SWUTC

SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER

2010 ANNUAL REPORT

TRANSPORTATION SOLUTIONS TO ENHANCE PROSPERITY AND THE QUALITY OF LIFE

Southwest Region University Transportation Center (SWUTC) is the Region 6 University Transportation Center (UTC) sponsored by the U.S. Department of Transportation's Research and Innovative Technology Administration

Consortium Partners
Texas A&M University System
University of Texas at Austin
Texas Southern University

This publication is a report of SWUTC's transportation research, education and technology transfer activities for September 1, 2009 – August 31, 2010.

SWUTC
Texas A&M University System
3135 TAMU
College Station, Texas 77843-3135
Telephone: 979-845-5815
www/swutc.tamu.edu

Credits
Editor: Barbara Lorenz
Design & Layout: Barbara Lorenz
John Hobbs
Ivan Lorenz
Cover Design: John Hobbs

2010 ANNUAL REPORT

CONTENTS

Region Six UTC

MESSAGE FROM THE DIRECTOR

Director's Message

Public expenditures for transportation research and education are properly considered investments that help secure our society's future productivity and its prosperity for the next generation of Americans. A tenet of basic Keynesian economics argues that investment expenditures are high-powered dollars that create not only the "multiplier effect" but add an additional boost to the economy due to the "accelerator" effects that come from creating additional, more productive capital. For us in the UTC program, we know that investment in human capital means that dollars spent on making the population more productive create more "bang for the buck" than dollars spent on current consumption.

However, in the current political climate, a likely response to this notion is: "So what? We don't have the resources to support additional public expenditures of ANY kind...in fact we ought to be reducing all kinds of governmental spending to save our future from ruinous deficits being incurred."

To those who share that view, let me encourage you to read through the following report to learn some of the successes and highlighted outcomes generated from the expenditures of public and private funds for investments in our transportation future made during the last fiscal year in the ***Southwest Region University Transportation Center***. You will find numerous examples of building for the future and adding productivity to the transportation sector: K-12 students being introduced to the rich variety of our transportation workforce; encouraged to study difficult subjects in math and sciences; and being rewarded with opportunities to prepare for professional careers following successful educational and research mentoring in universities. **Our exciting enterprise--education and knowledge creation--produces one of the most productive forms of expenditure of funds in an advanced economy...investment in human capital!**

The UTC programs across the country are daily engaged in this enterprise, and our outputs – trained students, new ideas, improved processes and products – become highly productive inputs to the economic engine of America's prosperity. As we end the first decade of this 21st century, we look forward to telling our story and building the foundation of a greater transportation system in the challenging years ahead.

Dock Burke

SWUTC Theme

Transportation Solutions to Enhance Prosperity and the Quality of Life

Our theme challenges SWUTC participants to expand their capacities to the fullest to produce education, research, and service solutions to transportation issues facing the people of the Southwest and the U.S. Our theme encompasses four strategic thrusts - support of economic growth and trade; enhancement of mobility, accessibility and efficiency; promotion of safety and safe environments; and development of the transportation workforce.

Vision

To achieve maximum value from the SWUTC in implementing our grant, the SWUTC continues to pursue its vision to become

an internationally recognized center for excellence providing knowledge, diverse leaders, and innovative solutions for the transportation challenges of the 21st Century.

This ambitious vision calls upon us, over the expected lifetime of this UTC grant, to deliver premier research programs in transportation systems, transportation education and workforce development, and transportation technology transfer and service. We will pursue this vision by building on the significant resource base already in place within the transportation programs of the consortium universities, adding new partnerships and alliances with other universities and transportation entities in the region, and keeping the three program elements (research, education, and technology transfer) focused upon our theme.

THE SWUTC CONSORTIUM

Lead University - Texas A&M University System

The *Texas Transportation Institute* is headquarters for the SWUTC and is a premier transportation research center in the U.S. The research program at TTI is extensive and includes transportation systems and operations, policy and planning, economics and environment, materials, structures, safety, and human factors.

Texas A&M University's transportation-related faculty -- composed of experts in transportation engineering, materials, and planning – prescribes the curriculum and requirements for undergraduate and graduate degrees with specializations in numerous aspects of transportation. Completion of these degrees creates engineers and scientists for professional careers and leadership positions throughout the transportation industry.

University of Texas at Austin

The transportation programs at the University of Texas at Austin and its Center for Transportation Research feature well-equipped facilities, top-notch research and teaching faculties, and high-quality students. A wide range of expertise in science, engineering, and policy gives the SWUTC a rich skill mix needed for developing viable solutions to complex issues involving transportation systems behavior, international goods movements, and harmonized modal transportation networks for improved performance, including a higher quality of life for the affected citizens.

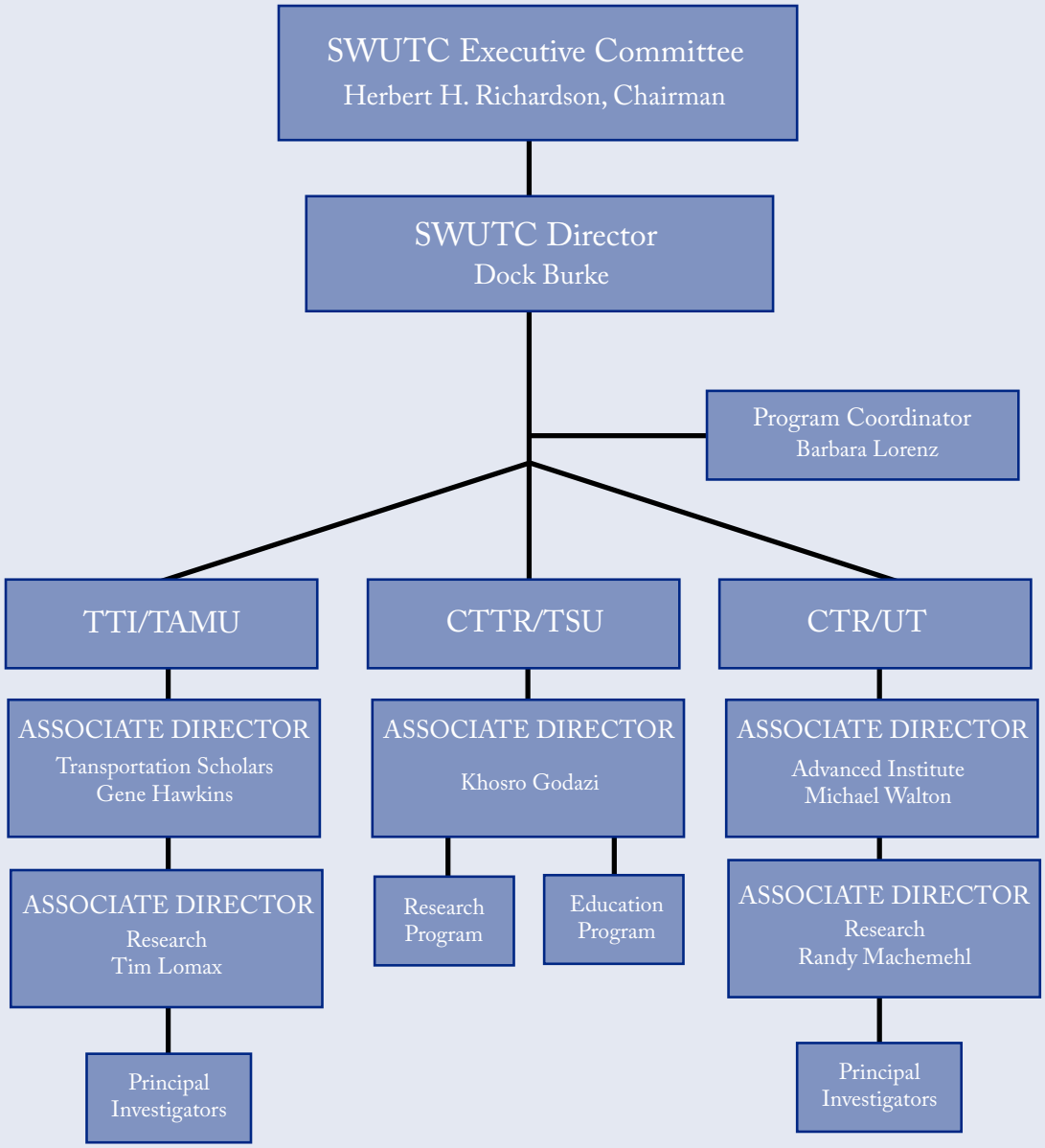
Texas Southern University

Located in Houston, Texas Southern University and its *Center for Transportation Training and Research* present a varied transportation program in planning, research, and implementation that has focused upon some unique opportunities in providing transportation excellence to African-American populations of students and transportation users. A blend of TSU's airway science expertise and its strength in urban transportation planning and operations creates new avenues for bringing multi-modal solutions into the classroom, laboratory, and implementation phases of existing and new transportation challenges for the 21st Century.

MANAGEMENT STRUCTURE

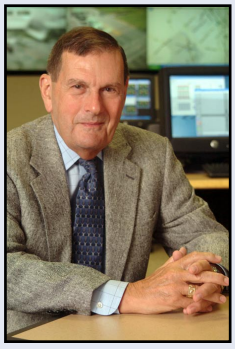
The SWUTC Executive Committee oversees the SWUTC activities by establishing budget priorities; determining program content by selecting research projects; choosing the educational programs to be undertaken; and reviewing the administrative affairs of the Center.

The SWUTC Director plans, executes, and reports the approved activities of the Center. The Director is assisted by a Program Coordinator and five Associate Directors - two at TAMU/TTI, two at UT-Austin/CTR, and one at TSU/CTTR. These Associate Directors are each responsible for administering that portion of SWUTC's activities in their charge.



SWUTC Executive Committee

EXECUTIVE COMMITTEE



Dr. Herbert H. Richardson, chairman

Dr. Richardson is Chancellor Emeritus of the Texas A&M University System, Director Emeritus of the Texas Transportation Institute, and Distinguished Professor of Engineering Emeritus, Texas A&M University.

