicy food and plays cricket. He is currently working for a CAD/CAM firm in Washington State.

## MATC UNL Intern Program: Kick-Off



On Wednesday, May 12th 2010, the MATC Intern-Sponsor Introductory Luncheon was held in the Jackie Gaughan Multicultural Center on the University of Nebraska-Lincoln campus from 11:30-1:00pm. This event brought together interns and their sponsors as the preliminary proceeding to the thirteen week summer internship, beginning May 17th and ending on August 13th. After introductions from the students and the sponsors, Karen Schurr, MATC intern coordinator, explained the intention of the summer internship as a program that was mutually beneficial for students, faculty and sponsors. According to Schurr, the purpose of the summer internship is to attract the best students to transportation engineering and to create an experimental environment for the students in which they can apply the knowledge they have gained in the classroom. In this way, the program functions to recruit students to the field of transportation engineering, but it also allows students the opportunity to discover the diversity and challenges that transportation engineering offers by actually working in the job field. While students are learning about career possibilities, the sponsors can benefit from low labor costs (though the students are still provided with acceptable pay) and a thirteen week trial period of the student as a potential job candidate. Accordingly, students can use this internship as an opportunity to network with professionals and become more motivated about their career path. Furthermore, the MATC internship program allows a dialogue between sponsors and university faculty so that class curriculum can correspond, as much as possible, with ever-changing occupational needs.

At the end of the internship, MATC provides a scholarship to each of the students if they have completed their work in a satisfactory manner and have adhered to the expectations of the sponsor. Among the expectations outlined by Schurr are the field visit (July 16th), in which the students prepare a powerpoint presentation of their job responsibilities and present it to the other interns, and the internship report (August 11th), a written report of their responsibilities and accomplishments. At the recognition luncheon, to be held on August 13th, the winners for the best essay (\$250 scholarship) and best presentation (\$100 scholarship) are announced and scholarship prizes are awarded to the interns.

Beginning in 1996, the MATC summer internship program has provided 139 students with 176 positions over a fifteen year period. Often students have the opportunity to intern multiple years, two or three years, for a new sponsor each year, or, if it is preferable, for the same sponsor.



Interns (from top, left to right): Jeff Bohlken, Keven Hock, Keven Messersmith, David Stuart, David McClintock, Mike Olsen, Eric Reiner, Brandon Prauner, Nicole Voelte, Jacob Miriovsky, Traci Sueper. Sponsors (second row, left to right): Kevin Wray, NDOR; Lonnie Burkland, ITERIS; Karla Lechtenberg, MwRSF; Koudous Kabassi, UNL; (first row) Greg Youell, MAPA; Dan Owens, LRA; Tom Shafer, City of Lincoln; Brian Johnson, NDOR. Interns not pictured: Carrie Mohlman, Tierney Moore, Don Nash, Adam Denney.

**Featured in our next MATC Newsletter will be KU, KSU and MS&T Intern Programs.**

# Letter from the Director



Dr. Laurence Rilett

The past six months have been an exciting time for the Mid-America Transportation Center. Our biggest change is that we have new headquarter space; I am happy to report that we have completed our move into the newly-renovated Whittier Building on the University of Nebraska-Lincoln city campus. This move was part of a major facilities upgrade for the

Nebraska Transportation Center in which we nearly doubled our space to 22,000 ft<sup>2</sup>. More importantly, we have incorporated three state-of-the-art transportation laboratories as part of this initiative: an Intelligent Transportation Laboratory, a Visualization and Simulation Laboratory, and a Logistics Laboratory. The three labs, each approximately 2,000 ft<sup>2</sup>, represent a significant upgrade in our facilities available for the research, education and technology transfer mission of MATC. The Whittier Building represents a substantive investment by the University of Nebraska administration, for which I am deeply appreciative. The building itself is spectacular and I invite all friends of MATC to come for a visit – I will be happy to give a personal tour of our new home. We are also planning an official grand opening and will be providing more information on this event in the near future.

I am particularly pleased to report that we have successfully achieved all the goals outlined in our 2006 proposal to host the USDOT Region VII University Transportation Center. While there are many metrics that can be used to illustrate this success, I would like to take the opportunity to highlight those related to our student participation in MATC activities. Since 2006, one hundred thirty-three graduate students have participated in our research program as research assistants, thirty-two undergraduate students have been employed as student workers on our research and education programs, and one hundred nineteen students have participated in the MATC internship program. The underlying MATC philosophy has been to develop student-centered and nationally impactful education, research and technology transfer programs – and these statistics illustrate our success in this regard. It is our students who will

become the future public and private sector transportation leaders – and will be developing the solutions to the complex transportation problems that each state in Region VII, and indeed the United States as a whole, will face in the future.

I also wanted to take this opportunity to introduce one of several new initiatives that I am excited about. This fall we are instituting a new program to attract and retain graduate students who are from groups that have been historically under-represented in transportation. The leaders of this project are Dr. Judy Perkins from Prairie View A&M University and Dr. Erick Jones from the University of Nebraska-Lincoln. We will be hosting a workshop for faculty members from historically under-represented groups in Lincoln, Nebraska in the fall 2010. We will be discussing this initiative in detail in our next newsletter.

I am very proud of the excellent education and research work that the MATC faculty, staff and students are conducting which you will find highlighted throughout this newsletter. As always, we are also taking the opportunity to introduce our readers to a small subset of our MATC students. We are very fortunate to have fantastic students, who, of course, are instrumental to our mission and success. As always I welcome your feedback and suggestions related to our program. Thank you for your interest and continued support.

Sincerely,  
Larry

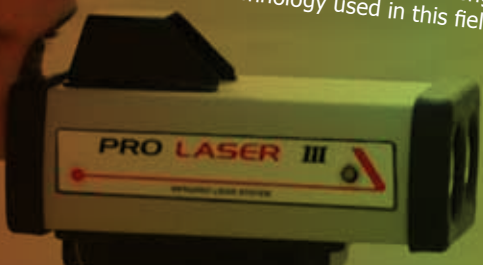




# McMillan Middle School's MATC Field Trip

On February 19th and May 6th, McMillan middle school students traveled from Omaha to visit the University of Nebraska-Lincoln campus for a "Transportation Engineering Experience" field trip. Conducted by MATC and NTC and lead by transportation engineering graduate students, the field trip introduced McMillan students to transportation engineering by demonstrating the technology used in this field. The students were divided into

groups and the day was organized so that each group visited five stations: geographic information systems, video detection and microsimulation, speed guns, radio frequency identification and logistics, and bridge and structures engineering. During these twenty minute sessions, McMillan students were taught how to map routes on a computer, measure car speed, use speed guns and other tracking devices, and a myriad of other skills. After a morning full of sessions, the students enjoyed pizza before their big competition. The groups were tested on their knowledge and the team with the best score was awarded for their efforts. The highlight of the field trip for many students was using the radar guns to capture speeds, while others were impressed with the technology used in transportation engineering. When asked about the field trip experience, one student answered: "it is a super fun time working as a transportation worker, and it also takes a lot of work. It was a very fun field trip!"



