2006 ANNUAL REPORT

SOUTHWEST REGION UNIVERSITY TRANSPORTATION CENTER

Credits

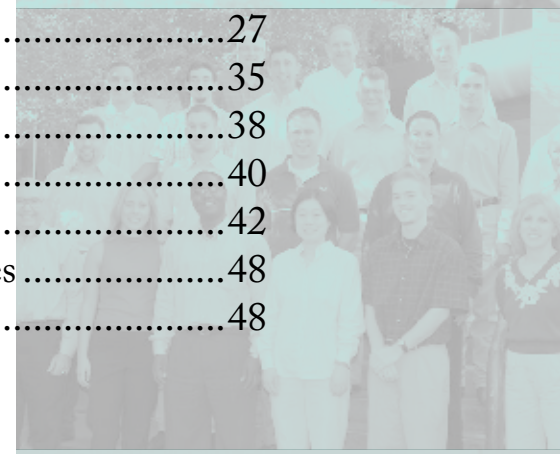
Editor: Barbara Lorenz
Cover Design: John Hobbs
Graphics: Ivan Lorenz
John Hobbs

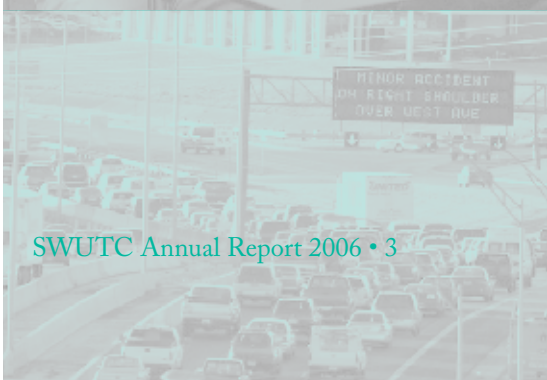
Southwest Region University Transportation Center
Annual Report 2006

Transportation Solutions to Enhance Prosperity and the Quality of Life

Region Six







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Message from the Director

We are pleased to report SWUTC's efforts for 2006 with selective highlights to mark the pursuit of our theme and its thrust areas. In completing the final year of our program authorized in TEA-21, we are revisiting the SWUTC's performance with the idea to capitalize on the strengths of the theme, *Transportation Solutions to Enhance Prosperity and the Quality of Life,* as we prepare for the future.

The underpinnings for this theme are based in the geographic location of Region 6 and its primary economic, social, and environmental dynamics that shape and are being shaped by its transportation network. Considering the region's proximity to the border with Mexico, its land and water-based transportation systems, rapidly growing population, increasing economic and technology opportunities, educational challenges for its younger cohorts of population, and the challenging and changing environmental qualities of the region, crucial elements of the theme resonate with U.S .DOT's strategic plan for the critical transportation issues of the country. We rely on four main thrust areas to focus our efforts to pursue the *Transportation Solutions to Enhance Prosperity and the Quality of Life* theme of SWUTC:

- Support Economic Growth and Trade
- Enhance Mobility and Infrastructure Efficiency
- Promote Safety, Environmental Stewardship, and a Secure Environment
- Transportation Workforce Development

Research

It is our intent to make fundamental strides in basic research and advanced research that will be implementable especially by operating agencies responsible for improving accessibility and mobility while reducing congestion in our urban transportation systems; providing infrastructure renewal; harmonizing freight movements between Canada, U.S. and Mexico; reducing the bottlenecks while improving the technology and linkages among the freight and passenger modes in the complete transportation network; improving the livability of our rural and urban neighborhoods; and contributing to improvements in the overall safety of the transportation enterprise in our region and Nation.

Some of this current effort conducted by SWUTC researchers and reported in this document includes: (1) some dynamics and impacts of U.S.-China trade upon multimodal freight systems in Texas and Mexico; (2) drivers' disregard for traffic controls and perceptions of risks and safety; and (3) application of transit-oriented development analysis at Houston MetroRail's Ambassador Way transit station.

In addition to the results of these projects, SWUTC researchers were able to create new funding opportunities with the EPA and TxDOT to extend efforts on SWUTC projects involving truck engine idling, drayage operations at intermodal sites, and improvements in warm-mix asphalt technology.

Education

Attracting the best students available has been our goal since the SWUTC consortium first began operation in 1988. More recently, taking a leadership role in the Summer Transportation Institute (STI) program in FHWA has made us realize how we can leverage our resources to begin attracting outstanding young students to transportation careers utilizing pre-K, secondary school, and other hands-on techniques before they enroll at the university level. At the university level, our curriculum improvements and faculty appointments will need to keep apace and contribute to new technologies that require constantly growing knowledge in the transportation sector. Developing new faculty members remains a high priority of our UTC educational program, and graduates from Texas A&M, University of Texas-Austin, and Texas Southern University are being placed in an increasing number of transportation faculty positions in the Region and nationwide. Continuing education and other capacity-building

programs will be a routine part of the "educational tool kit" that we will need to keep the transportation leaders at the frontier of the expanding knowledge base. Increased workforce productivity requires industrial-based knowledge as well as academic curricula, and we are seeking new and better ways to attract and train the transportation workforce of the 21st Century, including providing leadership and focus in distance learning curriculum efforts just getting underway in the group of 10 Regional UTCs.

Report highlights include brief presentations of the SWUTC's academic programs, faculty members, and students at TSU, UT-Austin, and Texas A&M. Particularly, I hope you will read about the award winning students – Ms. Aruna Sivakumar, Mr. Kenneth Brown, and Ms. Isabel Victoria -- who are representative of the graduate student participants in our programs. Additional honors for outstanding research, publications, and leadership were awarded to Mr. Zhirui Ye, Ms. Erin Eurek, Mr. Nick Lownes, Ms. Allison Conway, Mr. Stephen Boyles, Mr. Jeffery LaMondia, Ms. Jennifer Duthie, Mr. Feng Hong, and Mr. Pradeep Gulipalli. These young women and men are key to producing the overall success of what we do.

Technology Transfer

Conceptually, each of the educational programs in SWUTC creates a transfer of technical knowledge from the faculty to each student, who then applies that knowledge in the next phase of professionalization. That results in a pure case of technology transfer. Other proactive initiatives are needed to focus efforts upon creating easier access to research results. User friendly delivery mechanisms and a variety of technology transfer techniques will create the standard we expect to set and achieve as we implement our program to improve the prosperity and quality of life of our fellow citizens. Traditional methods of conferences, publication, presentation, and research documentation will be core elements. These elements will be produced in an enhanced cyber-environment. Internet based solutions, multi/mixed media, distance-learning and information delivery, and customized packaging of information products will be among the technology-driven approaches to improved delivery of research results.

Highlights of SWUTC's technology transfer in 2006 include: (1) recognition of the 50th anniversary of the Interstate Highway System; (2) developing and implementing performance measures in freight corridors'; (3) reducing engine emissions from idling trucks; (4) developing/implementing a traffic simulation laboratory; and (5) preparing a statistical textbook for classroom use in numerical methods.

A particularly compelling example of successful technology transfer developed when TSU grad Mr. Perry Miller, a former transportation undergraduate student, graduate student, and research assistant was promoted to Airport Manager at Ellington Field in Houston.

As we purse the education-research-technology transfer elements of the UTC program, we seek to have the SWUTC to be first among the UTCs in the U.S. in advancing the goals of the program set by USDOT. This means that our research, educational, and technology transfer programs must be sustainable at a high level of excellence. Throughout the U.S., but especially in Region 6, we expect our programs to be:

the "place to go" when prospective students contemplate a transportation career,
the "place to be" when transportation researchers and faculty members look for an improvement in their career opportunities,
the "place to call" when transportation entities need objective information, innovative solutions, and top-notch graduates; and
the "place to look to" for leadership and collegial partnership for all the UTC programs in Region 6.