Brief Bio: http://swutc.tamu.edu/Bios/Richardson.htm

Dr. Dennis Christiansen, member

Dr. Christiansen is Director of the Texas Transportation Institute and a TAMUS Regents Fellow.

Brief Bio: http://swutc.tamu.edu/Bios/Christiansen.htm

Mr. Rick Collins, member

Mr. Collins is currently Director of the Research and Technology Implementation Office of the Texas Department of Transportation (TxDOT).

Brief Bio: http://swutc.tamu.edu/Bios/Collins.htm

Mr. Robert Harrison, member

Mr. Harrison is a Senior Research Scientist and the Deputy Director of the Center for Transportation Research at the University of Texas at Austin.

Brief Bio: http://swutc.tamu.edu/Bios/Harrison.htm

Dr. H. Gene Hawkins, member

Dr. Hawkins is an Associate Professor in the Zachry Department of Civil Engineering at Texas A&M University.

Brief Bio: http://swutc.tamu.edu/Bios/Hawkins.htm

Dr. Carol Lewis, member

Dr. Lewis is an Associate Professor in Transportation Studies and Director of the Center for Transportation Training and Research at Texas Southern University.

Brief Bio: http://swutc.tamu.edu/Bios/Lewis.htm

EXECUTIVE COMMITTEE

Dr. Dallas Little, member

Dr. Little is Regents Professor of Civil Engineering and holder of the E.B. Snead Endowed Chair in Transportation Engineering in the Zachry Department of Civil Engineering at Texas A&M University.

Brief Bio: http://swutc.tamu.edu/Bios/Christiansen.htm

Dr. Talia McCray, member

Dr. McCray is an Assistant Professor in the School of Architecture at the University of Texas at Austin.

Brief Bio: http://swutc.tamu.edu/Bios/McCray.htm

Dr. Melissa Tooley, member

Dr. Tooley is Director of the University Transportation Center for Mobility (UTCM) at the Texas Transportation Institute.

Brief Bio: http://swutc.tamu.edu/Bios/Tooley.htm

Dr. C. Michael Walton, member

Dr. Walton is Professor of Civil Engineering and Ernest H. Cockrell Centennial Chair in Engineering at the University of Texas at Austin.

Brief Bio: http://swutc.tamu.edu/Bios/Walton.htm

Dr. Lei Yu, member

Dr. Yu is Professor of Transportation and Dean of College of Science and Technology at Texas Southern University.

Brief Bio: http://swutc.tamu.edu/Bios/Yu.htm

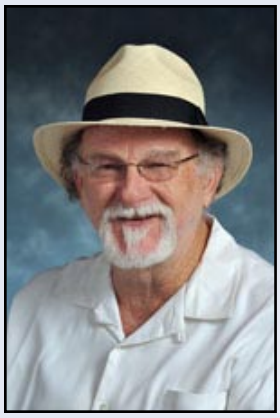
Dr. Zhanmin Zhang, member

Dr. Zhang is an Associate Professor in transportation engineering at the University of Texas at Austin.

Brief Bio: http://swutc.tamu.edu/Bios/Zhang.htm

Office of the Director

OFFICE OF THE DIRECTOR



Dock Burke, Director

Dock Burke is the Director of the Southwest University Region Transportation Center at the Texas Transportation Institute. Currently a Senior Research Scientist at the Institute, he has served as the Principal Investigator or Co-P.I. of 52 research projects, authored or co-authored 100 research reports and papers, and has made 75 presentations on a wide variety of transportation related issues since joining TTI in 1969. He is the 1998 recipient of the *TTI Career Achievement in Research* award and a 2003 recipient of the *Regents Fellow Service Award* presented by the Board of Regents of the Texas A&M University System.

Barbara Lorenz, Program Coordinator

Barbara Lorenz serves as Program Coordinator in the SWUTC, a position she has held since 1992. Ms. Lorenz oversees the daily operational activities of the Center. Ms. Lorenz, a graduate of Texas A&M University, has been employed with TTI for 31 years. She is the 2003 recipient of the *C.J. Keese Career Achievement in Administrative/Technical Support* award, which is TTI's highest award for excellence in administration.

Judy Shafer, Administrative Assistant

Ms. Judy Shafer has served as Administrative Assistant for the SWUTC Research Program at UT Austin since 1994. She is responsible for the initial call for research ideas, preparation of award notices, and processing proposal submissions. Ms. Shafer assists principal investigators with travel, funds transfers, equipment requests, technical report preparation, and payments to research project participants and consultants. She also prepares and submits annual report and directory data to regional office, and assists with the processing of SWUTC program contracts.

SWUTC Associate Directors

Dr. Gene Hawkins, Associate Director – Transportation Scholars, Texas A&M University

Dr. Hawkins is an Associate Professor in the Zachry Department of Civil Engineering at Texas A&M University.

Brief Bio: http://swutc.tamu.edu/Bios/Hawkins.htm

Dr. Tim Lomax, Associate Director for Transportation Research at Texas A&M University

Dr. Lomax is a Research Engineer at the Texas Transportation Institute, a member of the Mobility Analysis Program and a TAMUS Regents Fellow.

Brief Bio: http://swutc.tamu.edu/Bios/Lomax.htm

Mr. Khosro Godazi, Associate Director for Transportation Research and Education at Texas Southern University

Mr. Godazi is Adjunct Professor in the Department of Transportation Studies and Associate Director of Technical Transfer, Center for Transportation Training and Research at Texas Southern University.

Brief Bio: http://swutc.tamu.edu/Bios/Godazi.htm

Dr. Randy Machemehl, Associate Director for Transportation Research at the University of Texas at Austin

Dr. Machemehl is the Director of the Center of Transportation Research and the Nasser I. Al-Rashid Centennial Professor in Transportation Engineering at the University of Texas at Austin.

Brief Bio: http://swutc.tamu.edu/Bios/Machemehl.htm

Dr. C. Michael Walton, Associate Director – Advanced Institute at the University of Texas at Austin

Dr. Walton is Professor of Civil Engineering and Ernest H. Cockrell Centennial Chair in Engineering at the University of Texas at Austin.

Brief Bio: http://swutc.tamu.edu/Bios/Walton.htm

Transportation Workforce Development

Transportation education is an essential element in the overall process of developing a workforce with the skills and leadership qualities to guide the transportation industry of the future. The SWUTC has invested heavily in the development of human capital creating a "pipeline" process which takes in students at secondary school levels, adds high school and baccalaureate programs and culminates in graduate specialities in transportation science and engineering.

The SWUTC supports the Transportation Scholars and the Advanced Institute Programs that are integrated into established degree-granting university departments at Texas A&M University and the University of Texas at Austin. Additionally, SWUTC supports the academic enrichment of a well-developed graduate transportation studies program at Texas Southern University. The SWUTC seeks to enhance these programs by strengthening the multidisciplinary qualities of a body of transportation science that will prepare today's students for leadership in the emerging information-rich economy.

Pre-College Initiatives for 2010

Summer Transportation Institute - Kingsville

Contact: Debbie Jasek, TAMU, 979-845-5239, d-jasek@tamu.edu

The Summer Transportation Institute (STI) at Texas A&M University-Kingsville (TAMUK) has been jointly hosted by the Texas Transportation Institute (TTI) and TAMUK since 2004. A large number of students that have participated in past programs have continued their education and majored in engineering and science. This program is the only one of its type in south Texas. Unfortunately, this year, notice was received in April that the program was not selected for funding by FHWA.

Because of the historical success of the program, the SWUTC felt it was vital to step forward and provide additional funding so the program could be continued. This year's program, held from June 7th through June 11th, was modified into a more abbreviated format from a two week program to a one week program. The week's program featured hands on activities such as: making concrete stepping stones; building bridges and kites; conducting a spot speed study and analyzing the data; learning about designing highways; and taking a field trip to TxDOT. The

Kingsville STI Participants Working Together to Build Bridges

activities selected for the week emphasized math, technology, and science and allowed students the opportunity to work individually and as part of teams. **The trip to the TxDOT Corpus Christi District was a special treat because all of the engineers conducting the tour and tour activities were past STI participants and graduates of Texas A&M University Kingsville.**

This year, eighteen students attended the Kingsville STI program. The group consisted of 14 girls and 4 boys. This is the first time in the history of the program that the class was comprised of more girls than boys.

Partnering with AVID to Create Transportation Scholars

Contact: Debbie Jasek and Melisa Finley, TAMU, 979-845-5239, d-jasek@tamu.edu

To address the predicted future decline in trained transportation engineering professionals, Co-P.I.'s **Debbie Jasek** and **Melissa Finley** of Texas A&M University seized on the opportunity to stimulate student awareness in transportation careers and employment opportunities by creating a partnership with an existing program called Advancement Via Individual Determination (AVID) that targets students with interests in Science, Technology, Engineering and Mathematics (STEM). AVID is an in-school academic support program for grades 5-12 that prepares students for college eligibility and success. AVID places academically average students in advanced classes. It levels the playing field for minority, rural, low-income and other students without a college-going tradition in their families. The focal point for AVID is an elective class, held during the regular school day, where the students receive the academic and motivational support to succeed.

This year a one day workshop was developed for Oakwood and Cypress Grove middle schools in College Station, Texas. The 70 6th grade students who attended from these two schools were offered an opportunity to gain hands on experience and insight into what transportation, engineering, and technology careers have to offer. This event utilized a two pronged approach. First, engineers and transportation professionals went into the class room to introduce transportation concepts during the AVID class. The second part included a field trip for AVID students to the Texas Transportation Institute at Texas A&M University. The event provided experiences to encourage interests in engineering, science, and math. It also offered exposure and mentoring from role models that currently work in the transportation fields. This provided a venue that enabled students to recognize their interests in math and provide an early successful experience, two of the crucial factors to encourage careers in technology and engineering. This event was also designed in a format so that it could be used as a prototype by any college or university or professional organization.