# TRB

## MATC Scholars Attend TRB



Attendees from KU pictured left to right: Cheryl Bornheimer, Matthew Pierson, Romika Jasrotia, Carl Schwarzer, and Vinur Kaul.



attendance. This year's conference was no different—once again, the TRB provided

a multitude of presentations on relevant transportation related topics. The latest research, standards, and practices were addressed by the presentations and, importantly, new areas of potential research were introduced. For the MATC students who were in attendance—one MS&T, two UI, eleven UNL, eleven KU and seven KSU students—it was a wonderful opportunity to learn about innovative findings, new areas of research, and to meet people involved in their field of interest. Jeff Thiele, a UNL graduate student and MATC scholar, attended the TRB for the first time and it was a memorable experience: "the conference provided me with a better perspective on how problems are solved through research. It helped me understand the scope of my field both as an area of study as well as a career path. The field

of transportation is huge, and there are thousands of professionals improving many different aspects of the field that I'll never work in. It's inspiring and humbling to see how many people dedicate their professional lives to working in these different areas."

The sheer expansiveness of the conference circumscribed many students to their particular area of research, and this allowed them to network with professionals in their area. Jennifer Schmidt, a UNL graduate student and MATC scholar, considers networking to be one of the most valuable aspects of the TRB: "the conference exposes students to many professionals in the transportation field. Positive contact with these professionals encourages students to continue pursuing the transportation field and provides them with many possible job opportunities."

Professionalization is a beneficial aspect of the TRB and students are granted the opportunity to present or discuss their own research with professionals and other students. Nathaniel Burnett, a UNL graduate student and MATC



Pictured above: MATC students pose together at TRB.

scholar, felt that the best moment of the conference was presenting at a poster session on an article he co-authored with his advisor, Dr. Sharma. While at the conference, students from different MATC-affiliated universities were able to meet and discuss their interests thereby creating a network of discourse that may be useful during their coursework and career. The TRB conference is a fantastic opportunity for students and professionals alike to share research and ideas, and to create connections that are invaluable to future success.



Attendees from UNL pictured left to right: Yifeng Chen, Xiang Lan, Justice Appiah, Maurice Caviatt, Nate Burnett, Jennifer Schmidt, Jacob Schmitz, Bhaven Naik, and Jeff Thiele.



Attendees from UI pictured left to right: Nick Hatz, and Beth Westlake.



Attendees from KSU pictured left to right: Abhiteja Rallabandi, Farhana Rahman, Brian Geiger, Loshaka Perera, Ranjit Godavarthy, and Chandra Manandhar.

# ASCE / LOCate Transportation Conference provides interesting speakers and networking opportunities

by Benjamin Grone, UNL Master's Student



The Nebraska Section of the American Society of Civil Engineers (NEASCE) and the Lincoln, Omaha, Council Bluffs Association of Transportation Engineers (LOCate) teamed up on April 9th to present their annual Transportation Conference in Omaha. A number of MATC graduate students took advantage of complimentary student registration by taking part in the day's events. This year the conference provided speakers on a number of pertinent topics in transportation engineering and it was a great opportunity for networking with well over 100 industry professionals in attendance.

Presentations given throughout the day covered numerous topics ranging from a proposed alteration of EPA emissions standards to an overview of the South Omaha bridge project, spanning the Missouri River. Modal interactions were emphasized in three presentations including one by MATC/UNL professor and researcher Dr. Aemal Khattak

who spoke on his research involving unsafe driver behaviors at railroad-highway grade crossings. Other presentations were given on the topics of driver distraction, pavement management, and highway safety.

Two of the presentations which addressed highway funding were of particular interest as transportation funding policy is generally not addressed in transportation academia but has become a pressing issue for the industry in recent years with the depletion of the Highway Trust Fund. The first of these two presentations addressed the concept of a "Federal Fund Exchange Project" which would allow local governments to exchange federal funding (with numerous strings attached) for slightly less state funding (with fewer strings attached). This would allow these

local governments to more efficiently pursue their smaller projects while leaving the state to pursue larger projects that comply with the stipulations attached to the federal dollars. The second of these two presentations was given by Nebraska Senator Deb Fisher and addressed one potential path that the State Legislature may pursue for the future of highway funding in Nebraska. While funding is not a purely technical issue faced by transportation engineers, it is an area that greatly affects the industry and is due for significant restructuring in the near future.

From highway financing to pavement management, the organizers did a wonderful job of bringing together knowledgeable presenters on a broad spectrum of topics. Due to their work, the conference was a memorable experience. At the end of the day, attendees were left with a number of concepts to ponder and ideals to strive toward.

## "Water Resources Engineering" Graduate Seminar: Dr. Guo presents on UNL's FHWA Flow Simulation Lab



Pictured above: Dr. Junke Guo presenting at the Water Resources Engineering graduate seminar held in Omaha, NE with a live video conference from Lincoln, NE.

The Department of Civil Engineering at the University of Nebraska-Lincoln held a graduate seminar in "Water Resources Engineering" on April 16th. Led by Dr. Junke Guo and open to faculty and students, the seminar introduced the development and achievements of the

FHWA Flow Simulation Lab on the UNL campus. This lab was established through the collaborative efforts of UNL, FHWA Hydraulics Lab and Argonne National Lab. Some results have become national design standards. The lab not only supports the UNL hydraulics graduate program, it also supports MATC hydraulic research initiatives. One such program is bridge hydraulic research, which was the focus of this seminar as Dr. Guo provided an overview and explanation of the experiments that have occurred on campus relative to this issue.

Dr. Junke Guo's MATC project titled "Computational Design Tool for Bridge Hydrodynamic Loading in Inundated Flows of Midwest Rivers" described that the 1993 and 2008 Midwest floods showed that with weather pattern changes, the period between returning extreme floods may be shortening. These changes threaten existing bridges over rivers. This study transfers the recent supercomputer simulation technology of inundated bridge hydrodynamics from laboratory scales to practical design scales.

According to Guo, bridge hydraulic research is important to the sustainability of bridge infrastructure because more than 50% of bridge failures are due to hydraulic causes. Guo's presentation explained the research results of three on-campus research efforts: computational bridge hydrodynamics, bridge pressure flow scour, and cohesive sediment incipient motion.