We have had a great year in 2006 and are looking forward to expanded opportunities and responsibilities for SWUTC in the future.

Dock Burke
Director

Theme and Vision

The SWUTC theme

Transportation Solutions to Enhance Prosperity and the Quality of Life

clearly 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.

To achieve maximum value from the SWUTC in implementing our grant, the SWUTC pursues the following 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 professional 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

Since the establishment of the UTC program in 1988, the SWUTC consortium has included these members: Texas A&M University System, the University of Texas at Austin, and Texas Southern University. The transportation research and educational activities of the three consortium members in the SWUTC produce the largest combined program of its kind in the US. Further, the added strength from the synergy among the consortium's transportation faculty and research professionals has created a unique blend of efforts that has enhanced the education, research, and service leadership within Region 6.

Lead University - Texas A&M University

The Texas Transportation Institute is headquarters for the SWUTC and is one of the premier transportation research entities in the U.S. The research program at TTI is extensive and includes transportation systems and operations, policy and planning, economics, 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.

Texas Southern University

The Texas Southern University and its Center for Transportation Training and Research present a premier 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 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.

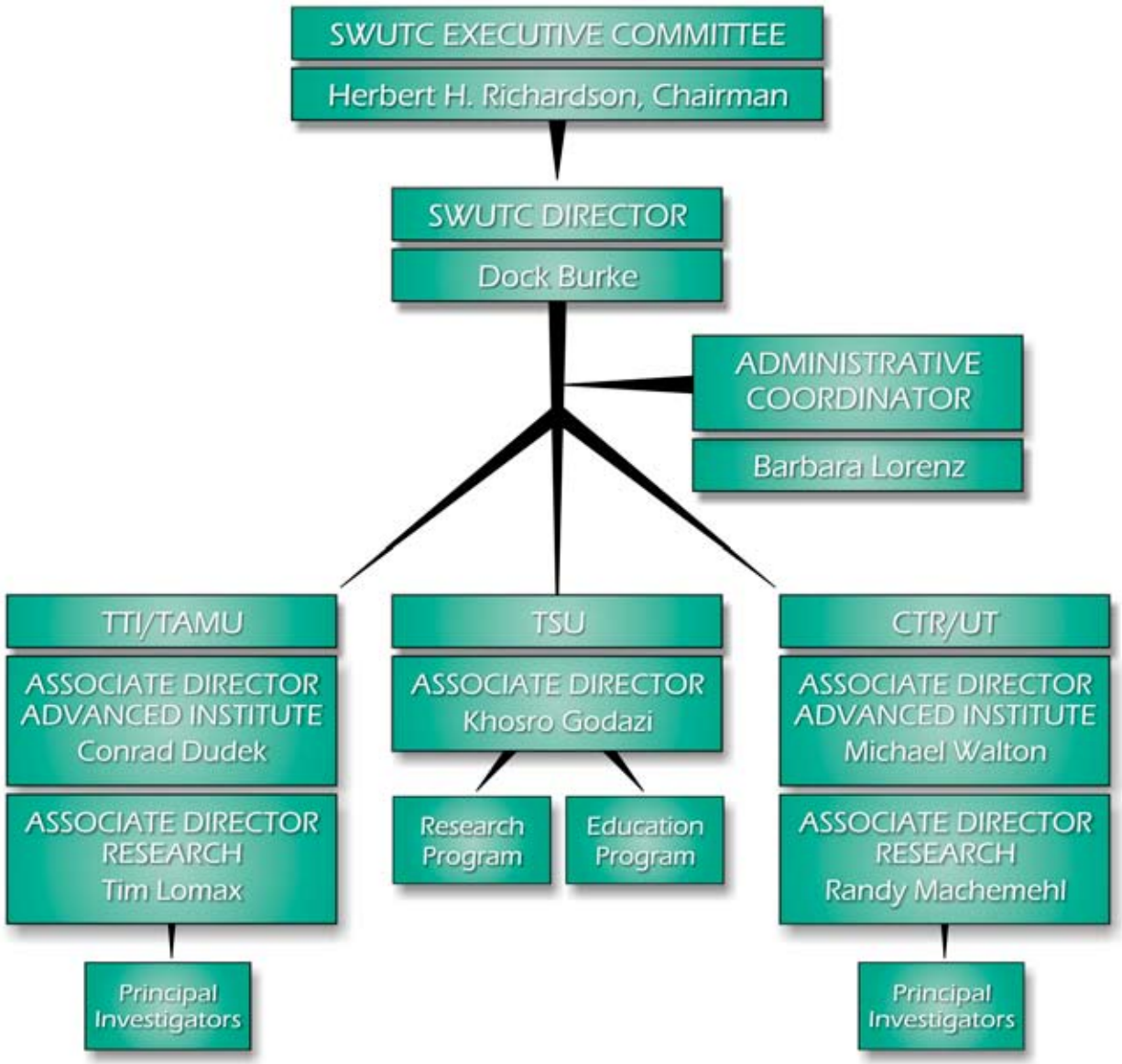
University of Texas at Austin

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.

Management Structure

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

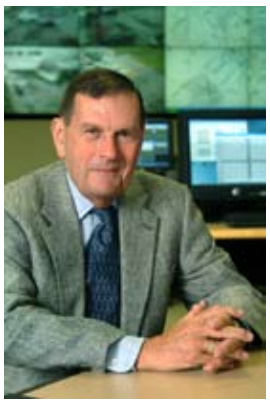
The SWUTC Director plans, executes, and reports the approved activities of the Center. The Director is assisted by an Administrative Coordinator and five Associate Directors - two at TAMU/TTI, two at UT-Austin/CTR, and one at TSU/CTTR. These Associate Directors are each responsible for administering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



Key Center Personnel

SWUTC Executive Committee

Dr. Herbert H. Richardson, chairman



Dr. Richardson is currently Director of the Texas Transportation Institute and Associate Vice Chancellor for Engineering in the Texas A&M University System, and also holds appointments as Regents Professor and Distinguished Professor of Engineering in Texas A&M University. He is a member of the National Academy of Engineering, Honorary Member of the American Society of Mechanical Engineers, and Fellow of the American Association for the Advancement of Science. He served as the first Chief Scientist of the U.S. Department of Transportation, as Chairman of the Transportation Research Board, and has led or participated in numerous TRB panels, study committees, and review boards. He served for 6 years on the Governing Board of the National Research Council and the Council of the National Academy of Engineering. He is a lifetime National Associate of the National Academies. He is the recipient of numerous professional honors, the most recent the *Lamme Medal of the American Association for Engineering Education* for leadership in engineering education. Dr. Richardson has announced his intention to retire from the TTI Director's position by the end of 2006.

Mr. G. Sadler Bridges, member

Mr. Bridges has more than forty years of experience in transportation research. His research has included urban transportation, bus operations, high occupancy vehicles, and fixed guide-way transportation. Mr. Bridges managed the 1970 and the 1972 *National Transportation Studies* for Texas, directing the efforts of several state agencies and twenty-three urbanized areas in Texas, and was its principal author. He was a member of the Mobility 2000 Group on the application of advanced technologies to vehicles and highways. The technologies include advanced traffic management techniques, onboard navigation systems, and advanced vehicle control systems. He co-edited the Mobility 2000 reports of the meetings in San Antonio in 1989 and Dallas in 1990. He was a founding member of ITS America, a designated advisory commission to the U.S. DOT on ITS issues. He has served on the Membership Committee, the Coordinating Council, the Planning Committee, and as chair of the Institutional Issues Committee. Coincident with Mr. Bridges' appointment to an administrative position his primary attention turned from technical research to concentrate on management. During his tenure as Interim Director, TTI was designated as one of three Research Centers of Excellence in ITS. One of his continuing interests is to expand TTI into new technologies and new disciplines of transportation. Mr. Bridges was the 2004 recipient of the *TTI/Trinity Career Achievement in Research* award presented for distinguished TTI performance. Presently, Mr. Bridges serves on TTI's Intellectual Properties Committee and is responsible for policy and oversight of the patents and licensing procedures for the Institute and its researchers.