Melissa Finley Introduces 6th Grade Students to Traffic Control Concepts

This year's program was such a success that the College Station ISD has contacted the P.I.s and asked if the program could be conducted again next year. A repeat program is now scheduled for April and May of 2011.

Transportation Games as a Recruitment Tool

Contact: Khosro Godazi, TSU, 713-313-7925, godazi_kx@tsu.edu

In today's society children are exposed to, and increasingly dependent on digital technology. This particular SWUTC educational effort led by **Mr. Khosro Godazi** at TSU attempts to capitalize on this available avenue for education and develop a transportation oriented video quiz game that targets K-12 students. The video game, which consists of more than 1000 questions about transportation terminology, transportation science, transportation engineering and the different modes of transportation have been organized in four different levels to challenge K-12 students in the field of transportation. The software was beta tested by over sixty students from three different cities in the state of Texas for the purpose of user friendliness, attraction, types of questions, and other concerns that could improve the finished product. Currently, the video game is being modified to address reviewer comments. **The development team feels the finished video game will ultimately provide a cost effective way to reach a large and diverse group of K-12 students and attract them into the field of transportation.**

Student Video Game Beta Testers

Extreme Makeover: Updating the SWUTC Transportation Outreach Modules

Contact: Debbie Jasek, TAMU, 979-845-5239, d-jasek@tamu.edu

From 1999 through 2004, the SWUTC funded numerous projects for transportation outreach for K-12. These projects include: the *Transportation Road Show*, *Careers in Transportation*, the *Rural Transportation Institute*, and *Transportation Engineering Education and Outreach Pilot Program Targeting Students in Grades K-12*. As a part of these projects, numerous on-line educational modules and products were developed.

Over the ensuing 11 years, these modules and presentations have been viewed by over 15,000 students. Some modules are still currently being used by outreach personnel. Today's students surf the web, communicate through *Facebook* and *Myspace*, and they also communicate through Twitter and websites such as *Squidoo*. Many students read blogs on a daily basis, the way older generations read newspapers. Clearly, the technology and the technological awareness of the target audience have changed tremendously in the past 11 years. In order to make these modules relevant for today's student audiences, an extreme makeover of these modules is required.

To address this need, P.I. **Debbie Jasek's** objective is to update existing on-line transportation modules and utilize social networking sites to increase outreach. Make the information current and relevant in content and update their ability to interface with students through the various media that they use on a constant basis. **This will enable transportation educators to cast a wider net and reach a more diverse population of students.**

2010 SWUTC Higher Education Highlights

SWUTC Hosts Consortium Wide Student Conference

Contact: Gene Hawkins, TAMU, 979-845-9294

How do you get students from rival universities to interact and view each other in a different light? Bring them together for a day of socializing, networking and structured activities in a casual, relaxed setting. And this is what the SWUTC did on March 5th of this year. Graduate transportation students and faculty members from Texas A&M University, Texas Southern University and the University of Texas at Austin were invited to attend a one day student conference held in scenic Winedale, Texas.

Attendance was strong for the event with 52 graduate students and 15 faculty and staff members participating. The day began with welcoming comments from key SWUTC personnel and an icebreaker activity designed to get the students interacting with each other. Next, the students were divided into work teams based on their previously identified area of interest. The groups for this conference consisted of Congestion Management, Infrastructure Preservation, Safety Management/Improvement, Sustainability, and Transportation Financing/Funding. Each team spent the remainder of the day defining the issues and the actions that would be needed to meet the transportation challenges for their area in the year 2030. Each team prepared a 10 minute presentation at the end of the day summarizing their findings and plans of action. Great effort was made to ensure that each group had equal representation from each university. Faculty members were free to interact with the various groups to mentor and help facilitate their discussions.

Students and Faculty Participating in Opening Icebreaker

Conference Teams at Work

Student evaluations of the conference were very positive with requests to make it an annual event. "I must say that (the conference) was a good way of sharing ideas and socializing with our colleague students from the other universities," said TSU participant Grace Arthur. "Today's student-focused SWUTC event in Winedale was terrific," writes University of Texas faculty member Kara Kockelman. "The students participated enthusiastically, and it was exciting to see all those fresh faces across our partner institutions."

The coordinators for this event were led by **Dr. Gene Hawkins** from Texas A&M University and included **Dr. Zhanmin Zhang** from the University of Texas at Austin and **Mr. Khosro Godazi** from Texas Southern University.

End of the Day Student Presentations

SWUTC 2010 Summer Undergraduate Fellows Program

The SWUTC Summer Undergraduate Fellows Programs at the University of Texas at Austin and Texas A&M University continue to be extremely successful recruiting endeavors to attract a diverse group of students into the graduate programs in transportation. Each year, the Summer Undergraduate Fellows Program recruits juniors and seniors from other universities and from diverse academic backgrounds into a summer-long program in transportation research and education as a first step towards graduate study in transportation. The students at both UT-Austin and TAMU have the opportunity to work with researchers and gain exposure to many different areas of transportation research. Students make field trips to various transportation agencies and attend professional meetings such as the summer meeting of TexITE. At the end of the summer term, the students make presentations on their research and produce a paper for publication. At Texas A&M, the papers are published annually as a *Compendium of Student Papers* and posted on the SWUTC website. For the 2010 session, the TAMU program doubled in the number of students over last year, with 8 participants. At UT-Austin, 9 participated in their summer program.

UT-Austin 2010 Summer Interns Take Time to Relax and Watch Baseball

The Summer Fellows Program has historically achieved a near 100% retention of undergraduate students into the graduate programs of transportation engineering.

SWUTC 2010 Advanced Institute and Transportation Scholars Programs

The SWUTC continues to support graduate programs at each of the three consortium member universities. The ultimate goal of the SWUTC graduate programs is to prepare a highly qualified cadre of new professionals into transportation science. **The Transportation Scholars Program at Texas A&M University, the Advanced Institute at the University of Texas at Austin, and the graduate program at Texas Southern University provide stipends to students to participate in classroom and sponsored research activities.** In addition, the program provides increased communications skills as students make presentations, participate in debates, write proposals and reports. Students also participate in technical tours and professional meetings throughout the year.

TAMU Students at TRB

For the 2010 program, 22 graduate students participated in the TAMU program, 27 in the UT-Austin program and 11 at TSU.

As an annual event, SWUTC also sends graduate students involved in the SWUTC education programs to the *Transportation Research Board* meeting in January. This year, in addition to those students, the SWUTC provided travel assistance to 37 other Texas A&M University Civil Engineering students to attend the annual meeting. While attending the meeting, many of these student gained valuable experience while presenting papers based on their research work and attending poster and conference sessions.

SWUTC Guest Lecturers

Stephen C. Lockwood - Parsons Brinckerhoff
SWUTC Sponsored Guest Lecturer

Presented "Institutional Architecture for 21st Century Transportation" to students in the Department of Civil, Architectural and Environmental Engineering at the University of Texas on March 10, 2010.

Jeff Whitacre, P.E. - Kimley-Horn Associates
Former TAMU Advanced Institute Graduate

Presented "Transportation Engineering and Planning Projects Using GIS - An Overview" to the TAMUite Student Chapter at Texas A&M University on July 7, 2010.

SWUTC Education Program Graduate Placement for 2010

Hassan Abbasi – Program Analyst for Prairie View A&M University
Krystal Lastrape - Planner for Booze Allen Hamilton Consultant
Luis Medina - Science Teacher for Houston Independent School District
Anthony Price - Transportation Planner for SISCO Corporation

Susan Paulus – LEED Green Associate for Bloom Companies
Stephen Sprague – Engineer in Training for Halff & Associates
Eric Talbot – Research Associate for Texas Transportation Institute
Ryan Eurek – Engineer in Training for Kimley-Horn
Jonathan Re - Research Associate for Texas Transportation Institute
Xiugang Li - Transportation Analyst for the Oregon DOT
John Lowery - Transportation Engineer for Parsons Brinckerhoff
Leslie Gates - Engineer in Training for Kimley-Horn and Associates
Brian Geiger - Technician for Winkler Service and Parts, Inc.
Andrew Muras - Geotechnical Professional for Terracon Consultants, Inc.
Debora Shelton - Engineer for Pape-Dawson Engineers

Jason Lemp – Senior Professional for Cambridge Systematics
Kristen Svicarovich – Designer for DKS Associates
Allison Conway - Substitute Assistant Professor for The City College of New York
Ashley Haire -Post Doctoral Position at Portland State University
Kristopher Pruner - Research Fellow for the Center for Transportation Research
Tara Snell - Transportation Engineer for Parsons Brinckerhoff
Erin Ferguson - Engineering Associate for Kittleson and Associates, Inc.
Andrew Karl - Transportation Engineer for H.W. Lochner
Jeffrey LaMondia - Assistant Professor for Auburn University
Beatriz Rutzen - Transportation Engineer for TransCore
Melissa Tompson - Transportation Engineer for Wilbur Smith

SWUTC 2010 Student Award Winners

Each year, in addition to selecting the overall SWUTC Outstanding Student to represent the SWUTC at the CUTC banquet and UTC awards program, the SWUTC honors other students for their academic, professionalism and leadership achievements. Each of the three major awards presented yearly at the SWUTC - the *Naomi Ledé Outstanding Masters Student Award*, the *William J. Harris Outstanding PhD Student Award* and the *Robert Herman Outstanding Student Award* - comes with a $1,000 cash award.

Robert Herman Outstanding Student Award

Dr. Allex Alvarez joined the PhD program at Texas A&M University in August 2005 after receiving his B.S. in Civil Engineering from the National University of Colombia in 1998 and his Master's in Civil Engineering from the University of Los Andes in Columbia in 2001.