# MATC Students Tour Union Pacific Gothenburg Ultrasonic Detection Site & Bailey Switching Yard



In early May, MATC students toured two Union Pacific facilities: the Gothenburg State of the Art Inspection Station and the Bailey Yard. At the Gothenburg Inspection Station, Bill GeMeiner, senior manager of methods and research for Union Pacific Railroad, gave a detailed explanation of the fifteen detectors that are located across the three main tracks and the three varieties of machine vision inspections systems (wheel profile, low air hose, brake shoe, and friction wedge rise) utilized at the site. The students were shown the advanced detection system which includes a wheel defect scanner, wheel profile measurement system, acoustic bearing detection, wheel impact load detector, and RFID tag readers. These sensors notify Union Pacific of any maintenance or repair issues that will need to be addressed at the Bailey Yard. For example, load sensors are built into the rail to detect the force that the train is exerting on the track, thus, these sensors can detect flat spots on the wheels because they would exert more force on the rail than the normal round wheel. All the data collected at the Gothenburg site is then sent via a microwave tower to North Platte and to Omaha.

Union Pacific Railroad's Bailey Yard is located in North Platte, Nebraska and is the largest railroad classification yard in the world. The yard covers 2,850 acres, processes 10,000 railroad cars every twenty-four hours, and employs 2,200 rail-workers. Serving as a mid-point for east and west moving trains, the Bailey Yard inspects, repairs, sorts and directs rail-traffic. Since the first train entered the station in 1866, the Bailey Yard has changed throughout the decades to meet the fluctuations and needs of railroad users and rail-traffic. The tour at the Bailey Yard, lead by Dean Buhlig, director of terminal operations, included a trip to the command center, where the guide explained the functioning of the rail yard, the guidance and dispatch system used to guide traffic into eastbound or westbound hump yards, and the standard work day for yard employees. In the locomotive workroom, MATC students learned about locomotive maintenance, inspection and repair. The Golden Spike Tower was the final stop on the tour, allowing the students a panoramic view of the entire yard. The Gothenburg and Bailey Yard tour, funded in part by Union Pacific, was a special treat for MATC students: they left with their intellectual curiosity piqued and were eager to learn more about career possibilities in railroad engineering.



On this page (clockwise from top): Attendees at the Union Pacific Gothenburg Ultrasonic Detection Site; Tour attendees at the Golden Spike Tower; Bill GeMeiner, senior manager at Union Pacific, shows attendees the sensors on the tracks; the Union Pacific logo seen as the train passes through the rail yard; and a railroad car classification hump at the Bailey Yard.





## KSU-MATC Technology Transfer Program

**PI: Mustaque Hossain, Professor, KSU;**  
**Co-PI: Robert Stokes, Professor, KSU**

KSU will offer courses in the fall of 2010 on pavement construction, preservation and Superpave mixture materials both in Kansas and nationwide via webinar. As many in the transportation workforce retire, a pool of highly qualified transportation professionals is required to plan, design, operate and maintain the nation's transportation infrastructure, facilities and services. Continuing education and technology transfer of new developments is essential for the success of the transportation field. This program will satisfy these two goals by educating the work force in the latest technology to build and maintain road pavements to cope with the increasing truck traffic due to freight transportation. Conferences, short courses, workshops and webinars are effective media that will be used as educational tools in the course. This project will also help distribute results obtained from various MATC research projects via the annual Kansas Transportation Engineering Conference.

## Transportation Workforce Development Initiative

**PI: Mustaque Hossain, Professor, KSU;**  
**Co-PI: Robert Stokes, Professor, KSU**

To expand workforce education and technology transfer, KSU established a Transportation Workforce Development Initiative. The main objective of this project is to educate and motivate the next generation of transportation students and professionals. The components of this program are KSU-MATC academic year internships, KDOT-KSU-MATC summer internships, and a certificate program in Transportation Engineering. The aforementioned initiatives are designed for students and future transportation professionals who want to expand their knowledge and skills. For undergraduate students, internships will provide experience in the transportation field that may motivate them to pursue a career in transportation engineering. The transportation engineering certificate program will provide transportation professionals with the opportunity to pursue a focused collection of courses that, when completed, allows them to receive recognition of their continued effort in the area of transportation engineering. This program is less extensive, and different from, a traditional master's program, however, it will allow the candidate to accumulate credit hours toward their master's degree, if they decide to continue their education. The internships and the certification program will each function to cultivate a better educated workforce.



## University of Iowa Transportation Symposium

**PI: Dr. Paul Hanley, Associate Professor, UI**

To encourage undergraduate and graduate students to seek careers in the transportation sector and provide an opportunity for local, regional and state transportation professionals to obtain current information on transportation finance policy, the Public Policy Center, with the assistance of the Mid-America Transportation Center, brought together national experts for a symposium. Many aspects of transportation policy, from highways and transit to the externalities of transportation, such as land use and equity, were the focus of this meeting.

The Public Policy Center of the University of Iowa, through the Forkenbrock Series on Public Policy, facilitated a two-day symposium on the topic of transportation finance and economics. The series was open to the public and targeted transportation professionals from all levels of public agencies and private industry to debate the future of transportation. Twenty-four speakers—representing the federal and state departments of transportation, four universities, four consultancies, and three private freight service providers—were scheduled during the two-day symposium. At the conclusion of the event, the slides and audio transcripts of each session were made available for download at the Public Policy Center's website.

## Industry-Oriented Freight and Public Transit Planning Courses

**PI: Dr. Paul Hanley, Associate Professor, UI**

The University of Iowa, with the assistance of the Mid-America Transportation Center, now offers two upper level undergraduate/graduate courses to encourage students to seek careers in the transportation sector. The two courses are "Public Transit Operations" and "Planning and Freight Transportation Planning" and subsequent offerings will be available to MATC partner universities. The Public Transit Operations and Planning course focuses on bus, light and heavy rail, and paratransit modes as well as transit operations, planning, modeling and optimization, transit agency economics, transit finance, and evolving transportation policy. This course also emphasizes skills essential to planners and engineers who intend to work for either a planning agency, transportation provider, or a transportation or planning consulting firm. This class is especially geared towards undergraduate and graduate engineering students and graduate urban and regional planning students. The Freight Transportation Planning course focuses on surface modes, primarily trucking and rail, as well as trade-offs in bulk movements by inland waterways and pipelines. Recent developments in policy, planning, and practice for surface transportation in other developed economies are also of primary concern in this course. The purpose of these two courses is to ensure that curriculums are altered to reflect the changes in the transportation industry's demand and to encourage undergraduate and graduate students to consider careers in the transportation sector.