Dr. Dennis Christiansen, member

Dr. Christiansen is Deputy Director of the Texas Transportation Institute. Dr. Christiansen has been a member of the staff of the Texas Transportation Institute for over 30 years. Projects directed by Dr. Christiansen have addressed areas such as: the role of rail transit in Texas cities; roadway operations and design; transportation and energy relationships; the design and operation of bus transfer centers and park-and-ride lots; the role of intercity rail passenger service in Texas; the potential role for a system of strategic arterial streets; and urban goods movement. In addition to this research, Dr. Christiansen

has become recognized as an international expert in the planning, design, operation and evaluation of preferential facilities for high-occupancy vehicles.

In 1979 he received the Transportation Research Board's *Fred Burgraff Award*. The International Institute of Transportation Engineers awarded him their Technical Paper Award in 1984 and the Technical Council Award in 1988. The Texas Section of the Institute of Transportation Engineers named him its Transportation Engineer of the Year in 1989. He is a past president of the International Institute of Transportation Engineers and is currently one of the 15-member Board of Direction for IITE. Dr. Christiansen is past president of the Research and Education Division of the American Road and Transportation Builders Association and currently serves on ARTBA's Board of Directors. He also served as President of the Council of University Transportation Centers (CUTC) in 2002. In 2003 he received the *S.S. Steinburg Award* presented by the American Road and Transportation Builders Association. In 2003, Dr. Christiansen was awarded the *Regents Fellow Service Award* presented by the Board of Regents of the Texas A&M University System.

Mr. Robert Harrison, member

Mr. Harrison is a Senior Research Scientist and Deputy Director of the Center for Transportation Research at the University of Texas at Austin. He has worked in the area of transportation economics and planning for over 30 years and has published extensively in the area of economic impact studies, trucking issues, cost benefit analysis and transport system planning. Recently, his work has focused on Texas-Mexico border trade issues and inland ports (which was started with seed money from the SWUTC), with both studies resulting in Texas Department of Transportation (TxDOT) Top Innovation Awards. In addition, he has studied NAFTA trade corridors and the major markets served by the Texas gulf ports. Most recently, Mike Schofield, a UT student working with Mr. Harrison on a truck safety SWUTC study was awarded the 2005 graduate paper competition in the Research and Education Division of ARBTA. Mr. Harrison has written over 40 research reports and published over 30 peer reviewed technical papers, made presentations to senior U.S. Department of Transportation (USDOT) staff, and has given testimony at a number of Texas Senate hearings. Prior to joining the Center for Transportation Research in 1987, Mr. Harrison worked first as an academic in the United Kingdom, then as an economist for the United Nations, and finally as a consultant to the World Bank.

Mr. Harrison is active within the Transportation Board (TRB). He is Chair of the Intermodal Freight Terminal Design and Operations committee, and a member of the committees on Motor Vehicle Size and Weight, International Trade and Transportation and Agricultural Transportation. He is a past president of the Transportation Research Forum (TRF) and currently serves as an associate editor of the *TRF Journal*.

Dr. H. Gene Hawkins, member

Dr. Hawkins is an Associate Professor in the Department of Zachry Civil Engineering at Texas A&M University, where he also serves as Division Head of the Transportation and Materials Division. He also holds a joint appointment as a Research Engineer with the Texas Transportation Institute (TTI). He joined the faculty at A&M in September 2004. Prior to that, he spent 18 years at TTI, where he supervised and conducted transportation engineering research. He received his Ph.D. in Civil Engineering from Texas A&M University in May 1993. He also holds Master of Engineering and Bachelor of Science (Cum Laude) degrees in Civil Engineering from Texas A&M University. Dr. Hawkins is a Registered Professional Engineer in Texas. Before joining A&M and TTI, Dr. Hawkins worked in the

private sector for consulting firms in Bryan and Houston, providing services in the areas of general civil and transportation engineering.

Dr. Hawkins' primary field of interest is transportation infrastructure, with a special emphasis on traffic control devices, retroreflectivity, and visibility. He has been the PI or Co-PI on over 20 projects with a total budget of $6 million. He has authored over 20 refereed journal papers on his research and has authored or co-authored over 70 research reports. Dr. Hawkins is a member of numerous professional and technical organizations. He is heavily involved in the efforts of the National Committee on Uniform Traffic Control Devices which provides recommendations on changes to the MUTCD. He is a member of the full National Committee, chair of the Markings Technical Committee, and a member of the Research Committee. In addition to his NCUTCD activities, he is a member of the Transportation Research Board (TRB), the Institute of Transportation Engineers (ITE), and American Traffic Safety Services Association (ATSSA). Within TRB, he is the chair of the Traffic Control Devices Committee and a member of the Signing and Marking Materials Committee and the Tort Liability and Risk Management Committee. He has served on several industry panels associated with infrastructure and traffic control devices.

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. Dr. Lewis received her Ph.D. in Political Science from the University Houston. Her responsibilities at TSU include educating students in fundamentals of transportation and urban transportation issues, as well as conducting operational and policy related transportation research. Since joining the Texas Southern University faculty in 1992, she has conducted research for the Texas Department of Transportation, the Southwest Region University Transportation Center, Federal Highway Administration and others. Examples of recent publications include *Best Practices in Public Involvement: 2004-2005*; *An Examination of Successful Mixed Use in Transit Oriented Development as Conceptually Applied to the Proposed Ambassador Way Transit Station in Houston*; *Smart Growth Texas Style, Impacts of Freeway Ramp Locations on Land Use and Development*; and *Socio-economic and Land Value Effects of Elevated and Depressed Freeways*. Dr. Lewis also assisted with the citizen involvement portions of major investment studies for the Metropolitan Transit Authority (Houston) and TxDOT.

Dr. Lewis was recently named one of 10 individuals to serve on the State of Texas' emergency evacuation Task Force. In January, 2004, she was appointed by Houston Mayor Bill White to serve as advisor to the Mayor's Office on Mobility and in December 2004, appointed to chair the City of Houston Planning Commission. She also serves on the Technical Advisory Committee for the Metropolitan Planning Organization and serves on the Technical Advisory Panel for TxDOT. She is a member of a number of professional organizations including the American Red Cross Transportation Advisory Committee. Since becoming CTTR's Director, Dr. Lewis has received two outstanding research awards. The first was from the Austin Metropolitan Business Council and the second from the Conference of Minority Transportation Officials. She is also the winner of the 2005 *Heart Award* awarded by the Houston Intown Chamber of Commerce in recognition of her 15 years as manager and director of planning at Houston METRO, her two years on the METRO board and her mayoral appointment to the Office of Mobility and Planning Commission.