While at Texas A&M, his research and PhD activities focused on improving the mix design of permeable friction course mixtures for pavements. Dr. Alvarez was a key researcher on a Texas Department of Transportation (TxDOT) funded study that evaluated and recommended improvements for porous friction course (PFC) mix design. This project involved conducting the state-of-the-practice mix design analysis and evaluating each part of the design using advanced mixture characterization tools. This included X-ray computed tomography to determine air void (AV) distribution and interconnected AV, and bond strength calculations with and without water present using surface energy components of both asphalt binder and aggregates. For this project, Dr. Alvarez recommended significant improvements for PFC mix design with respect to evaluation of volumetrics, functionality, and durability. Dr. Alvarez continued his work with PFC mixtures with a SWUTC funded study that further investigated the internal microstructure of PFC to enhance mix design and construction of these hot mix asphalt mixtures. These research activities led to production of ten journal articles with participation as first author in nine of them, as well as four research reports and three conference papers. In addition to his excellent written communication skills, he has exhibited his oral communication skills through three separate presentations at international conferences over the last two years.

Professionally, Dr. Alvarez is active in the Transportation Research Board (TRB), American Society of Civil Engineers (ASCE), the Association of Asphalt Paving Technologies (AAPT), the Columbian Geotechnical Society, and the Association of Civil Engineering Doctoral Students (AASCEdocS) at Texas A&M. While at TAMU, Mr. Alvarez received a Dwight D. Eisenhower Transportation Fellowship (2008), a Chemical Lime Company Endowed Fellowship (2007), and a Eugene L. Marquis Scholarship (2006).

Dr. Alvarez graduated December 2009. He has returned to Colombia and is currently a professor at the University of Magdalena in Colombia where he teaches and conducts research in pavements and materials. Dr. Alvarez's PhD advisor while at TAMU was Dr. Amy Epps Martin.

William J. Harris Outstanding PhD Student Award

Dr. Jason D. Lemp completed his undergraduate education at the University of Missouri in 2004, studying civil engineering. He came to the University of Texas at Austin in the fall of 2005 in pursuit of master's and doctoral degrees.

Since arriving at the University of Texas, Dr. Lemp has participated in a number of research endeavors across a variety a fields, including transportation economics, land-use planning, and travel demand modeling. His work in these areas has led to several published papers and presentations. Through these experiences, travel behavior and travel demand modeling emerged as research areas of particular interest to Dr. Lemp. His dissertation research focused on developing models of travelers' activity scheduling decisions that offer an econometrically rigorous connection to microeconomic theories of behavior. During his graduate studies, Dr. Lemp was a recipient of a Dwight D. Eisenhower Graduate Transportation Fellowship, Talbot S. Huff Highway Engineering Graduate Fellowship, and an SWUTC Advanced Institute (AI) Fellowship. He has also been supported as a research assistant on the SWUTC project entitled "Microsimulation for Coupled Models of Travel & Location Choice Behavior."

Dr. Lemp completed his doctoral degree and graduated in December 2009. He is now employed as a Senior Professional Analyst for Cambridge Systematics. Dr. Lemp's faculty advisor at the University of Texas was Dr. Kara Kockelman. **Jason represented the SWUTC at the annual UTC Outstanding Student of the Year Awards ceremony during TRB's Annual Meeting in January, 2010.**

Naomi Ledé Outstanding Masters Student Award

Mr. Jonathan Ré graduated in 2004 from Michigan State University with a Bachelor of Science in Civil and Environmental Engineering. After graduating with his B.S. he was employed as a Civil Engineer with Midwestern Consulting, L.L.C. in Ann Arbor, Michigan. In September 2007, he entered the graduate program at Texas A&M University to pursue his masters degree.

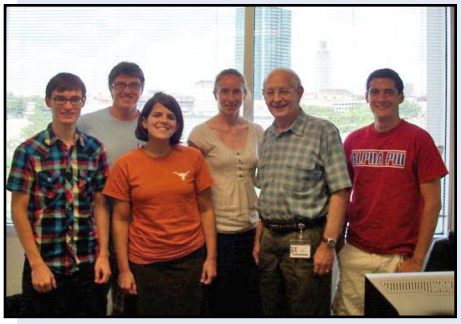
As a graduate student, Mr. Ré was a member of the SWUTC Advanced Institute and also a Research Assistant for the Texas Transportation Institute. As a graduate researcher on the TxDOT/FHWA Study *Developing Comprehensive Roadway Delineation Guidelines*, Mr. Ré was instrumental in establishing project design and methodology, assisting with data collection and facilitating subject experiments, formatting and coding various types of vehicle operations and significantly contributing to the research report *Driver Response to Delineation Treatments on Two-Lane Horizontal Curves*. He has also made numerous presentations on his research work, including two to TRB and one to the Texas ITE Annual Summer Meeting.

Mr. Ré is an active member of the Institute of Transportation Engineers and is an American Society of Civil Engineers Associate Member. While at TAMU he was winner of the 2009 Texas A&M Student Research Week Systems Engineering Session, recipient of the Jack E. Leisch Memorial National Graduate Fellowship (2008), Transoft Solutions Inc. Ahead of the Curve Scholarship (2008), ITE Outstanding Student Paper Award for District 9 (2008), and the TAMU ITE Outstanding Student Award (2008).

Mr. Ré graduated with his Masters of Science in Civil Engineering – Transportation in December 2008 and has since joined the Texas Transportation Institute on a full-time basis as an Assistant Transportation Researcher in the Operations and Design Division. Mr. Ré's major professor at TAMU was Dr. Gene Hawkins.

Other Student Highlights

University of Texas at Austin Advanced Institute PhD student, **Katherine Kortum,** supervised by Dr. Randy Machemehl was the recipient of the *2010 Elaine Dezenski President's Legacy Scholarship*, awarded by the Heart of Texas Chapter of Women's Transportation Seminar (WTS). This year, Katherine also received a $1000 scholarship from ITS Texas in November at the ITS Texas 2009 Annual Meeting. And, she was also chosen for the 2010 Eno Transportation Foundation's Leadership Development Conference, held in Washington DC the week of May 17-20, 2010.



(L-R) Jeff Bridgman, Jeff Loskorn, Alison Mills, Jennifer Duthie, Randy Machemehl, John Brady

UT-Austin Student Team Wins Award

WTS International's Innovative Project Solutions Award was presented to **Dr. Randy Machemehl** and three Advanced Institute graduate research assistants, **Alison Mills**, **John Brady** and **Jeff Loskorn**, and former SWUTC graduate researcher, **Jennifer Duthie** all from the University of Texas at Austin, in January 2010, for the Austin BIKE Study, conducted by the Center for Transportation Research for the City of Austin. Advanced Institute intern, **Jeff Bridgman**, helped gather and analyze data for the study.

TAMUite Wins District Traffic Bowl, Advances and Wins International Competition

A team of four SWUTC Transportation Scholar students, **Ben Sperry, Kristopher Ball**, **Phillip Dunham** and **Andrew Persyn**, representing the Texas A&M University Student Chapter of the *Institute of Transportation Engineers* (ITE) placed first in the district-level competition for the ITE Collegiate Traffic Bowl, held on Jan. 29 at the winter meeting of the Texas District Institute of Transportation Engineers in Frisco, Texas.

(L-R) Traffic Bowl Team members Phillip Dunham, Kristopher Ball, Ben Sperry and Andrew Persyn

The Traffic Bowl tested the students' knowledge of traffic-related subjects such as traffic control devices, highway design, and other topics in a Jeopardy!-style format.

By winning the Texas District, the Texas A&M team advanced to compete against 9 other district collegiate teams at the international ITE Collegiate Traffic Bowl in Vancouver, British Columbia which was held in conjunction with the ITE Annual Meeting and Exhibit on August 11th.

The Texas A&M University team was victorious and won a grand championship prize of $2,000.

Transportation Solutions for a Livable World

SWUTC pursues a balanced program of transportation research (transit, highway, and multimodal) by selecting those projects that reflect our vision, theme and strategic thrusts. Some of the specific research program sub-themes are: improved linkages between the U.S. and Mexican transportation systems, developing transportation solutions to improve the livability of our neighborhoods and communities and the quality-of-life for their inhabitants, development of transportation-based solutions to various infrastructure, environmental, and safety problems, and development of a superior transportation workforce for the 21st Century. For a listing and description of new, on-going and completed research projects please visit our website at http://swutc.tamu.edu/research.htm.

Selected 2010 Research Highlights

Facilitating Safer Cross-Border Trade

Study Improves Tracking of Cross-Border Hazardous Materials Shipments

Contact: Rajat Rajbhandari, TAMU, 915-532-3759, rajat@tamu.edu

Under NAFTA requirements, all hazardous materials that are shipped into Mexico or generated during the manufacturing process must be shipped back to their point of origin, typically the United States. Thus, the delivery and return of hazardous materials have created a "hazmat transportation corridor." At present, there is no automated, real-time method to track hazardous materials shipments crossing the U.S.-Mexico border. As a result, border agencies (specially the first responders) do not have advanced information about the hazardous materials being transported through border crossings and other locations within their communities. This lack of information hinders first responder's ability to resolve hazardous materials incidences.

Photo credit: allied-environmental.com

The objective of this research conducted by **Dr. Rajat Rajbhandari** of Texas A&M University was to develop a prototype of an information system by which hazardous materials movement will be relayed and/or shared with local and regional agencies (mainly the first responders) which will assist these agencies to respond to major hazardous materials incidents more efficiently. This prototype information system was designed for first responders as a model for what could be developed for the wide range of stakeholders from all U.S. and Mexican border states. A large part of the initial research was spent in identifying the agencies that played minor and major roles in transportation of hazardous materials across the border. The researchers found that the large number of agencies interacting have created

an extremely complicated process of hazardous materials transportation and incident response. Finally, based on stakeholder needs, the research proposed logical and physical architecture of a prototype system to monitor movement of hazardous materials in the border area and to provide advanced warning of hazardous materials related incidents to the first responders.