# MOVITE

## Spring Meeting

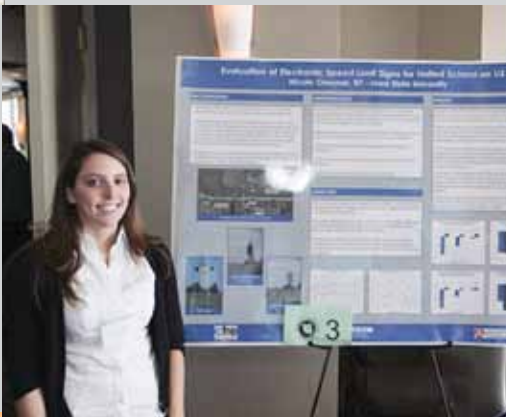
by Robert Rescot, KU Graduate Assistant

In late April the Missouri Valley ITE division (MOVITE) held their annual spring meeting in Kansas City, Missouri. Current and former MATC students participated in the event and several of the students gave presentations or were honored with awards for their research. Bhaven Naik, a University of Nebraska Ph.D. student, won third place in the student poster competition with a poster titled "Developing a State-Wide Traffic Simulation: Issues and Challenges." Robert Rescot, a



University of Kansas Ph.D. student, presented on the MATC funded project "Evaluation of the Gardner (Edgerton), Kansas Rail-Truck Intermodal Facility," and served on the conference planning committee. University of Kansas master's students Romika Jasrotia and Cheryl Bornheimer won first place in the student poster competition with a poster titled "Pavement Condition Assessment & Best Management Practice Analysis for the city of Haiwatha, Kansas." Brian Geiger, a recent master's degree graduate from Kansas State University now employed with Parsons

Brinckerhoff, presented on a MATC funded project titled "Opinions of Rural Public Transportation Riders and Non-Riders." Five volunteers from the University of Kansas ITE student chapter further supported the MOVITE spring meeting by assisting with registration and on-site hospitality.



As shown in these images, the MOVITE spring meeting featured presentations, lectures and poster sessions.



## AREMA Scholarship

John Coburn is winner of the Union Pacific William E. Wimmer Scholarship of \$1000, provided through the AREMA Foundation. Mr. Coburn was awarded this prize for his MATC intern project, advised by Dr. Anuj Sharma.



...continued from page 1

## MATC Student of the Year: Nathaniel Burnett

Engineers, and has served in leadership roles in the Society of Physics Students & Engineers and in the Phi Mu Alpha fraternity. Dr. Anuj Sharma, Burnett's advisor, is confident that this award is just the beginning of Burnett's success: "Nate was my first advisee. Nate's work ethic, leadership skills, sincerity and ownership has made my task a lot easier. I just point him to the right direction and am confident to get the best results. I have no doubt that he will be successful in both his job and his life."

Burnett was selected for the MATC Student of the Year award because of his exemplary academic excellence and the leadership qualities that he has exhibited throughout his college career. Of his achievement Burnett states, "I was truly honored to receive the MATC Student of the Year award. It was a humbling experience for me, as many of our department's students could have easily won this award. The award has meant to me that all the long nights and weekends of working on homework and research were worth putting in the time and energy. Attending the awards reception in Washington D.C. with my then fiancée (now wife), was one of the most exhilarating experiences I have been a part of. Not only did I get to share the experience with the love of my life, but I was in the presence of some of the brightest students and faculty in the United States."

# 11th Annual ITS Heartland Meeting

# ITS Heartland Annual



Above: President Bill Troe welcomes everyone to the 11th Annual ITS Heartland Meeting

The 11th Annual ITS Heartland Meeting was held March 29-31st in Omaha, Nebraska and brought together new research and ideas from the public and private sectors. ITS Heartland is a chapter of ITS America and is intended to create a dialogue between five heartland states: Missouri, Iowa, Kansas, Nebraska, and Oklahoma. The state departments of transportation along with the major universities in each state work alongside the Federal Highway Administration in maintaining the organization's goal to improve transportation through technology and communication. The Mid-America Transportation Center has supported the ITS Heartland Board of Directors with chapter administration and an annual meeting event coordinator since their first conference in Omaha, Nebraska in 1999.

Each year the ITS Heartland chapter holds a meeting to allow members to discuss ITS issues, share ideas, learn about activities in other states, and to provide a venue in which vendors can showcase new products.

At this year's meeting the first day was utilized for a large group session which addressed operations and priorities in the region given the available resources and funding allocations. The afternoon of the same day was used to establish plans, discuss goals and formalize a schedule of action based on the ideas raised in the morning session. Speakers included Bill Troe, President, URS Corporation; Jeffrey Lindley, Federal Highway Administration Associate Administrator; Douglas Kindig, Mayor, City of LaVista; John Jacobsen, Deputy Director-Operations; Mark Shook, OU – ODOT; Shari Hilliard, KDOT; Missy Wilbers, MoDOT; Jon Ogden, NDOR; Willy Sorenson, IDOT; and Paul Feenstra, Vice President of Government Affairs, ITS America. The second and third days of the annual meeting were used for general meetings and concurrent panel sessions with paper presentations by students, professors, and members of the public and private sectors. Some of the topics addressed by the panels included travel information systems, non-highway applications, technology and safety, the economic benefits and sustainability of ITS systems, incident management, ITS efficiencies and corridor management, and communications systems.

## ITS Vendors

- Consensus Systems Technologies
- Sensys Networks
- Brown Traffic Products
- High Sierra Electronics, Inc.
- RuggedCom, Inc.
- LogicTree Corporation
- Traffic Control Corporation
- Rhythm Engineering
- O.M.J.C. Signal, Inc.
- Electronic Technology Inc.
- Telvent
- IMAGO North America
- TransCore
- Image Sensing Systems Canada
- SRF Consulting Group, Inc.
- Daktronics
- EtherWAN
- Amercan Signal Company
- Delcan
- Vaisala
- Meridian Environmental Technology, Inc.
- Skyline Products
- Larson Data Communications
- Naztec, Inc.
- Southern Manufacturing
- Mid American Signal
- Wavetronix
- Mid-America Transportation Center
- MODOT



Surrounding images: A few of the vendor booths that participated in this year's meeting.



# Meeting



Above and right: The ice breaker for this year's meeting took place at the Strategic Air and Space Museum.



## ITS Sponsors



Nate Burnett, UNL master's student, 2nd Place winner and (below) Zheng Luo, UNL master's student, 1st place winner, receive their awards for this year's student essay competition.



Pictured above: A collection of current road signs on display at the annual meeting.



save the date

MARCH 28, 29, & 30, 2011



12<sup>th</sup> Annual ITS Heartland Meeting

Sheraton West Des Moines Hotel, Iowa

For Information Contact Valerie Lefler at [vllefer2@unl.edu](mailto:vllefer2@unl.edu) or visit [www.itsheartland.org](http://www.itsheartland.org)





## Region VII State Agency Research Directors



Mara Campbell



Rodney Montney



Moe Jamshidi



Sandra Larson



# MATC Final Report Summaries

The annual research reports are distributed to national transportation research libraries and will be accessible on the MATC website ([matc.unl.edu](http://matc.unl.edu)). The information included in these reports is of interest to both transportation professionals and the general public. A brief overview of these final research reports follows.