Dr. C. Michael Walton, member

Dr. Walton is Professor of Civil Engineering and Ernest H. Cockrell Centennial Chair in Engineering, University of Texas at Austin. Dr. Walton is a member of the National Academy of Engineering. He is past chair and member of the Transportation Research Board (TRB) Executive Committee. Currently he serves as chair of the TRB Subcommittee for the National Research Council (NRC) Oversight and ex-officio member of the Governing Board of the NRC. In other professional society affairs he serves as the Senior Vice Chairman of the American Road and Transportation Builders Association and a member of the Board of Governors of the Transportation and Development Institute of American Society of Civil Engineers. Dr. Walton has received numerous awards including the 2005 Outstanding Projects and Leaders (OPAL) award from the American Society of Civil Engineers to recognize and honor lifetime excellence in furthering civil engineering education. In addition, Dr. Walton was named to America's Top 100 Private Sector Transportation Design and Construction Professionals of the 20th Century by the American Road and Transportation Builders Association. This honor recognizes "outstanding individual achievement, innovation and leadership in transportation design and construction." Dr. Walton's other awards include the 2000 *George S. Bartlett Award* in recognition for outstanding contributions to highway progress. The *Bartlett Award* is considered to be among the highest honors in the highway transportation profession. The American Society of Civil Engineers presented him with several awards including the 1999 *Francis C. Turner Lecture* for contributions to transportation research, education and practice, the 1992 *James Laurie Prize* for contributions to the advancement of transportation engineering; the 1987 *Harland Bartholomew Award* for contributions to the enhancement of the civil engineer's role in urban planning and development; and the 1987 *Frank M. Masters Transportation Engineering Award*, for innovations in transport facility planning. The Transportation Research Board presented Dr. Walton with the 1998 *W.N. Carey, Jr. Distinguished Service Award* in recognition of outstanding leadership in support of transportation research. In 1995, he was named TRB's Distinguished Lecturer in recognition of the research contributions over his entire career. The American Road and Transportation Builders Association presented Dr. Walton with the 1994 *S.S. Steinberg Award* recognizing his outstanding contributions to transportation education. He received the 1995 Distinguished Engineering Alumnus Award from the College of Engineering at North Carolina State University. The College of Engineering at the University of Texas at Austin awarded Dr. Walton the 1996 *Joe J. King Award*, their highest professional award, in recognition of his outstanding leadership to the engineering profession. The Institute of Transportation Engineers has awarded him the 1996 *Wilbur S. Smith Distinguished Transportation Educator Award* in recognition of outstanding contributions to the transportation profession by relating academic studies to the actual practice of transportation.

Dr. Walton has contributed to more than 250 publications in the areas of ITS, freight transport, and transportation engineering, planning, policy and economics, and he has delivered several hundred technical presentations. He has served as senior editor or contributing author for a variety of technical reference books and manuals and as a member of the editorial board for several international journals.

Dr. Lei Yu, member

Dr. Yu is Professor and Chairman of the Transportation Studies Department at Texas Southern University. He obtained his Ph.D. degree in Civil/Transportation Engineering from Queen's University (Canada) in 1994, Master of Engineering Degree in Production and Systems Engineering from Nagoya Institute of Technology (Japan), and Bachelor of Engineering Degree in Transportation Management Engineering from Beijing Jiaotong University (China). During his tenure at TSU, he has been the driving force to improve its academic programs and develop advanced transportation laboratories.

Under his leadership, TSU's transportation labs have successfully acquired top-end equipment such as full-motion driving simulator, mobile traffic van, portable emission monitoring system, and real-time traffic surveillance system through Houston TranStar. Dr. Yu has a wide spectrum of research interests and expertise related to highway traffic design and operations, Intelligent Transportation Systems (ITS), transportation planning and modeling, and vehicle emission modeling. In the past 11 years, he has served as the Principal Investigator (PI) for 35 projects sponsored by Texas Department of Transportation (TxDOT), Federal Highway Administration (FHWA), Southwest Region University Transportation Center (SWUTC), Houston Advanced Research Center (HARC), etc. Through these projects, he has established a solid knowledge base in the respective areas and gained extensive experience in project management skills. Dr. Yu is the author of over 120 research papers in scientific journals and conference proceedings, and 35 project reports. He is currently a *Cheung Kong Scholar* of Beijing Jiaotong University awarded by the Ministry of Education in China and Li Ka Shine Foundation in Hong Kong. Professionally, Dr. Yu is an active member of the Institute of Transportation Engineers (ITE), the American Society of Civil Engineers (ASCE) and the Transportation Research Board (TRB). He is registered engineer in the state of Texas.

Dr. Zhanmin Zhang, member

Dr. Zhang is an Associate Professor in transportation engineering at the University of Texas at Austin who has been actively conducting research in the engineering and management of infrastructure systems and the applications of advanced database and information systems to infrastructure management for more than 15 years in the United States and abroad. His current research interests include: infrastructure systems analysis and management, behavior and performance simulation of pavements, large-scale database and information systems, application of advanced technologies, and intelligent infrastructure systems.

Dr. Zhang is a member of two technical committees of the U.S. National Academies' Transportation Research Board (TRB): ADF10-Pavement Management Systems and AFH30-Emerging Technologies for Design and Construction. He is also a member of the Infrastructure Systems Committee of the American Society of Civil Engineers (ASCE. He serves as a member of the Technical Advisory Panel for the Research Management Committee 1 (RMC-1) of the Texas Department of Transportation. In addition, he has recently served on the National Research Council's Committee on "Renewal of DOE Infrastructure" which served the U.S. Department of Energy (DOE) in developing and implementing a corporate strategy for intelligent renewal of its infrastructure.

Dr. Zhang is an author or co-author of more than 75 technical papers, reports, and articles. He serves on the Editorial Board of the journal of *Transportation Research, Part C: Emerging Technologies*. He has also frequently served as a technical reviewer for prestigious journals such as the *Transportation Research*, the *Journal of Transportation Engineering*, the *Journal of Infrastructure Systems*, and the *Transportation Research Record*.

FY06 New SWUTC Executive Committee Members

Dr. Eyad Masad, member

Dr. Masad is an associate professor in the Zachry Department of Civil Engineering at Texas A&M University. His primary area of research is characterization of asphalt mixes and aggregates. In the past five years, Dr. Masad has been the PI and Co-PI on projects with total funds that amount to approximately $3,000,000. He has published more than 80 technical journal papers on performance testing of asphalt mixes, modeling, and equipment development. Sponsors of his research include the National Science Foundation, National Cooperative Highway Research Program, Federal Highway Administration, Texas Department of Transportation, International Center for Aggregate Research, the Asphalt Institute, Washington State Department of Transportation, Idaho Transportation Department, as well as private industrial firms.

Dr. Masad is an active member of the American Society of Civil Engineers (ASCE), Association of Asphalt Paving Technologists (AAPT), and Transportation Research Board. He is also the chair of the pavement committee of the Geo-Institute, ASCE. He is a member of the technical advisory committee of the International Center for Aggregate Research (ICAR). He is the recipient of the *Eisenhower Graduate Research Fellowship* at Turner-Fairbank Highway Research Center for the year 1997, and the *Faculty Eisenhower Fellowship in Transportation Engineering* for the year 1998. He is also the recipient of the *W. J. Emmons Award* for the best paper published in the *Journal of the Association of Asphalt Paving Technologists* (AAPT) for the year 2001.

Dr. Tracy E. McMillan, member

Dr. McMillan is a transdisciplinary Assistant Professor at the University of Texas at Austin, holding appointments in Community and Regional Planning, Civil Engineering and Social Work. Her teaching and research is designed to reach across traditional disciplinary boundaries to address the complexity of real world issues. Her research examines the relationship between the built environment and public health, focusing particularly on the impact of non-motorized transportation and children's physical activity and traffic safety and women's health and neighborhood opportunities and barriers.