Final report may be viewed at:
http://swutc.tamu.edu/publications/technicalreports/476660-00016-1.pdf

Economic Development

Study Analyzes the Relationship between Land Values and Freestanding Bus Facilities

Contact: Carol Lewis, TSU, 713-313-7924, ca@tsu.edu

Public transit professionals continue to seek methods that offer greater service opportunities, while not materially increasing the costs of service provision. One strategy is to construct bus transit centers that operate much like the airline hub and spoke concept. More frequent destinations can be made available with shorter patron wait times and with minimal or no increase in the number of bus hours in operation. Patrons tend to appreciate the convenience of a transfer occurring in a lighted facility, in addition to the increased level of bus service. The land use preferred for potential bus transit center siting is generally a mix of commercial and higher density residential. Despite the favored higher density residential use, many of these neighborhoods may have single family homes near the commercial areas and the transit centers.

Houston Transit Center
Photo credit: Houston Metro

At various times, transit authorities hear complaints from neighborhood residents when searching for a new transit facility site. Often area residents feel that a transit facility will negatively impact their property values. Besides the bus transit centers that serve traditional local or express routes, a number of cities are planning bus rapid transit lines with stations that might lead nearby communities to ask similar questions about property values. In this research study, **Dr. Carol Lewis** of Texas Southern University assessed the effect of bus transit centers operating over 15 years in Houston, Texas, on nearby single family residential property values. According to the research team's findings, transit centers have a negligible influence on property values. Professionals can communicate that almost none of a property's value over the long run will be negatively affected by a nearby transit center. Property values are more likely to be influenced by improvements to the property and the neighborhood or quality of the school district. That bodes well for the many communities considering bus based facilities to improve service or to use as a cornerstone for economic development.

Final report may be viewed at:
http://swutc.tamu.edu/publications/technicalreports/167372-1.pdf

Improving Linkages for International Trade

Analysis of Texas Biofuel Supply Chains

Contact: Leigh Boske, UT-Austin, 512-232-4005, leigh.boske@mail.utexas.edu

Midwest corn ethanol and Brazilian sugarcane ethanol constitute two sources of the biofuel necessary for synthesis of the ten percent ethanol, ninety percent gasoline fuel blend, commonly referred to in the U.S. as E10. The updated 2007 Renewable Fuel Standard passed by Congress and signed into law by President George W. Bush in December 2007, promotes national availability of E10. This research effort conducted by **Dr. Leigh Boske** of the University of Texas at Austin examined the requisite equipment, time, and costs to transport ethanol to the Lone Star State from its Midwestern or Latin American sources. Federal biofuels policy along with new transportation technology, such as pipeline movement of renewable fuels, will largely determine whether domestic or international ethanol is more economically competitive in six Texas fuel markets.

Photo credit: stenabulk.com

Currently, corn ethanol dominates the U.S. biofuels market but has significant drawbacks including the energy needed to produce it, the negative effect on corn prices for human and animal consumption by shifting such a large percentage of the corn harvest to ethanol production, and the logistics of delivering corn ethanol which is manufactured largely in the Midwest Corn Belt to major markets along US coastal regions.

Brazilian sugarcane ethanol currently represents the most promising alternative to the corn variety. A four-parameter comparison citing lifecycle energy output, carbon emissions, land use intensity, and production costs indicates sugarcane ethanol is superior to corn ethanol in all categories. After identifying sugarcane's advantages over corn in terms of ethanol synthesis the next step involved detailing a supply chain by which Brazilian biofuel imports can service the Southwest region.

This research of domestic and international biofuel supply chain analysis supplements the 2008 SWUTC scoping study enabling a truer cost comparison between the corn and sugarcane ethanol alternatives. The findings detail specific costs and time durations associated with transporting sugarcane ethanol from Brazilian biorefineries to ports, shipping the fuel overseas to Texas, and then unloading the commodity and transferring it to ground transportation at the port.

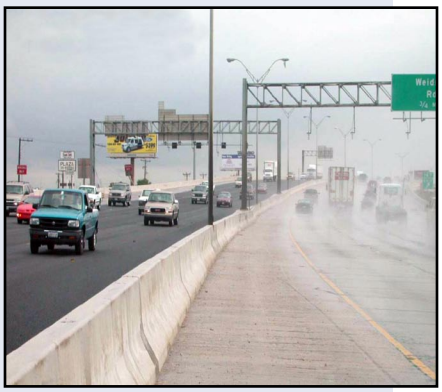
Final report may be viewed at:
http://swutc.tamu.edu/publications/technicalreports/169201-1.pdf

Infrastructure Performance

Research Effort Improves Mix Design of Permeable Friction Course Mixtures

Contact: Amy Martin-Epps, TAMU, 979-862-1750, a-eppsmartin@tamu.edu

Permeable friction course (PFC) mixtures are a special type of hot mix asphalt characterized by a high total air voids content to guarantee proper functionality and stone-on-stone contact of the coarse aggregate fraction to ensure adequate mixture stability. Thus, PFC mixtures constructed in a thin layer at the surface of a pavement structure produce several benefits in terms of economy, safety, and the environment. This project conducted by **Dr. Amy Epps-Martin** of Texas A&M University focused on improving the mix design of PFC mixtures fabricated using both Asphalt Rubber and Performance Grade asphalts. The project included the study of the internal structure of compacted mixtures based on the acquisition and subsequent analysis of X-ray Computed Tomography images. The entire evaluation incorporated the following aspects of PFC mixtures: (i) modification in the fabrication of laboratory compacted specimens used for mix design and evaluation; (ii) evaluation of stone on stone contact; and (iii) analytical prediction of permeability. These aspects were assessed for mixtures compacted in the laboratory and in the field and facilitated the research team in making recommendations to improve the current mix design procedure for PFC mixtures.



PFC alllows water to drain away from the roadway, which creates a safer driving environment. Photo credit: TTI Archives

Results from this research effort also produced two journal papers in the *Journal of Materials and Civil Engineering* and another in the *Journal of Construction and Building Materials*.

Final report may be viewed at:
http://swutc.tamu.edu/publications/technicalreports/476660-00013-1.pdf

Environmental Stewardship

Research Evaluates Driving Cycles for Air Quality Assessment

Contact: Lei Yu, TSU, 713-313-7282, yu_lx@tsu.edu

Transportation-related emissions are becoming one of the principal contributors to air pollution and Greenhouse Gas (GHG) emissions. To develop air quality inventories and implement emission control strategies, the driving cycle (a series of data points representing the speed of a vehicle versus time) is an important concept that has been applied for many years for the purpose of emission testing and estimation. The quality of a driving cycle is directly associated with the accuracy of any air quality analysis and, therefore, whether the desired emission reductions can be achieved. However, due to the limitation of real-world source data, the widely used driving cycles bring considerable uncertainties when the emission estimation is carried out for a specific city or region. Further, the existing driving cycles have been developed based only on driving activities, without capturing the characteristics of emission profiles.

Photo credit: edmonds.com

This comprehensive study, conducted by **Dr. Lei Yu** of Texas Southern University, sought to increase the accuracy of emissions estimation. The team utilized Portable Emission Measurement System (PEMS) and Global Positioning (GPS) to collect instantaneous vehicle activity data. After the data collection, data preprocessing was conducted and a specific database was built in which each record includes the activity and emission information at every second. The research team was able to evaluate how well the driving cycles can represent real world driving and emission characteristics by developing driving cycles for classified roads incorporating both a vehicle's driving activities and its emission characteristics; and by developing an evaluation approach of driving cycles in which Vehicle Specific Power (VSP) is adopted.

Final report may be viewed at:
http://swutc.tamu.edu/publications/technicalreports/169300-1.pdf

Infrastructure Cost Recovery

Improved Commercial Vehicle Cost Allocation

Contact: C. Michael Walton, UT-Austin, 512-471-4995, cmwalton@mail.utexas.edu

In recent years, it has become clear that to ensure sustainable operation of the nation's roads and bridges, new methods of user charging must be developed and employed to recover social, environmental, and infrastructure costs for highway system use. Technology development has allowed for many recent advances in highway charging; however, these have focused primarily on recovery of social and environmental costs through congestion and emissions fees. While some improvement in infrastructure cost recovery has been introduced through distance-based taxation, there has been little improvement in better matching highway user fees to intensity of use between or within different vehicle classes.


Photo credit: TTI Archives

This research conducted by **Dr. C. Michael Walton** at the University of Texas at Austin developed a methodology for better recovering infrastructure consumption costs, particularly from commercial vehicles, through a direct user fee. The research employed methods traditionally used in highway cost allocation to establish Axle-Load based user fees. The research team also utilized a method of comparison to determine improvements in equity of cost recovery between existing (Number-of-Axle) and proposed (Axle-Load) methods.

The improved rate structure identified and examined in this study was an Axle-Load based toll utilizing Weigh-in-Motion (WIM) technology systems already widely employed for planning and weight enforcement. After applying the proposed methodology to a theoretical case study based on Texas State Highway 103, the research team concluded that WIM technologies can provide valuable information for both toll estimation and implementation, thereby yielding a more equitable tolling structure than the more commonly employed Number-of-Axle structure.

Final report may be viewed at:
http://swutc.tamu.edu/publications/technicalreports/476660-00064-1.pdf

SWUTC Colleagues Recognized for Research Contributions

Dr. Kara Kockelman, Professor and SWUTC researcher in the Civil, Architectural and Environmental Engineering Department at the University of Texas at Austin is the recipient (with co-author Dr. Cara Wang) of the *2009 Young Researcher Award* from the Transportation Research Board's Committee on Statistical Methods (ABJ80) for paper titled "Application of the Dynamic Spatial Ordered Probit Model: Patterns of Ozone Concentration in Austin, Texas," awarded in Washington, D.C. January 2010, at the 89th Annual Meeting of the Transportation Research Board.

In April, Dr. Kockelman was awarded the *2010 ASCE Walter L. Huber Civil Engineering Research Prize*.