For the complete version of the  
final reports, please visit:  
[matc.unl.edu](http://matc.unl.edu)

## University of Nebraska Projects

UNIVERSITY OF  
**Nebraska**  
Lincoln

### Impact of Truck Loading on Design and Analysis of Asphaltic Pavement Structures (Joint Research)

**PI:** Yong-Rak Kim, Assistant Professor, UNL

**Co-PI's:** Hoki Ban, Post-Doctoral Research Associate, UNL; Soohyok Im, Ph.D. Student, UNL

**DESCRIPTION:** In this study, pavement performance predictions were conducted from both the mechanistic-empirical pavement design guide (ME-PDG) approach and the mechanistic approach based on the finite element (FE) method. As a first step of this research, we investigate the effects of only one design parameter (i.e., properties of hot-mix asphalt surface layer) on pavement performance and life predicted by only one type of failure mode, rutting. The purpose of this research is to improve safety and to minimize the risk associated with increasing heavy truck movement on the U.S. surface transportation system. This study investigates the truck load impact on pavement damage and performance life of highways by employing the ME-PDG method, which is currently the best model, and the next-generation mechanistic design-analysis approach.

**RESULTS:** Analysis results indicated that the FE mechanistic model produced a longer life than the ME-PDG approach. This is because the ME-PDG involved pavement damage through the empirical transfer function of rutting, while the FE mechanistic model at this stage determined the pavement life by accounting for only one source of energy dissipation due to the linear viscoelastic asphalt layer depression. However, by using the mechanistic approach, the accuracy of pavement performance results can be improved by considering other sources of energy dissipation in the model, such as cracking and aging. This study can eventually contribute to improving public safety by mitigating risk associated with pavement deterioration.

## Investigating RFID for Roadside Identification Involving Freight Commercial Vehicle Operators (CVO)

**PI:** Erick C. Jones, Associate Professor, UNL

**Co-PI's:** Dwight Mosby, National Aeronautics and Space Administration (NASA) engineer; Judy Perkins, Full Professor, PVAMU; Dejing Kong Dejing Kong, Ph.D. student, UNL; Angela Garza, Ph.D. student, UNL

**DESCRIPTION:** Radio Frequency Identification (RFID) is an emerging technology that has the ability to track commercial vehicles. This research investigates the ability for RFID technologies to work in license plates. Mile markers are common fixtures on the roadside

and may provide infrastructure to support identifying RFID to enabled Commercial Vehicle Operators (CVO). This research considers variables that affect the performance of a RFID License Plate System that uses a scanner which is located at the mile marker. Mile marker characteristics, such as horizontal distance and vertical height, were evaluated along with RFID tag characteristics, such tag type and license plate location.

**RESULTS:** The results from the experiments indicate that the two specified factors – Antenna Height and Tag Height – have a significant impact on the readability of tags.

There are 5 vital areas that are tied directly to the performance, readability and read range of RFID: power to tag, power to reader, internal attenuation of signal, transmittance frequency, and environmental conditions. Based on the experiment result, a suitable height range for the RFID measurement was determined. The best range of suggested height of passive tags is around 3 feet and this value indicates that it is better to be closer to the antenna in the horizontal level. For active tags, the good range of suggested height is around 2 feet, which means the best angle is between the tag and antenna (5 feet high) in this level.

## Risk Mitigation for Highway and Railway Bridges

**PI:** Andrzej S. Nowak, Professor, UNL

**Co-PI's:** Marek Kozikowski, Ph.D., UNL; Marta Lutomirska, Ph.D., UNL

**DESCRIPTION:** Performance of the transportation network strongly depends on the performance of bridges. These structures

must be protected but the current approach to risk is not rational. Therefore, the objective of this project is to develop efficient risk analysis procedures for assessment of the actual safety reserve in highway and railway bridges. The focus of this research is at the system level, using system reliability methods. The work involved the formulation of limit state functions, identification of basic parameters, and the

development of advanced procedures for the analysis of structural behavior.

**RESULTS:** The developed procedures will serve for quantification of the risk and provide important tools in the transportation network's decision making process as it concerns the operation, maintenance, repair, rehabilitation and replacement of bridges.

## University of Iowa Projects

### Safety Climate of Commercial Vehicle Operation

**PI:** Linda Ng Boyle, Associate Professor, UW (formerly of UI)

**Co-PI's:** Jeffrey Short, Senior Research Associate, ATRI

**Co-Authors:** Yiyun Peng, Graduate Research Assistant, UW; David M. Neyens, Graduate Research Assistant, UI

**DESCRIPTION:** Enhancing the safety culture

and climate within trucking and motor coach industries has become a key area of concern given the potential impact on crashes and overall safety. Unfortunately, the specifics of a good safety climate and the methods by which safety climate is fostered are relatively ambiguous. Researches show that management plays an important role in shaping an operation's safety climate. The purpose of the current study is to develop a set of key factors that capture the essence of safety managers' safety attitudes, which can have a large influence on the safety

climate within the commercial vehicle industry.

**RESULTS:** This study suggests that a four-factor model accounting for 81.8% of the total variance was best to explain motivations of safety manager attitudes towards safety. The four factors include different aspects of safety managers' perceptions and considerations of safety: the financial impact of safety, internal awareness of safety, demand for safety, and overall safety culture in the industry.



### Performance Measures of Warm Asphalt Mixtures for Safe and Reliable Freight Transportation

**PI:** Hosin "David" Lee, Associate Professor, UI

**Co-Author:** Yongjoo "Thomas" Kim, Postdoctoral Research Scholar, UI

**DESCRIPTION:** The central objectives of this research are to investigate the available technologies for producing Warm Mix Asphalt (WMA) and evaluate various WMA products with respect to their fundamental engineering properties and performance-related characteristics. First, the available

technologies for producing WMA mixtures were investigated and six WMA products were selected that show the greatest potential for both economic and environmental benefits. Second, experimental methods to produce WMA mixtures in the laboratory were identified based on a literature review of the past research. Third, various WMA mixtures were tested in the laboratory for their fundamental engineering properties and performance-related characteristics. The main product anticipated from this research is an evaluation of various WMA materials with

respect to their strength, moisture sensitivity and performance characteristics.

**RESULTS:** Research on this project found that Sasobit®, Evotherm J1 and Rediset™ WMX were effective in producing WMA mixtures in the laboratory that are comparable to HMA mixtures. This information will be useful for pavement engineers who are interested in WMA technologies for implementation. Identifying reliable WMA technologies would contribute to road safety by minimizing the accident risk caused by an unsafe road surface condition.