Dr. McMillan has served as a co-investigator on research funded by the National Institutes of Health, the California Department of Transportation and the Texas Department of Transportation. She has served as a consultant for the Robert Wood Johnson Foundation, the California Department of Health Services, and the Mexican American Opportunity Foundation and currently serves as an expert consultant for the Safe Routes to School Clearinghouse administered by the Highway Safety Research Center at UNC-Chapel Hill. Her professional affiliations include memberships in the American Planning Association, the American Public Health Association, and the Transportation Research Board. She is an appointed member of the City of Austin Mayor's Council on Fitness and is an adjunct assistant professor at the University of Texas School of Public Health.

McMillan received a Ph.D. in Urban and Regional Planning from the University of California, Irvine;

a Masters in Public Health from Emory University; and a Bachelor's degree in Exercise Science from SUNY Buffalo.

Key SWUTC Departures

Dr. Naomi Ledé

After a 51 year distinguished career in higher education, transportation planning and management, Dr. Ledé retired from the Texas Transportation Institute in July 2005. In addition to having more time with her family, she manages a community center (Heritage House) and writes a weekly column for the local newspaper *The Huntsville Item*. Dr. Ledé is also Executive Director Emeritus of the Center for Transportation Training and Research at Texas Southern University. She retired from Texas Southern University in 1997 after having served 33 years in several administrative positions, including Associate Dean, School of Public Affairs, Vice President for Institutional Advancement and Director of the Center for Transportation Training and Research, Chairperson of the Department of Transportation Studies, and Distinguished Professor of Transportation.

Dr. Ledé is a nationally and internationally recognized scholar who authored 10 books and more than 300 research studies, articles and professional papers on urban planning, community development, education, and transportation issues and problems. She has been the winner of a myriad of awards recognizing her outstanding contributions to the field of transportation science. Dr. Ledé also devoted many hours to public and community service activities serving on numerous boards such as Houston METRO's board and governor appointed boards such as the Texas Board of Protective and Regulatory Services, the Texas Emissions Reduction Plan Advisory Board and the Public Transportation Advisory Committee. Her community activities include serving on the boards of the Houston Area Urban League, the Martin Luther King Jr. Community Center, the Urban Affairs Corporation, the Young Women's Christian Association and the Editorial Committee of the Houston Public Library and she served as President of the Common Heritage Association - an organization that provides scholarships to worthy high school students.

Since 1988, the year the SWUTC won the first regional competition, Dr. Ledé has been an integral member of the Executive Committee. She literally set the tone for the positive collaboration that characterizes the synergy within the SWUTC consortium today.

The SWUTC wishes her well in her retirement, but, we will greatly miss her insightful guidance, soft spoken intellect and wonderful sense of humor.

Office of the Director

Dock Burke, Director

Dock Burke is the Director of the Southwest University Region Transportation Center at the Texas Transportation Institute. A Senior Research Economist, he also coordinates the activities of TTI's regional divisions. In his 37-year career at the Institute, he has served as the Principal Investigator or Co-P.I. of 55 research projects, authored or co-authored 99 research reports and papers, and has made over 70 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 the 2003 recipient of the *Regents Fellow Service Award* presented by the Board of Regents of the Texas A&M University System. This prestigious award honors research professionals within the Texas A&M system who have provided exemplary professional service to society that has created large and lasting benefits to Texas and beyond.

SWUTC Administrative Staff: Dock Burke and Barb Lorenz

Barbara Lorenz, Senior Administrative Coordinator

Barbara Lorenz serves as Administrative 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 28 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.

SWUTC Associate Directors

Dr. Conrad Dudek, Associate Director - Advanced Institute, Texas A&M University

Dr. Dudek is a Professor of Civil Engineering and has taught transportation engineering courses in Civil Engineering for over 39 years. He has over 46 years experience in transportation research. He has administered civil engineering undergraduate and graduate programs in transportation engineering. He has served as Program Manager, Project Director, Principal Investigator, Principal Researcher, or Study Supervisor on over 50 research projects sponsored by state and federal agencies.

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

Dr. Lomax is a Research Engineer at the Texas Transportation Institute and Manager of the Mobility Analysis Program. He is internationally known for his research to quantify urban mobility problems and communicate his results to many different audiences. He has been active in devising practical mobility solutions employing both changes to practices and improvements in design and operations. He is a professional engineer and is a member of the Transportation Research Board, Institute of Transportation Engineers and American Society of Civil Engineers.

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

Mr. Godazi, Associate Director for the SWUTC, has 17 years of teaching and administrative experience at Texas Southern University. He holds a B.S. in Civil Engineering Technology and a M.S. in City Planning. He is Director of 4-week Texas Summer Transportation Institute that has been held in Houston, at Texas Southern University. In addition he spearheads the Transportation Studies Mentorship Program and Directs the Transportation Club at the Middle College for Technology Careers which is a high school located in Houston. Mr. Godazi has coordinated numerous conferences for the Center for Transportation Training and Research and has extensive experience in transportation research. He has served as Principal Investigator on numerous SWUTC projects and has completed the Dwight David Eisenhower database software for FHWA. Mr. Godazi teaches transportation students in transportation software applications and quantitative statistics methods.

Dr. Randy Machemehl, Associate Director for Transportation Research at UT-Austin

Dr. Machemehl is the Director of the Center for Transportation Research and is the Nasser I. Al-Rashid Centennial Professor in Transportation Engineering at the University of Texas. In addition to these duties, Dr. Machemehl has distinguished himself as a researcher focusing particularly on transportation system operations and he has published over 200 papers and reports. Administrative positions have included service as the Associate Chairman of UT's Civil Engineering department, he is also a registered professional engineer, a registered professional land surveyor and has memberships in the Institute of Transportation Engineers, the American Society of Civil Engineers, the Canadian Society for Civil Engineering, National Society of Professional Engineers, the Transportation Research Forum and the Council of University Transportation Centers. He is a retired U.S. Army Reserve Corps of Engineers officer.

Dr. C. Michael Walton, Associate Director - Advanced Institute, UT-Austin

(See bio on page 11)

Education Program

The SWUTC Transportation Education Pipeline

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 Advanced Institutes 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.

SWUTC Pre-College Initiative Highlights

During the current UTC grant, several self-sustaining programs have been developed that take transportation concepts to public schools to attract future transportation professionals. One early example was the development of educational modules that introduce careers in transportation for students in grades K-12. These modules developed for use in the classroom are still being downloaded by educators U.S. wide via the internet at http://tti.tamu.edu/groups/cpd/resources/presentations/index.htm. Another initiative was the development of road-show promotional materials for use at career fairs to encourage students to pursue careers in transportation. The success of this program is reflected in the fact that these materials are currently being requested by educators nationwide for use at various career fairs. In August 2004, these road-show promotional materials were made available for free download at http://tti.tamu.edu/groups/cpd/resources/brochures/index.htm. Now available on this same website is the *Transportation Career Guide* developed in 2003 by SWUTC researchers. The *Transportation Career Guide* is a tool to help increase awareness of transportation as a profession to high school students and to help students set their career goals and objectives within the area of transportation. Another important success was the promotion of transportation science at science fairs. By the establishment of transportation specific categories, transportation science is now being promoted on a continuing basis at Texas science fairs along with meteorology, physics and other sciences. Through these efforts, SWUTC researchers were able to directly contact over 2,300 Texas students at career fairs, science fairs and engineering recruiting events during the 2006 fiscal year.

2006 Texas Summer Transportation Institute Update

The SWUTC continues to support the Texas Summer Transportation Institutes held annually at Paul Quinn College in Dallas, and Prairie View A&M University in Prairie View. This year an additional one-week TSTI program was conducted at the University of Texas at El Paso campus in El Paso and focused on junior high students.