The Huber Prize is awarded to members of the American Society of Civil Engineers (ASCE) for notable achievements in research related to civil engineering. The prize citation read: "For her contributions in the areas of data acquisition and analysis for highway safety, urban systems forecasting, vehicle design, road pricing, spatial statistics and energy savings, providing objective answers to multi-faceted questions that facilitate decisions in transport planning and policy-making."

Also in April, Dr. Kockelman was appointed to the USDOT Bureau of Transportation Statistics' Advisory Council. The Advisory Council for Transportation Statistics (ACTS) is composed of six members appointed by the Director. The members are chosen on the basis of their expertise in transportation statistics, economics, and analysis.

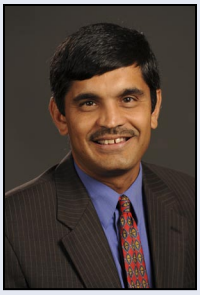
In its highest recognition of notable and outstanding professional achievement, the Institute of Transportation Engineers (ITE) awarded SWUTC Executive Committee member and Texas Transportation Institute Agency Director **Dr. Dennis Christiansen** with honorary membership. Christiansen becomes ITE's *77th Honorary Member*.

"Dr. Christiansen has demonstrated his leadership and dedication to the transportation profession as a former Texas District director on ITE's Board of Directors and as a past international president," ITE International Vice President Robert C. Wunderlich said during the ceremony.

A member of the TTI staff for 36 years, Christiansen has extensive research experience in several areas, including traffic operations and transportation planning, and is an international expert in high-occupancy vehicle (HOV) lanes.

SWUTC Executive Committee member and researcher, **Dr. Lei Yu** of Texas Southern University accepted the position of Dean of the College of Science and Technology at Texas Southern University effective September 1, 2009. He originally joined the faculty in the Department of Transportation Studies in 1994, and is currently serving as Professor of Transportation Planning and Management and Co-PI of National Transportation Security Center of Excellence for Petro-Chemical Transportation. Previously, he has been the Interim Chair and Chair of Department of Transportation Studies for 12 years. He earned his PhD degree in Civil/Transportation Systems Engineering from Queen's University (Canada) in 1994, M. Eng. Degree in Production and Systems Engineering from Nagoya Institute of Technology (Japan) in 1988, and B.Eng Degree in Transportation Management Engineering from Beijing Jiaotong University (China) in 1984. He is a professional engineer registered in the State of Texas.

In the Dean's position, Dr. Yu serves as chief academic and administrative officer of the College under the general direction of the Provost, and provides leadership in formulating educational policies. He is responsible for supervising the College's daily operations, managing the College's budget, and leading fund-raising efforts.



Key SWUTC researcher **Dr. Chandra Bhat** of the University of Texas at Austin was selected to receive the *S.S. Steinberg Award* from the Research and Education Division of the American Road and Transportation Builders Association (ARTBA) in October 2009.

The award, named after the founding president of the ARTBA Research & Education Division (RED), recognizes an individual who has made remarkable contributions to transportation education. He is a nationally-recognized expert on travel demand modeling and travel behavior analysis. Bhat has conducted extensive research and written on land-use and travel demand modeling, evaluation of transportation control policy and congestion pricing, the use of non-motorized travel modes and physical health and transportation.

This award was presented during the annual meeting of the *Transportation Research Board* in January 2010.

Dr. Bhat was also selected by the Student Engineering Council (SEC) to receive the *Most Outstanding Faculty Award for Civil Engineering*. The award was presented to Dr. Bhat at the annual Faculty Appreciation Event on March 2.

And in April, Dr. Bhat was elected to the *Academy of Distinguished Teachers* at the University of Texas at Austin.

The *Academy of Distinguished Teachers* was established in 1995 and demonstrates the university's commitment to excellence in teaching. Approximately 5% of the tenured faculty in the university are elected as members.

SWUTC Researcher and Assistant Professor of Transportation Engineering at Texas A&M University **Dr. Dominique Lord** was awarded the CUTC-ARTBA *2009 New Faculty Member Award* at the CUTC Annual Awards Banquet in Washington D.C in January.

The award, co-sponsored by the Council of University Transportation Centers (CUTC) and the American Road & Transportation Builders Association (ARTBA), is given annually to a tenure-track faculty member in transportation engineering and recognizes outstanding teaching and research contributions to the transportation field. Lord received a plaque and cash stipend of $2,000.

SWUTC researcher **Dr. Clifford Spiegelman** has been appointed Distinguished Professor of Statistics at Texas A&M University's College of Science. The title of Distinguished Professor is reserved for faculty who are recognized by their peers as being among the top 5 percent in their fields worldwide. Currently, there are seventy Distinguished Professors among the 2,900 faculty members of Texas A&M University.

"This appointment is a career highlight, to say the least," Spiegelman said. "It's a huge honor for me to work alongside my colleagues at TTI and the university to try and solve problems through statistics."

Spiegelman, who joined the Texas A&M faculty in 1987, made international news in 2007 when his work on bullet fragments from the JFK assassination case determined that the FBI analysis was flawed.

Spiegelman is a founder of chemometrics and a leader in statistical forensics. His appointment as Distinguished Professor became effective September 1, 2009.

Dr. Ivan Damnjanovic, Assistant Professor of construction engineering and management in the Zachry Department of Civil Engineering and SWUTC researcher, has been appointed to an ad hoc committee by The National Academies' Division on Engineering and Physical Sciences.

The project, Predicting Outcomes from Investments in the Maintenance and Repair of Federal Facilities, has a committee of experts who will develop methods, strategies, and procedures to predict outcomes anticipated from investments in federal facilities' maintenance and repair. The project will begin Dec. 1 and run for 18 months.

Damnjanovic received his PhD from the University of Texas in 2006 and joined Texas A&M University in Aug. 2006.

Dr. Dallas N. Little, Snead Chair Professor in the Zachry Department of Civil Engineering at Texas A&M University and SWUTC Executive Committee member was named a Regents Professor by the Texas A&M University System Board of Regents during its meeting on December 4, 2009.

Little, who is also the associate director of the International Center for Aggregates Research, conducts research through TEES, TTI as well as the SWUTC.

The board established the Regents Professor Award program in 1996 and Regents Fellow Service Award program in 1998 to recognize employees who have made exemplary contributions to their university or agency and to the people of Texas. To date, 118 faculty members have been named Regents Professor and 71 agency professionals have been named Regents Fellow.

Recipients will receive a $9,000 stipend, a commemorative medallion and a certificate.

Dr. C. Michael Walton, Professor in Transportation Engineering at the University of Texas at Austin and SWUTC Executive Committee member and researcher, was awarded on November 13, 2009 the TxDOT *Road Hand Award*. This award is an honored TxDOT tradition to acknowledge those who have made improvements to Texas transportation a labor of love.

In the early days of the 20th century, anyone who helped build roads was called a Road Hand. Today's Road Hands are citizens who have given their time, energy, and vision to help improve transportation throughout the state. In bestowing this award, TxDOT recognizes its friends who have helped build one of the best transportation systems in the world. Luther DeBerry (BSCE '37), a former State Highway Engineer, created the Road Hand award in 1973 as the highest tribute to public-spirited citizens who championed transportation projects in their community.

Professor Walton is recognized for his involvement in shaping the state's future transportation plans. According to Amadeo Saenz, Jr., TxDOT Executive Director, he has played a decisive role in helping determine the fiscal requirements for the state's transportation goals by serving as chair of the agency's "2030 Committee". The 2030 report provides a comprehensive analysis of estimated needs, the anticipated costs to realize those needs, and the resulting benefits of highway construction and maintenance on urban and rural mobility and safety.

The names of Road Hand award recipients are inscribed on the Road Hand Hall of Honor plaque which hangs prominently in the foyer of the historic Dewitt C. Green Highway Building in Austin.

Dr. Carol Lewis, Director for the Center for Transportation Training and Research as Texas Southern University and SWUTC Executive Committee member and researcher, was appointed by Houston Mayor Annise D. Parker to serve on the Gulf Coast Rail District Board. This district encompasses Harris County, as well as the City of Houston, Fort Bend County, Galveston County and Waller County.

The Gulf Coast Rail District works with public and private partners to develop and implement a systematic approach to improvement of the regional rail network for the benefit of the region's residents and economy. Specifically, projects to be pursued or supported by the Gulf Coast Rail District shall address the following goals: (1) safety and security, particularly safety at grade crossings and homeland security, (2) mobility and access, for vehicles, pedestrians and trains, including commuter rail, and (3) quality of life, through context sensitive design, air quality improvements, noise reduction, natural hazard mitigation, and other neighborhood enhancements.

In October**,** SWUTC researcher and Associate Professor **Dr. Ming Zhang** at the University of Texas at Austin was accepted to the Planning Accreditation Board (PAB) Site Visitor pool. As part of a team comprised of two planning educators and one practitioner, site visitors conduct multi-day, in-depth, fact-finding visits to planning programs in academia seeking initial accreditation or re-accreditation. They review programs' Self Study Reports and curricula, and interview administration, staff, students, alumni, and local planning professionals to assess program performance and quality. Site visitors then work with their teams to produce a Site Visit Report. The PAB reviews the Site Visit Report in addition to other materials when considering programs for (re) accreditation.

Each year, the PAB organizes roughly twelve site visits to planning programs around the country. Site visitors are appointed for renewable five-year terms, and ideally, each site visitor will be asked to conduct a site visit once every two or three years. Serving as a site visitor provides the opportunity to visit universities around the country, meet planners, educators, students, and community leaders and gather new ideas and perspectives on planning.