# MATC Final Report Summaries

## Improving Freight Fire Safety: Analysis and Testing of Real Engine Conditions to Progress Development of Mist-controlling Additives for Fire Mitigation

**PI:** Albert Ratner, Assistant Professor, UI

**DESCRIPTION:** A fuel mist often forms in high intensity transportation accidents because of high shear stresses experienced by the fuel resulting from vigorous sloshing and tank rupture. Suppressing the formation of this mist can therefore help in minimizing the intensity of crash-induced fires—adding long

chained associative polymers to diesel has been proposed to achieve this purpose. It is important to ensure that the change in liquid properties caused by the polymer additive does not affect the performance of fuel systems. In order to assess the shear stresses occurring in fuel systems, flow calculations were performed for a typical diesel engine fuel system, assuming representative operating conditions. Additionally, drop impact experiments using

high speed imaging were carried out to characterize the flow behavior of diesel.

**RESULTS:** The results have shown that the performance of the fuel system would not be affected by the additive since outside the intended range of shear stresses its effect on fuel properties would be minimal.

## University of Kansas Projects

### Estimating Highway Pavement Damage Costs Attributed to Truck Traffic

**PI:** Yong Bai, Associate Professor, KU

**Co-PI's:** Steven D. Schrock, Assistant Professor, KU; Thomas E. Mulinazzi, Professor, KU;

**Co-Authors:** Wenhua Hou, Graduate Research Assistant, KU; Chunxiao Liu, Graduate Research Assistant, KU; Umar Firman, Undergraduate Research Assistant, KU

**Description:** In the southwest Kansas region, there are more than three hundred feed yards and several of the biggest meat processing plants in the nation. With the continuous growth of these industries, there will be more trucks on highways transporting meat and meat-related products in southwest Kansas. The primary objective of this research was to estimate the highway damage costs attributed to the truck (e.g., tractor-trailers) traffic associated

with the processed meat and related industries in southwest Kansas.

**Results:** The results of this study suggest that industries and government agencies need to study the possibility of increasing the utilization of railroads as an alternative to truck transportation for the processed meat and related industries.



### Mitigating Wind Induced Truck Crashes

**PI:** Tom Mulinazzi, (Corresponding Author), Professor, KU

**Co-PI's:** Steven D. Schrock, Assistant Professor, KU

**Co-Authors:** Robert Rescot, Graduate Research Assistant, KU; Romika Jasrotia, Graduate Research Assistant, KU; Kelly Hovey, Engineering Associate III, KDOT; Yue Li, Graduate Research Assistant, KU; Jacob Pohlman, Undergraduate Research Assistant, KU

**Description:** Data for truck crashes on I-70 in Kansas were analyzed using regression

and, surprisingly, wind did not show up as a significant factor in truck crashes. The factors that were found to be statistically significant were the hour of the day; the milepost; inches of precipitation in the hour; presence of rain, a thunderstorm, or scattered clouds; daylight driving conditions and dawn driving conditions. The case study along I-70 found a "dilemma zone" between wind velocities of 24.2 mph and 28.2 mph. Wind-related truck crashes seemed to increase between 24.2 mph and 28.2 mph, while wind-related truck crashes decrease with wind velocities above 28.2 mph. The only possible explanation is that truck drivers utilize precautionary measures and change their driving behavior with alterations in weather.

**Results:** The recommendations from this research are (1) to connect the Roadway Weather Information Systems (RWIS) to the Dynamic Message Signs (DMS) along I-70, where possible; (2) to install lighted wind socks on overpasses in areas with high velocity wind potentials; (3) to change the DMS displays to read "STRONG WINDS" if the wind velocity is between 20 and 40 mph or "WARNING, VERY STRONG WINDS" if the wind velocity exceeds 40 mph; and (4) to communicate wind velocity information at rest stops and weigh stations along I-70.

### Closed Course Testing of Portable Rumble Strips to Improve Truck Safety at Work Zones

**PI:** Steven D. Schrock, Assistant Professor, KU

**Co-PI's:** Yong Bai, Associate Professor, KU

**Co-Authors:** Kevin Heaslip, Assistant Professor, USU; Ming-Heng Wang, Post Doctoral Researcher, KU; Romika Jasrotia, Graduate Research Assistant, KU; Robert Rescot, Graduate Research Assistant, KU; Brandon Brady, Undergraduate Research Assistant, USU

**Description:** Work zone safety is of paramount importance for both drivers and workers. Driver

distraction and speeding are two of the major contributors of crashes in construction and maintenance work zones. Rumble strips can be an effective device to alert drivers to reduce speed in advance of some change in the driving situation. To evaluate sound and vibration, the devices tested were of two basic types: plastic rumble strips and adhesive rubberized polymer rumble strips. Both types of strips were tested for their ability to generate steering wheel vibrations and in-vehicle sound and the results were then compared with a set of permanent cut-in-place (CIP) rumble strips. The movements and vertical displacements were tested on four

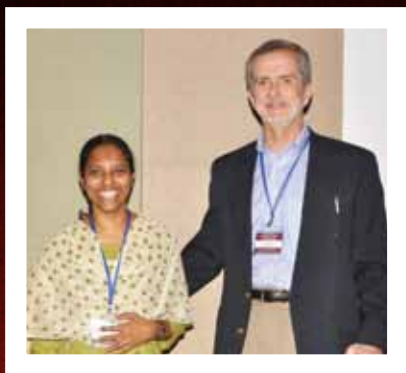
generations of plastic rumble strips and reusable temporary rumble strips made out of steel with a rubber bottom.

**Results:** The movement and vertical displacement test results revealed that the earlier generations of plastic rumble strips did not perform as well as the fourth generation especially at 60 mph (96.6 km/hr). The steel rumble strips also hold some promise; however, the structural integrity of the steel rumble strips is an issue that needs to be addressed.



MID-AMERICA  
TRANSPORTATION CENTER

# Indo-US Workshop: "Emerging Trends in Intelligent Transportation Systems (ITS)"



Richard Reiser of Werner Enterprises with Lelitha Devi Vanajakshi of IIT Madras.

This spring the Indo-US Workshop on "Emerging Trends in Intelligent Transportation Systems (ITS)" was held at the Indian Institute of Technology-Madras in Chennai, India on February 11th through the 13th. The workshop, which was funded by the Indo-US forum, brought together 27 leading ITS experts from academia and the public and private sectors to discuss the future of ITS. The principle investigators for this conference were Lelitha Devi Vanajakshi, an Assistant Professor in the Department of Civil Engineering at the Indian Institute of Technology-Madras, and Laurence R. Rilett, Keith W. Klaasmeyer Chair in Engineering and Director of MATC at the University of Nebraska-Lincoln. The workshop included over 100 participants from the US and India. Presenters included MATC Advisory Board members Abbas Mohaddes, Dick Reiser and John Craig.