Weslaco Students at Tour of TxDOT Pharr District Office

The Rural STI program at Texas A&M University Kingsville added during the summer of 2004 continues to be a success providing engineering career opportunities to mainly Hispanic students in rural Texas. This year 18 students participated in the two-week long program conducted in early June. After a one year absence from the program, the Rural STI at Weslaco, Texas was once again conducted in late June with the support from FHWA and TxDOT. This year 14 mainly Hispanic students participated in the two-week program held at the TAMU-Kingsville Citrus Extension Center near the Texas-Mexico border.

In addition, the well established four week Houston National Summer Transportation Institute conducted at Texas Southern University remains an award-winning program in the national STI initiative. This year 18 students participated in the Houston program.

Each of these STI programs is based on the program design developed through the SWUTC and has the goal of creating an education and training delivery system that will: attract secondary students to and enhance their interest in careers in transportation; improve mathematics, science, communication and technology skills; and through creative partnerships, strengthen the links between the transportation sector and public/private institutions. Through the course of the program, all modes of transportation are addressed and augmented with hands-on technical activities, lectures by transportation professionals and field trips to such places as TxDOT District Offices, TranStar, TransGuide, Houston METRO, DART, VIA, HEB Regional Distribution Center in San Antonio, Port of Houston, Port of Corpus Christi, airport operation and maintenance facilities, and the Texas Transportation Institute research facilities.

The STI program continues to be a huge success and this year the SWUTC program helped sponsor 132, primarily minority, 9th -12th grade students. Historically, near 90% of these participating students go on to college with a majority indicating that they are currently pursuing careers in mathematics, science, business, technology and transportation engineering.

SWUTC's Post-Houston National Summer Transportation Institute Has Third Successful Year

P.I. Khosro Godazi

Building upon its highly successful Houston National Summer Transportation Institute (HNSTI) program, SWUTC colleagues at TSU have instituted a follow-on internship program for selected student

participants of the HNSTI. Established during the summer of 2004, the Post-Houston National Summer Transportation Institute has become an proven success. The focus of the program is to recruit previous HNSTI students and place them in internship positions in the transportation industry. During the three month long program students are provided the opportunity to gain hands-on experience, tackle an important issue, make valuable connections within the industry, and contribute to a project or program that can make a difference. During the summer of 2006, four students participated in the program. The positive impact this program has on these aspiring young professionals is illustrated in the letter below.

Dear Mr. Godazi,

My name is Melinda Nieto, I am the mother of Steven Nieto. I am writing you these few lines to say THANK YOU! for accepting my son in your HNSTI program. It has made him a better person, and he learned a lot while working for TxDOT. I hope that he will pursue a career in engineering. I appreciate everything you did for him. I hope that the program will be there next summer. THANK YOU! again for you and your staff and for the great work that you are doing for everyone. These are the young men and young woman of tomorrow.

Sincerely,
Mrs. Melinda Nieto

New Pre-College Initiatives for 2006

SWUTC Initiates Transportation Careers Program for Girls

SWUTC Project #167459/P.I. Debbie Jasek

SWUTC's new initiative "Go Girl! Exploring Transportation Career Horizons" under the direction of Ms. Debbie Jasek at Texas A&M University was a tremendous success for 2006. The program develops one-day conferences or workshops for girls in grade levels K - 9 that offers an opportunity to gain hands on experience and insight into what transportation, engineering, and technology careers have to offer. These conferences provide girls with experiences to encourage interests in science and math, and offer exposure and mentoring from female role models currently working in the field of transportation.

The first Go Girl! event was held February 11, 2006 in Houston at the Houston Museum of Natural Sciences. This event was attended by 34 high school and junior high girls and 15 engineers from the Houston Area. Agencies and companies represented included, Texas Transportation Institute, TxDOT, Texas A&M University Kingsville, Walter P. Moore and Associates, the Women's Transportation Seminar, NASA, Brown and Gay Engineering, Gunda Corporation, Wilbur Smith and Associates, Parsons Brinckerhoff, HNTB, TCB, Michael Baker, and the City of Houston.

The second Go Girl! Event was held February 24, 2006 at Texas A&M University Kingsville (TAMUK). This event was attended by over 40 students ranging from middle school through undergraduates at TAMUK. This event was held in conjunction with the TAMUK Engineering Day and featured an issues forum. The forum panel was comprised of female engineers from TTI and TxDOT, as well as members of the TAMUK chapter of Society of Women Engineers (SWE).

On March 24, 2006 the West Texas Go Girl! event was held at Frenship Middle School in Lubbock, TX. This event, attended by 70 6th-8th grade girls, was set up as a round robin learning event. Female engineers from TTI, Texas Tech, TxDOT, 3M, a chemical company, a construction firm, and a design firm manned eight tables that featured hands on learning activities chosen by that engineer to show the girls about what they do as an engineer in their field. Activities featured at the tables included learning about road signs and their roll in transportation, learning about highway design, building a gumdrop geodesic dome, learning about designing a park and activity center, learning how plastics are made, and learning about wind power generation.

Dallas Go Girl! Participants

The final Go Girl! event was held May 6, 2006 in Dallas, TX. This event was held in partnership with the Texas Girl Scout Council and the Dallas Area Rapid Transit (DART). This event was attended by 35 Daisies and Brownies (Kindergarten through 2nd grade). The activity filled day focused on DART's various transit systems. The girls took a trip on the light rail, toured Union Station, observed the Trinity Express heavy rail train depart to Fort Worth, viewed the rail yards and freeway interchanges around downtown from Reunion Tower, and boarded DART's turn of the century trolley car for a tour through the historic district.

The South Texas Girls Collaborative which is a National Science Foundation Project at the University of North Texas filmed the Dallas event live and is documenting the other three Go Girl! events. When the documentary film is finished it will be featured on the SWUTC website.

The response to the Go Girl! Program has been overwhelming. Requests for future programs are being received on a monthly basis. Positive response from the corporate world has also been quite surprising. As a direct result of this project, Ms. Jasek has been invited to be a member of the Champions Board for the South Central Girls (SCG) project at the University of North Texas as well as a partner in a grant proposal for a future National Science Foundation Project. She has also received a $1,000 mini-grant from the Girls Collaborative to fund another Go Girl! event in the spring of 2007.

SWUTC Summer Undergraduate Fellows Program

The SWUTC Summer Undergraduate Fellows Program at the University of Texas at Austin and Texas A&M University continues to be extremely successful recruiting endeavor to attract a diverse group of students into the graduate programs in transportation. Each year, the Summer Undergraduate Fellows Program recruits undergraduate 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 universities have the opportunity to work with researchers and gain exposure to many different areas of transportation research. To 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 oral presentations on their research and produce a paper for publication. During the summer 2006 session, 6 undergraduate fellows participated in the program at TAMU, 6 participated in the UT-Austin program.

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

SWUTC Advanced Institute 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 attract a highly qualified cadre of new professionals into transportation science. The Advanced Institutes at Texas A&M University and 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. This year, Advanced Institute graduate students from Texas A&M University and the University of Texas at Austin attended and participated in the Transportation research Board's 85th Annual Conference in Washington, D.C., in January. While attending the meeting, many of these student gained valuable experience while presenting papers based on their SWUTC research work.

Since the beginning of this current grant in the fall of 1999, 154 students have been supported thorough the SWUTC education programs. Of those students, 119 have since graduated with 86% entering into the field of transportation either with the government or private industry sectors, or into an academic/ teaching environment.

New Graduate Program Initiated for 2006

Transportation Engineering Student Seminar and Development Program Initiated

SWUTC Project #473700-00035/P.I. Gene Hawkins

This educational program was established to provide Texas A&M University graduate and undergraduate students an expanded range of transportation experiences. The program consists of a field trip program and a seminar series.