On October 1st, SWUTC researcher, **Dr. Eyad Masad** was appointed Assistant Dean for Research and Graduate Studies at Texas A&M at Qatar. "As a relatively new campus, we still have significant work to do in terms of building research capacity in Qatar," Masad said. Masad holds a joint appointment as Halliburton Professor of Civil Engineering at Texas A&M's home campus and is a member of the mechanical engineering program at Texas A&M at Qatar. His expertise lies in developing innovative materials for improving the performance and qualities of infrastructure systems, and he is looking to establish regional research centers to

support development in Qatar. "Eyad has contributed to the well-being of society by helping to make roads better, and in the process had demonstrated how sophisticated scientific instrumentation can be used to produce very practical improvements to engineering practice," said Dr. James C. Holste, associate dean for research and graduate studies at Texas A&M at Qatar. "Now, he will be assisting other researchers to develop their programs as well as assisting with the implementation of our graduate programs. These programs will certainly provide more opportunities to develop the technical expertise and technical base that Qatar requires."

On June 8th, Zachry Department of Civil Engineering Associate Professor, SWUTC Associate Director and researcher, **Dr. Gene Hawkins**, was awarded the prestigious TexITE *2010 Engineer or the Year Award.* The TexITE Transportation Engineer of the Year has been awarded since 1974. The award recognizes outstanding practice, teaching or research of the science and art of transportation engineering in the State of Texas.

"This honor was a complete surprise," Hawkins said. "When you look at the list of people who have been given this award, it's a who's who in transportation engineering, and I'm very honored to be included in that company."

SWUTC Student Researcher Achievements

The following SWUTC student researchers received *Outstanding Student Awards* from the Texas Institute of Transportation Engineers. These awards recognize an outstanding student in each of the TexITE Student Chapters.

Eleni Pappas - SWUTC Advanced Institute MS student from the University of Texas at Austin supervised by Dr. Randy Machemehl.

Yan Zheng - SWUTC MS graduate researcher at Texas Southern University supervised by Dr. Fengxiang Qiao.

Ben Sperry - SWUTC Transportation Scholars PhD student and SWUTC researcher at Texas A&M University supervised by Mr. Curtis Morgan.

Bharath Rajagopalan, former SWUTC graduate researcher at the University of Texas at Austin, was honored as the 2009 recipient of the *Charley V. Wootan Memorial Award* for the best MS thesis in North America in the field of Transportation Planning and Policy at the Council of University Transportation Centers (CUTC) annual meeting in Washington, D.C. in January 2010. Mr. Rajagopalan's thesis is titled "Comprehensive Analysis of Workers' Non-Work Activity Time-Use and Timing Behavior." While in graduate school, Mr. Rajagopalan conducted research in association with Dr. Chandra Bhat's SWUTC study "An Analysis of Children's After-School Activity and Travel Patterns." Mr. Rajagopalan received his Masters of Science in Civil Engineering in December 2008. Professor Bhat was also Rajagopalan's advisor as a graduate student.

This highly competitive recognition comes with a $1,500 cash award.

Lauren Gardner, SWUTC PhD researcher and Advanced Institute student at the University of Texas at Austin, supervised by Dr. S. Travis Waller, was the recipient of the *2010 Helene M. Overly Memorial Scholarship*, awarded by the Heart of Texas Chapter of Women's Transportation Seminar (WTS).

Jose Aguiar-Moya - SWUTC PhD student researcher at the University of Texas at Austin, supervised by Dr. Jorge Prozzi, was chosen to participate in the 2010 International Road Federation Road Scholar Program held in Washington D.C. January 6-15, 2010.

Lily Aung - SWUTC MS student researcher from the University of Texas at Austin, supervised by Dr. C. Michael Walton, received a $1000 scholarship through ITS Texas in November at the ITS Texas 2009 Annual Meeting.

2010 Funded Projects

Enhancing Mobility

Managed Lane Travelers - Do They Pay for Travel as They Claimed They Would?
P.I. Mark Burris, TAMU

How Fast is a Fast Train? Comparing Attitudes and Preference for Improved Passenger Rail Service Among Urban Areas in the South Central High-Speed Rail Corridor
P.I. Curtis Morgan, TAMU

The Study of the Inter-Relationship between Parent's and Children's Physical Activity Participation Frequency
P.I. Chandra Bhat, UT-Austin

The Effect of Public Transit on Social and Economic Opportunities for Youth
P.I. Talia McCray, UT-Austin

Getting the Parking Right for Transit-Oriented Development
P.I. Ming Zhang, UT-Austin

High Speed Rail: A Study of International Best Practices and Identification of Opportunities in the U.S.
P.I. Michael Walton, UT-Austin

Predicting Incremental Ridership Due to Buses on Shoulder Implementation
P.I. Randy Machemehl, UT-Austin

Examining the Role of Trip Length in Commuter Decisions to Use Public Transportation
P.I. Randy Machemehl, UT-Austin

Reviewing, Analyzing and Updating Marketing Strategies to Increase Public Transit Ridership
P.I. Carol Lewis, TSU

Pre-Determining Performance Based Operational and Toll Rate Setting Measures
P.I. Ginger Goodin, TAMU

Identification of Priority Rail Projects
P.I. Curtis Morgan, TAMU

Promoting Safety

Characterizing Information Propagation Through Inter-Vehicle Communication on a Simple Network of Two Parallel Roads
P.I. Bruce Wang, TAMU

Treatments and Warrants Eliminating Potential Conflict Points between Bicycles and Motor Vehicles at Freeway Interchanges
P.I. Fengxiang Qiao, TSU

Automated Generation of Virtual Scenarios in Driving Simulator from Highway Design Data
P.I. Sue Chrysler, TAMU

Use of Micro Unmanned Aerial Vehicles (MUAVs) for Roadside Condition Surveys
P.I. Nasir Gharaibeh, TAMU

Senior Automobile Crashes and Fatalities in Texas
P.I. Gwen Goodwin, TSU

Safety and Economic Impacts of Converting Two-Way Frontage Roads to One-Way
P.I. Bill Eisele, TAMU

Signing Guidelines for Flooding Conditions and Warrants for Flooded Conditions Detection Systems
P.I. Kevin Balke, TAMU

Transportation Network Efficiency

Performance Measures for Transportation Planning and Operations for MPOs
P.I. Tara Ramani, TAMU

Develop a System to Support Preparation of Life-Cycle Budget Needs for Highways
P.I. Zhanmin Zhang, UT-Austin

Mega-Region Freight Movement: A Case Study of the Texas Triangle
P.I. Rob Harrison, UT-Austin

Moving the Concept of Megaregions into Transportation Planning
P.I. Carol Lewis, TSU

Rural Planning Organizations – Their Role in Transportation Planning and Project Development in Texas
P.I. John Overman, TAMU

Environmental Stewardship

Developing Infrastructure for Interconnecting Transportation Network and Electric Grid
P.I. Ivan Damnjanovic, TAMU

The Relationship Between Income and Personal Vehicle Fuel Efficiency and Associated Equity Concerns for the Fuel Tax
P.I. Ginger Goodin, TAMU

Impacts of Proposed Federal Greenhouse Gas Mitigation Legislation on Texas' Transportation Economy
P.I. Leigh Boske, UT-Austin

Evolution of the Nation's Vehicle Fleet and the Market for Plug-in Hybrid Electric Vehicles
P.I. Kara Kockelman, UT-Austin

Network Methods for Project Selection Based on Optimizing Environmental Impact
P.I. Travis Waller, UT-Austin

An Evaluation of Mobile Source Greenhouse Gas Modeling Approaches for Traffic Management Assessment
P.I. Lei Yu, TSU

Comparisons Between Vehicular Emissions of Real-World In-Use and Regulatory Dynamometer Driving
P.I. Doh-Won Lee, TAMU

Optimized Deployment of Emissions Reduction Technologies for Large Fleets
P.I. Reza Farzaneh, TAMU

Comparison of Operational Strategies for Reducing Fuel Consumption and GHG Emissions from Trucking
P.I. Michael Walton, UT-Austin

Security Preparedness & Response

Investigate Existing Non-Intrusive Inspection (NII) Technologies for Port Cargo Inspections
P.I. Yi Qi, TSU

Infrastructure Efficiency

Evaluating the Fundamental Mechanisms of Fatigue Crack-Growth in Hot and Warm Mix Asphalt
P.I. Amit Bhasin, UT-Austin

Framework for Reliability Analysis of Flexible Pavements
P.I. Jorge Prozzi, UT-Austin

Nanotechnology and a MEMS/NEMS-Based System for Damage Resistant Pavements
P.I. Rashid Abu Al-Rub, TAMU

Performance of Permeable Friction Course (PFC) Pavements Over Time
P.I. Amy Epps-Martin, TAMU

Performance Evaluation & Mix Design for High RAP Mixtures
P.I. Fujie Zhou, TAMU

Transportation Workforce Development

Developing Transportation Games for High School Students
P.I. Khosro Godazi, TSU

Extreme Makeover: Bringing the SWUTC Transportation Outreach Modules into the 21st Century
P.I. Debbie Jasek, TAMU

2010 Summer Transportation Institute-Kingsville
P.I. Debbie Jasek, TAMU

2010 Technology Transfer

Current information, timely delivered to the right people is the desired outcome for the SWUTC's technology transfer program. Both educational and research program activities pursue vital aspects of technology transfer. **Educationally, the student/professor relationships are the principal loci of technology transfer activities -- knowledge exchanged between professor and students in classroom and research endeavors. In the research program, technology transfer outcomes are typically associated with the delivery of research products (papers, lectures, presentations, reports, video/media) -- from individual research projects --- to potential and interested users and colleagues.** During 2010, the SWUTC researchers made 61 presentations at professional meetings and published 21 journal articles based on SWUTC research. The SWUTC maintains a website at http://swutc.tamu.edu that presents overviews all SWUTC research and educational activities. Technical reports generated by SWUTC research projects may be downloaded at http://swutc.tamu.edu/publications.htm.