The recommendations of the conference emphasized an interdisciplinary and multi-institutional approach that will join academia, the public sector and the private sector in addressing transportation concerns. There is great potential for US and Indian academics and researchers to work together because each group has expertise from which they can mutually benefit. The workshop demonstrated that this was possible and, in fact, many of the workshop participants, from both India and the US, indicated their commitment to collaboration. This commitment came in the form of in-kind staff support and equipment donations as well as education resources, such as joint course development and reciprocal student internships (from US to India and India to US). A proposal



Dr. Abbas Mohaddes, a MATC Advisory Board member, provided a private sector perspective of ITS issues.

for an Indo-US Joint Centre on Intelligent Transportation Systems between the University of Nebraska Lincoln and Purdue University in the US and IIT Madras and IIT Mumbai is currently under development.



Mr. John L. Craig, a MATC Advisory Board member, spoke on ITS issues from a state and governmental perspective.



Featured on this page are India and US attendees collaborating ideas and research at the Indo-US conference.

## Indo-US speakers

### US Speakers and India Speakers

#### US Speakers

- Dr. Abbas Mohaddes President and CEO Iteris Inc.
- Dr. Anuj Sharma Assistant Professor, UNL
- Dr. Darcy Bullock Professor, Purdue University
- Dr. Dick Reiser Executive Vice President and General Counsel Werner Enterprises, Inc.
- Dr. Elizabeth Jones Associate Professor, UNL
- Mr. John L. Craig Program Manager Oregon Bridge Delivery Partners
- Mr. John Lower Traffic & Transportation Manager, City of Anaheim
- Dr. Joseph L. Peters Director Office of Operations Research & Development, USDOT
- Dr. Laurence R. Rilett Keith W. Klaasmeyer Chair in Engineering, Director of MATC, UNL
- Dr. Mark Hickman Associate Professor, University of Arizona

#### India Speakers

- Mr. Ashok Kumar Saroha Director, Urban Transport, Ministry of Urban Development
- Dr. Aravind S Bharadwaj Chief Executive Officer, Automobile Infotronics Ltd.
- Dr. Gitakrishnan Ramadurai Visiting Assistant Professor, Indian Institute of Technology Madras
- Mr. C. Kandasamy Chief Engineer Ministry of Shipping, Road Transport and Highways
- Mr. Krishna Kumar Vice President CMS Traffic Systems Pvt. Ltd
- Dr. Lelitha Devi Vanajakshi Assistant Professor, Indian Institute of Technology Madras
- Mr. Md. Shakeel Akhter I.P.S. Additional Commissioner of Police, Traffic, Chennai Police
- Mr. Muralidharan Additional Director & Head CIG, CDAC Trivandrum
- Dr. Partha Chakroborty Professor, Indian Institute of Technology Kanpur
- Dr. Praveen Kumar Professor, Indian Institute of Technology Roorkee
- Dr. Ram Ramjee Senior Researcher Microsoft Research Lab India Pvt. Ltd.
- Mr. Syed Zameer Pasha, I.A.S. Managing Director Bangalore Metropolitan Transport Corporation
- Dr. Tom V. Mathew Associate Professor, Indian Institute of Technology Bombay
- Dr. S. Velmurugan Scientist E II Traffic Engg. and Safety Division Central Road Research Institute



## University of Nebraska Projects

Effect of Freeway Level of Service and Driver Education on Truck Driver's Stress - Phase 1	2010	Dr. Anuj Sharma
Heavy Vehicle Adjustment Factors for High Percentages of Trucks	2010	Dr. Elizabeth Jones
Impact of Truck Loading on Design and Analysis of Asphaltic Pavement Structures - Phase II	2010	Dr. Yong-Rak Kim
Reducing Impact of Heavy Truck Traffics on Service Life of Bridge Structures	2010	Dr. Atorod Azizinami
Simulation and Evaluation of a Cable-to-Post Attachment for High-Tension, Cable Barriers Placed in Medians along Freight Transportation Systems	2010	Dr. Robert Bielenberg
Investigating RFID for Linear Asset Management	2010	Dr. Erick Jones
Assessing the Risk of Crash for Trucks on Onset Yellow	2009	Dr. Anuj Sharma
Computational Design Tool for Bridge Hydrodynamic Loading in Inundated Flows of Midwest Rivers	2009	Dr. Junke Guo
Design of High Tension Cable Post Bases	2009	Dr. John Rohde
Material Model Development for Wire Rope used in Safety Cable Barriers to Contain Passenger and Commercial Vehicles	2009	Dr. John Reid
Impact of Truck Loading on Design and Analysis of Asphaltic Pavement Structures	2009	Dr. Yong-Rak Kim
Risk Mitigation for Highway and Railway Bridges	2009	Dr. Andrzej Nowak
Assessment of Truck Safety at Railroad Crossings	2009	Dr. Aemal Khattak
Study of RF Propagation Characteristics for Wireless Sensor Networks in Railroad Environments	2009	Dr. Hamid Sharif
Safety Investigation and Guidance for Work-Zone Devices in Freight Transportation Systems Subjected to Passenger Car and Truck Impacts with New Crash Standards	2008	Dr. Ronald Faller
Foundation Design for High Tension Cable Guardrails	2008	Dr. John Rhode
Investigating RFID for Roadside Identification Involving Freight Commercial Vehicle Operators (CVO) *Conducted at Praire View A&M University	2008	Dr. Erick Jones
Impact of Trucks on Signalized Intersections	2008	Dr. Elizabeth Jones
Investigation of Factors Associated with Truck Crashes Related to Skid Resistance in Region VII	2008	Dr. Aemal Khattak

## Kansas State University Projects

Characteristics and Contributory Causes Related to Large Truck Crashes-Phase II	2010	Dr. Sunanda Dissanayake
Determining the Stresses in Steel Railroad-Track Rails Due to Freight Movements using Non-Contact Laser-Speckle	2010	Dr. Robert Peterman
Improving Safety of the Surface Transportation System by Addressing the Issues of Vulnerable Road Users: Case of the Motorcyclists	2009	Dr. Sunanda Dissanayake
Assessing the Damage Potential in Pretensioned Bridges Caused by Increased Truck Loads Due to Freight Movements (Phase 2)	2009	Dr. Robert Peterman
Extending Asphalt Pavement Life Using Thin Whitetopping	2009	Dr. Mustaque Hossain
Assessing the Damage Potential in Pretensioned Bridges Caused by Increased Truck Loads Due to Freight Movements (Phase 1)	2008	Dr. Robert Peterman
Characteristics and Contributory Causes Related to Large Truck Crashes (Phase I)	2008	Dr. Sunanda Dissanayake
Extending Pavement Life Using Thin Surfacing to Counter the Effect of Increased Truck Traffic Due to Freight Movements on Highways	2008	Dr. Mustaque Hossain