On November 17, 2005, 21 students participated in a day-long field trip to Houston. During the day, the students visited the TxDOT Houston District Office, Walter P. Moore & Associates consultants in structural, civil and traffic engineering, and Uptown Houston a development association for the Uptown district which includes the Galleria in Houston. Multiple individuals from each of these organizations spoke at each location. In addition, speakers from Williams Brothers Construction spoke during the WPMA visit.

TAMU Engineering Students at Uptown Houston Presentation

The seminar series brought two distinguished speakers to Texas A&M to lecture on current transportation issues. The seminars were open to all undergraduate or graduate students who wished to attend.

The first seminar featured Dr. John Mason of the Pennsylvania State University who presented a seminar titled *Development of the Highway Safety Manual* on March 28, 2006. In addition, Dr. Mason held a transportation roundtable discussion during the lunch hour titled *Continued Professional Development of the Transportation Workforce* focusing on how transportation professionals of the future will maintain their competency through formal professional development activities.

The second seminar was held on April 21st and featured Dr. Joseph Sussman of the Massachusetts Institute of Technology and the New England University Transportation Center. Dr. Sussman presented a seminar titled *Where Transportation is Going: Transportation in the CLIOS System Era* which covered the concept of complex, large-scale, interconnected, open, and socio-technical transportation systems.

STUDENT AWARDS

SWUTC's Student Award Winners

Each year, in addition to selecting the overall SWUTC Outstanding Student to represent the SWUTC at TRB, the SWUTC honors two more 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 Ph.D. Student Award* and the *Robert Herman Outstanding Student Award* comes with a $1,000 cash award.

Robert Herman Outstanding Student Award

University of Texas at Austin Transportation Engineering doctoral student Ms. Aruna Sivakumar was selected to win the 2006 *Robert Herman Outstanding Student Award*. Ms. Sivakumar was chosen as the recipient of this award for her spirit of curiosity, her stellar academic record, and her rigorous approach to the study of analytic problems with intellectual creativity, good organization, a commitment to intense study and excellent verbal communication skills.

Ms. Sivakumar's dissertation research focuses on examining and understanding the choice of recreational activity locations of individuals within a household. This topic is a critical one in the emerging area of activity-based travel analysis, which views travel as being fundamentally derived from the need to participate in activities distributed over time and space. The central basis of the activity-based travel analysis paradigm is that individuals' activity-travel patterns are a result of their time-use decisions in the context of variety-seeking behavior. Understanding and accommodating variety-seeking behavior will enable better and accurate forecasting of the impact of transportation and urban land-use policy actions (such as congestion-pricing, toll roadways, and mixed land-use development) on travel patterns. Ms. Sivakumar's dissertation is developing conceptual theories of variety-seeking and travel linkages, and formulating and estimating advanced econometric models using activity-travel surveys.

Ms. Sivakumar has already been involved in the publication of four articles, on two of which she is the lead author. She has made several presentations at leading national and international transportation conferences. She has been active in many research efforts at the University of Texas and has co-authored

eight technical reports. She was the recipient of CUTC's *Milton Pikarsky Award* for the best MS thesis in the transportation field in 2002. Also, Ms. Sivakumar won the prestigious University Continuing Fellowship at UT-Austin in 2004-2005. Her major professor is Dr. Chandra Bhat.

Naomi Ledé Outstanding Master Student Award

Mr. Kenneth Brown, master's of science student from Texas Southern University and SWUTC stipend recipient, was selected to receive the 2006 *Naomi Ledé Outstanding Masters Student Award*. He was also selected to represent the SWUTC at the annual UTC Outstanding Student of the Year Awards ceremony during TRB's Annual Meeting in January, 2006. Mr. Brown displays impressive academic skills, a focus and dedication to assigned tasks, and skills acquired through his undergraduate degree in electronics engineering technology. He has been awarded several internships and served as president of the student ITE chapter. This year, Mr. Brown was selected as a Dwight David Eisenhower Fellow.

While conducting his graduate studies, he has participated in a series of important research projects. These include an examination of the spending for the CMAQ and STP portions of the Transportation Equity Act for the 21st Century and data collection for a survey of state DOTs. His area of research interest is Intelligent Transportation Systems (ITS), and he has completed research in that area concentrating on homeland security. His thesis builds on that initial research, coupled with his summer internship experience at the Federal Maritime Administration to examine the expanded use of ITS in the maritime industry. The work completed on his thesis was displayed in a poster exhibit at the Dwight D. Eisenhower forum at the 2006 Transportation Research Board Annual Meeting. His undergraduate degree in electrical engineering technology, combined with the Master's degree in Transportation Planning and Management provides a solid foundation for Kenneth's career interest. Kenneth's major professor is Dr. Carol Lewis.

William J. Harris Outstanding Doctoral Student Award

University of Texas at Austin doctoral student and SWUTC Advanced Institute Fellow Ms. Isabel Victoria received the 2006 *William J. Harris Outstanding Doctoral Student Award*. Ms. Victoria was presented this award in recognition of her excellent intellectual abilities both in academics and research, her dedication and commitment to her goals, and her personal skills.

Her current research is in the area of environmental justice associated with the development of new toll facilities. This is a high priority project with TxDOT given the emphasis on new toll projects throughout the state. Isabel with her bilingual skills is working with a multidisciplinary team of faculty and staff from law, engineering, planning, economics and others with a variety of backgrounds and experience. This issue is very topical given the growing emphasis in tolling projects and road pricing schemes in general. Given the importance of this issue nationally and her academic and professional record, she was awarded an Eisenhower Fellowship.

Her record of professional service includes Assistant to the Executive Director of the Puerto Rico Highway and Transportation Authority in San Juan and other related practical experience prior to returning

to academia. During her academic pursuits she has participated in several research studies resulting in published reports and made several presentations at technical and professional conferences. Ms. Victoria is also a registered professional engineer in Puerto Rico and Columbia. Her major professor is Dr. Michael Walton.

SWUTC Advanced Institute Student Achievements

Two Advanced Institute Students Receive Leadership Development Opportunity

Texas A&M University Advanced Institute graduate student Erin Eurek and University of Texas at Austin graduate student Nick Lownes were two of 20 students nationwide selected by the Board of Regents of the Eno Transportation Foundation to participate in the 2006 Leadership Development Conference in Washington, DC on May 22-26, 2006. The Leadership Development Conference provides a first-hand look at how transportation policy is developed and implemented. Erin, Nick and the other selected students met with top government officials, leaders of associations, and members of Congress and their staff. The students examined how the nation's transportation policies are debated, shaped, formed, and ultimately adopted and applied. Upon completion of this intensive program, the students are better equipped to understand the policy-making process that will become increasingly more important as they pursue a career in transportation.

University of Texas at Austin Graduate Students Receive Eisenhower Fellowships

This year, three Advanced Institute graduate students, Allison Conway, Stephen Boyles and Jennifer Duthie and one SWUTC graduate researcher, Feng Hong were selected to receive 2006 *Dwight David Eisenhower Transportation Fellowships*. Eisenhower Fellowships are awarded annually to Ph.D students to promote the study of a broad range of topics that will contribute to the intellectual growth of tomorrow's leaders.

University of Texas at Austin Advanced Institute Student Recognized

Doctoral student, Jeffrey LaMondia was selected to received the 2006 *Outstanding Student Award* presented by the Texas Institute of Transportation Engineers. This award recognizes outstanding student members in each of the TexITE Student Chapters. Jeffrey's major professor is Dr. Chandra Bhat.

Research Program

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 environmental and safety problems, and development of a superior transportation workforce for the 21st Century.