Technology Transfer Highlights

SWUTC Researcher Presents Findings in China

Senior SWUTC Researcher, **Ms. Gwen Goodwin** of Texas Southern University attended the 12th International Conference on Mobility and Transport for Elderly and Disabled Persons (TRANSED 2010) in Hong Kong, China on June 1-4, 2010. At the conference, Ms. Goodwin presented a paper titled *Driving Cessation: Who Gives You the Right to Decide* based on her SWUTC research work. The presentation summarized study findings which analyzed crash and fatality data from the Texas Department of Transportation for 2003 to 2008 to determine if enacting Katie's Law (HB 84), which places requirements on senior drivers when they reach 79, decreased the number of senior fatalities in Texas.

SWUTC Research Leads to Best Paper Award from JAPA

A paper penned by **Dr. Eric Dumbaugh**, Assistant Professor of Urban Planning at Texas A&M University, and his graduate student **Robert Rae** has shattered myths about the safety of suburban roads and related community design, said associate editors at the Journal of American Planning Association (JAPA), who selected the paper for the prestigious journal's *2009 Best Paper Award*. The paper, "Safe Urban Form: Revisiting the Relationship Between Community Design and Traffic Safety" is a product of SWUTC supported research project "Examining the Design and Develop-


Dr. Dumbaugh

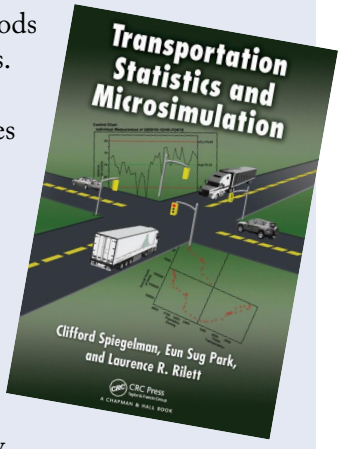
Mr. Robert Rae

mental Factors that Influence the Incidence of Urban Traffic Crashes."

Robert Rae graduated with a Master of Urban Planning degree from Texas A&M in 2008. He is currently employed as an analyst for Kimley-Horn in Dallas, Texas.

SWUTC Effort Produces New Textbook for Transportation Students

By discussing statistical concepts in the context of transportation planning and operations, *Transportation Statistics and Microsimulation* provides the necessary background for making informed transportation-related decisions. It explains the why behind standard methods and uses real-world transportation examples and problems to illustrate key concepts.



Classroom-tested at Texas A&M University, the text covers the statistical techniques most frequently employed by transportation and pavement professionals. To familiarize readers with the underlying theory and equations, it contains problems that can be solved using statistical software.

Dr. Clifford Spiegelman, Texas A&M University **Dr. Eun Sug Park**, Texas Transportation Institute and **Laurence Rilett**, University Nebraska-Lincoln co-authored this textbook and drew on their extensive experience in the application of statistical techniques in transportation research and teaching. This textbook explicitly defines the underlying assumptions of the techniques and shows how they are used in practice. It presents terms from both a statistical and a transportation perspective, making conversations between transportation professionals and statisticians smoother and more productive.

SWUTC Student Researchers Present Findings at Evacuation Conferences

SWUTC graduate students **Brandon Mosley** and **Garlin Wynn** from Texas Southern University presented research comparing Hurricanes Rita and Ike at evacuation conferences sponsored by the University of Houston, August 6 and Rice University September 13. Their work illuminated issues with clearing large numbers of residents via urban area roadways and public transportation systems. In addition, they discussed other events including potential terrorists' attacks or wildfires that need to be better understood to predict community evacuation. Much work has already been done to improve evacuation times and experiences when the need to evacuate occurs. The various models that assess evacuations were viewed with a specific eye to hurricanes. Their presentation examined the application of these models in Gulf Coast states and discussed future directions for improving their use by government officials. Further, an assessment of evacuations during Hurricanes Rita and Ike was included which made use of an index comparing evacuation travel time to average daily peak travel time.

(L-R) Garlin Wynn & Brandon Mosley

TRB Presentations - Past and Upcoming

In January 2010, twenty six presentations based on SWUTC research were made to the 89th Annual Meeting of the Transportation Research Board. Highlighted below is one example.


Dr. Travis Waller

Dr. S. Travis Waller, Lauren Gardner, and **Stephen Boyles** SWUTC researchers from the University of Texas at Austin presented a paper entitled *Congestion Pricing for Transportation Networks Under Supply and Demand Uncertainty* at the 89th Annual Meeting of the Transportation Research Board (TRB), Washington DC, January 2010. This paper reported some results from Dr. Waller's recent research study *Robust Pricing of Transportation Networks Under Uncertainty*.

The presentation included a modeling framework for representing uncertainty in long-term travel demand, and in day-to-day network capacity, in the context of pricing problems. By considering four different scenarios on user information and flexibility in pricing, the value of these options can be quantified for a given network, providing guidance both to public agencies and private entities in developing toll policies and in influencing legal structures regarding toll regulation.

Tractable solution methods were developed for all of these information scenarios; when tolls can be varied flexibly, they are exact. When tolls must be independent of the demand and supply realization, heuristics were provided. These methods were all applied to the well-known Sioux Falls network. The most interesting results from this analysis are the relative benefits of providing information versus responsive tolling under conditions of uncertainty. Although both improve the system performance it appears that information is more valuable than responsive tolling under the circumstances examined in the paper. The Full Information/Unresponsive Tolls seemed to provide the most robust results, with both lower system cost and increased revenue over the No Information/Unresponsive Tolls scenario, and relatively low variances. It is also clear that both supply and demand uncertainty should be considered collectively, as the system performance is underestimated when they are evaluated independently, or not at all.

Undergraduate Transportation Scholars Have Papers Accepted for Presentation

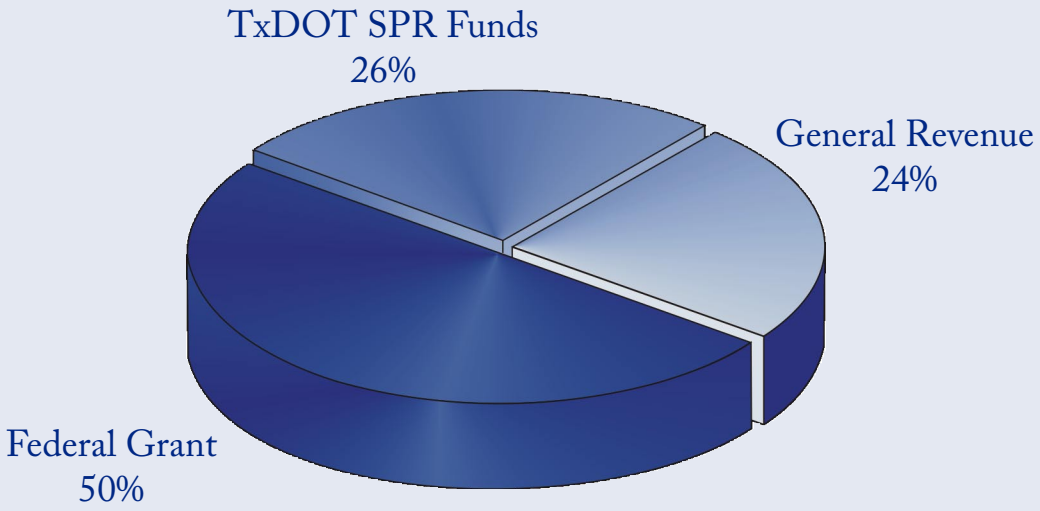
As part of the SWUTC Summer Undergraduate Transportation Scholars Program (UGTSP) at Texas A&M University, each student prepares a paper at the end of the term for publication. This year, three UGTSP students submitted their papers to TRB for possible inclusion at 90th Annual Meeting in January 2011. Lance Ballard's paper *Evaluation of Retroreflectivity Measurement Techniques for Profiled and Rumble Strip Pavement Markings* has been accepted for presentation and publication. Brad Brimley's paper *Analysis of Retroreflectivity and Color Degradation in Sign Sheeting* has been accepted for presentation. And the third paper by Brian Ward, *Evaluation of Lithium Based Curing Compound Effectiveness*, is still in review as of this printing.


2010 Texas A&M University UGTSP Participants

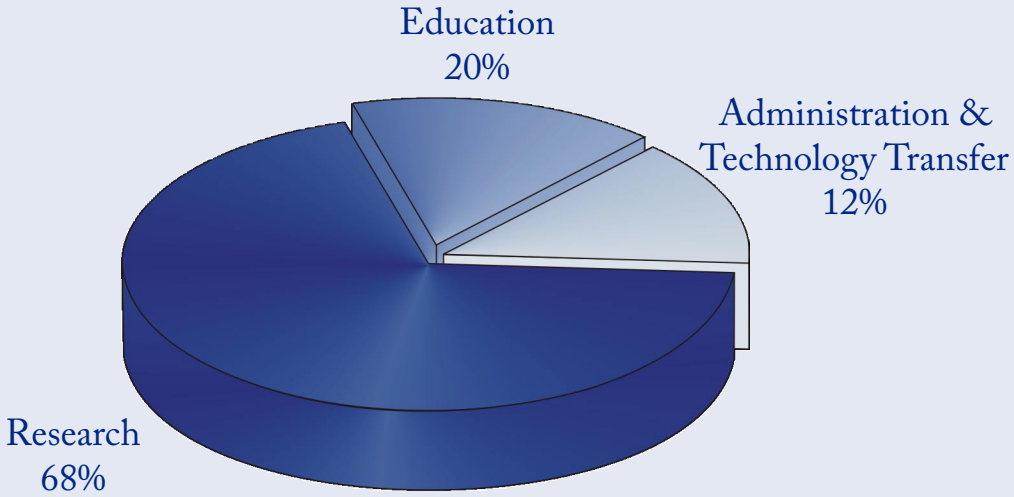
FINANCIAL REPORT

For September 1, 2009 - August 31, 2010

Funding Sources



Expenditures of Funds



Southwest Region University Transportation Center
Texas A&M University System
3135 TAMU
College Station, Texas 77845-3135
(979) 845-5815
Fax (979) 845-9761

Visit our web site:
http://swutc.tamu.edu/