## For information on MATC funded research p

Since 2006, 133 graduate students have participated in our research program as research student workers on our research and education programs, and 119 studen



# Research Projects



<b>University of Kansas Projects</b>		
Enhanced Sustainability of Railroad Ballast	2010	Dr. Robert Parsons
Improving the Long-Range Tracking Algorithm for use in Tracking Long-Haul Trucks using Cellular Data	2010	Dr. Steven Schrock
Modeling Truck Speed in the Upstream of Two-lane Highway Work Zones: Implications on Reducing Truck-Related Crashes in Work Zones	2010	Dr. Yong Bai
Closed Course Testing of Portable Rumble Strips to Improve Truck Safety at Work Zones	2009	Dr. Steven Schrock
Estimating Highway Pavement Damage Costs Attributed to Truck Traffic	2009	Dr. Yong Bai
Mitigating Wind-Induced Truck Crashes	2009	Dr. Thomas Mulinazzi
A Preliminary Appraisal of the Safety and Operational Effects on the Regional Transportation System Created by New Rail-Truck Intermodal Facilities	2008	Dr. Thomas Mulinazzi
Feasibility of Using Cellular Telephone Data to Determine the Truckshed of Rail-Truck Intermodal Facilities	2008	Dr. Steve Schrock
<b>Missouri University of Science &amp; Technology Projects</b>		
Crash Analysis in MoDOT I-64 Project	2010	Dr. Hojong Baik
I270/I-255 Variable Speed Limit Study	2010	Dr. Ghulam Bham
Initial Study and Verification of a Distributed Fiber Optic Corrosion Monitoring System for Transportation Structures	2010	Dr. Hai Xiao
Validation on the Mechanical Models of Asphalt Pavement Structures with Field Measured Data Associated with Increasing Freight Movements	2009	Dr. Yu-Ning Ge
Pilot Study on Rugged Fiber Optic Brillouin Sensors for Large Strain Measurements to Ensure the Safety of Transportation Structures	2008	Dr. Genda Chen
Impact of Trucks in the Development of Work Zone Capacity Guidelines	2008	Dr. Ghulam Bham
Safer Work Zones for Heavy and Light Weight Vehicles: Speed Limit Up or Speed Limit Down	2008	Dr. Ghulam Bham
Improving Work Zone Safety for Freight Vehicles: Effective Design Patterns for Vehicle-Mounted Attenuators	2008	Dr. Ghulam Bham
A Framework for the Nationwide Multimod Transportation Demand Analysis	2008	Dr. Hojong Baik
<b>University of Iowa Projects</b>		
Automated Erosion System to Protect Highway Bridge Crossings at Abutments	2010	Dr. Thanos Papanicolaou
Improving Freight Fire Safety: Experimental Testing and Computer Modeling to Further Development of Mist-controlling Additives for Fire Mitigation	2010	Dr. Albert Ratner
Performance Measures of Warm Asphalt Mixtures for Safe and Reliable Freight Transportation (Phase 2: Evaluation of Friction and Raveling Characteristics of Warm Mix Asphalt Mixtures with Anti-stripping Agents)	2010	Dr. Hosin Lee
Improving Freight Fire Safety: Analysis and Testing of Real Engine Conditions to Progress Development of Mist-controlling Additives for Fire Mitigation	2009	Dr. Albert Ratner
Improving Freight Fire Safety: Assessment of the Effectiveness of Mist-controlling Additives in Mitigating Crash-induced Diesel Fires	2008	Dr. Albert Ratner
Performance Measures of Warm Asphalt Mixtures for Safe and Reliable Freight Transportation	2008	Dr. Hossin "David" Lee
Safety Climate of Commercial Vehicle Operation	2008	Dr. Linda Boyle
<b>Prairie View A&amp;M</b>		
Investigating RFID for Roadside Identification Involving Freight Commercial Vehicle Operators (CVO)	2008	Dr. Judy Perkins

For more information on these projects please visit the web at [matc.unl.edu](http://matc.unl.edu)

In addition to 12 graduate assistantships, 32 undergraduate students have been employed as interns. Over 100 students have participated in the MATC internship program.

# MATC Advisory Board Members



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Former Executive Director, FHWA; Former Secretary of Transportation, Kansas



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**IMPROVING SAFETY AND MINIMIZING RISK ASSOCIATED WITH INCREASING MULTI-MODAL FREIGHT MOVEMENTS**

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# MS&T Earthquake Shake Table: Fox 4 "School Day at the K"

By Laura Rathe, MS&T Graduate Student



Pictured above: Local students creating simulation models to test on the earthquake shake table.

Fox 4 News in Kansas City recently held the 12th Annual "School Day at the K" for local school children on May 13th at Kauffman Stadium in Kansas City. "School Day at the K" is the largest weather education event in the world. Every year, it attracts over 20,000 students from elementary, middle, and high school. This year the event included an interview with a tornado chaser, a weather balloon launch, an earthquake shake table demonstration, a cloud formation exercise, and many other exciting demonstrations.

The Missouri S&T team presented the earthquake shake table during the

aforementioned show. First, we demonstrated how important frequency is in determining the damage suffered by a building. Three buildings of different heights and stiffness were run on the shake table at varying frequencies to see the results. Then, we showed soil liquefaction by making a small plastic house sink into sand.

After the event, the students were invited to the parking lot for hands-on experiments. Our team gave the kids the opportunity to build their own structures and test them on the shake table to see if they could withstand a "real earthquake." The buildings were constructed from K'nex building

pieces, attached to the shake table, and then subjected to a simulated earthquake. The kids were thrilled when their building survived a quake.

This event allowed students to engage in transportation engineering projects since they constructed structures and tested the effectiveness of their models. Much like bridge development or structure testing done at MATC facilities, the students were able to see how structures react to real weather conditions.

## Upcoming 2010 MATC Events:

**May 17-August 13:**  
MATC Summer Intern Program

**June 14-17 & July 7-15:**  
UNL Professional Development  
Science and  
Math Summer Institute  
*\*For details visit:  
matc.unl.edu/summer\_institute*

**July 8-15:**  
Engineering Education Excellence  
Institute  
Lincoln, NE - July 8  
Omaha, NE - July 9  
Lexington, NE - July 13  
Hastings, NE - July 15

**August 27-29 & Dec 3-5**  
MATC Scholars Programs

**September 22-25**  
MATC Diversity Education Seminar

## MATC Contact Info:

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