Selected 2006 Research Highlights

SWUTC Study Develops Recommendations on How to Improve Driver Safety

SWUTC Project #167451/P.I.: Laura Higgins

Laura Higgins' SWUTC project "Disregard for Traffic Controls - Driver Perceptions of Risk", completed in 2006 examined driver perceptions of the reasons for and the risks associated with certain aggressive or negligent driving behaviors, including illegal turns, disregard of stoplights or stop signs, and improper lane usage. The research team utilized interviews with Department of Public Safety officers and "defensive driving" instructors, driver focus groups and also conducted a driver survey in two cities to determine drivers' perceptions of the risks of selected traffic violations, factors that encourage or discourage unsafe driving behaviors, and how a change in perceived risk may affect future driver behavior.

The police and driving instructors interviewed and the drivers participating in the focus groups gave many of the same answers regarding risky driving behaviors. Most of the driving behaviors identified as "riskiest" involve driver distraction: cell phone use and other "multi-tasking" that pull a driver's attention away from the road. Driver aggression and deliberate risk-taking were also mentioned frequently by interviewees and focus group members, as causes of other high-risk driving behaviors such as speeding, following other vehicles too closely, and right-of-way violations. Lack of driver knowledge, either of traffic laws or of potential risks, was also cited by these participant groups as a contributor to many traffic violations.

Police officers, driving instructors and focus group participants also emphasized the importance of linking education and enforcement in order to improve driver safety. It was stated that all too often defensive driving classes are viewed by drivers as a means to avoid a traffic-violation fine, not as a way to improve their driving skills or knowledge. There was also a consensus that higher visibility of law enforcement on the roadway, tougher educational requirements and licensing criteria, higher

penalities for traffic violations, increased public outreach, and positive reinforcement for safe driving are needed.

This in mind, the following suggestions for improving driver safety were developed.

Enforcement:

- **Require** defensive driving classes for traffic violators in addition to fines or other penalties (not as a substitute).
- **Increase** the use of red-light cameras and other forms of automated enforcement, particularly at high-risk locations.

Education/Licensing Requirements:

- **Require** or encourage (through discounted fees or other incentive) a defensive driving "refresher course" for drivers renewing licenses.
- **Require** a defensive driving course for all new state residents before they can obtain a driver's license in the state.
- **Increase** public outreach efforts to communicate information about new traffic laws and high-risk driving behaviors.

SWUTC Study Applies Findings to Proposed Ambassador Way Transit Station in Houston

SWUTC Project #473700-00046/P.I.: Carol Lewis

Through the implementation of a state of the art light rail system, Houston has relinquished its title as the largest city in the US without a fixed guide way transit system. METRORail has been designed with the intent to enhance environmental, social, and economic development. METRORail is one of a number of mobility improvements to counter Houston's ranking as among the top ten worst cities in terms of traffic congestion. This is in some measure due to lower density, vast residential and commercial development patterns that force people to drive more frequently and over longer distances. However, in recent times people have rediscovered that building in proximity to "good public transit connections" is an amenity that attracts the interest of renters, homebuyers and many businesses. This realization has been formed out of a 30-year debate about rail transit systems. It has become apparent that a Transit Oriented Development (TOD) in Houston can work.

Future Uptown Houston Ambassador Way Transit Area
Soure: Houston-Galveston Area Council, 2001

Transit Oriented Development (TOD) refers to urban design and land use characteristics with a transit nucleus that reduces the individual's need to use a vehicle as their primary mode of transportation. It is conducive to development of a cohesive bond that encourages different land uses and often contributes to a sense of neighborhood and livability. The Urban Land Institute (ULI) has specified 10 key principles that must be addressed. These principles range from creating a vision and initiating partnerships to getting a stronghold on parking and engaging

corporate attention toward initiating and sustaining development. These fundamental components were analyzed along with basic principles of planning and implementation in order to develop a set of suggestions applicable to the proposed Ambassador Way Transit station in Houston Texas.

To help in the analysis, Dr. Lewis assembled information from TODs across the nation. The Lindbergh City and Buckhead Stations in Atlanta and Bethesda Metro in the Washington, D.C. area served as baselines for comparative purposes. The areas were assessed across the square footage of office, retail hotel, and residential usage. In addition, a survey was designed to gain further insight into the current view of transit representatives and other stakeholders about the proposed Ambassador Way station location. The survey included a battery of eleven items including some closed and open-ended questions and was administered to local Houston officials and stakeholders.

Reviewing and analyzing existing TODs showed that no two stations are the same. The uniqueness of the stations creates a place within itself, while being a planning response conducive to generating non-automotive tripmaking. How Ambassador Way's station area is planned and developed will depend on the particular attributes of that station and surrounding community. *It is suggested that by adding key design features, such as continuous and direct pedestrian connections, minimizing the amount of parking proximate to the station, and providing amenities to enhance the on-street experience will be critical to the success of the proposed station. Another recommendation is for the larger Ambassador Way station area to balance the amount of space occupied by parking facilities. This can be accomplished by creating TOD parking standards, which reduce the amount of parking for motorists. Share parking and parking structures are other methods, which can reduce parking facility cost and encourage more efficient land use.*

SWUTC Study Examines the Dynamics of U.S.-China Trade and its Impact on Multimodal Transportation Systems and the Economies of Texas and Mexico

SWUTC Project #167551/P.I.: Leigh Boske

During the past 25 years, U.S.-Pacific trade has grown 40 times. China has become the dominant force in the region and the major location for U.S. outsourcing of production. In 2003, China surpassed Mexico as the U.S.' second-largest source of imports, behind only Canada. By the same token Brazil has become the dominant force that drives U.S.-South American trade and is also well-established for U.S. outsourcing of production. For example, it is interesting to note that both countries export furniture, auto parts and footwear (among other common products) to the U.S.

Unbalanced trade is becoming a hallmark in both U.S.-China and U.S.-Brazil trade lanes, with U.S. imports greatly exceeding U.S. exports. The Southwest Region is increasingly relying on its seaports to link both trade lanes as West Coast ports experience growing congestion. Changes are rapidly taking place in the introduction of new maritime services, ports of call, types and sizes of vessels used, and pooling agreements. These rapid changes have serious implications for the adequacy of connecting landside transport infrastructure in Brazil, China, and the U.S. to accommodate two-way trade in the respective trade lanes.

This research project compared the parallels and differences in the U.S.-China and U.S.-Brazil supply chains so as to ascertain their comparative economic impacts on trade and the Southwest Region's economy.

The report examined trends in U.S.-China and U.S.-Brazil trade; surface transport infrastructure and services in all three countries to accommodate trade flows; maritime services, alternative trade lanes, ports of call, steamship liner schedules, and transit times; and non-transport trade issues that may also play a role in inhibiting and/or spurring trade and economic growth.

The project required extensive travel for all personnel involved in collecting data for this research work. Researcher John Cuttino was assigned the task of researching U.S.-Brazil transport and trade. He traveled to Brazil to collect background data and information. He also interviewed Customs officials, transportation officials, and trade officials.

Principal Investigator Dr. Boske traveled to the Port Authority of Houston in August 2006 to interview a Brazilian trade mission, composed of public officials from the City of Sao Paulo and port officials from the Port of Santos.

And graduate student Tim Box was assigned the task of researching U.S.-China transport and trade, along with Dr. Boske. This past summer, in connection with an international conference on transportation, Dr. Boske traveled to China to interview public- and private-sector officials about developments in China's surface transport infrastructure and ports.

SWUTC Research Generates New Funding Opportunities

SWUTC Project #473700-00033/P.I.: Joe Zietsman

Completed in November, 2005, Joe Zietsman's SWUTC study titled "Mexican Truck Idling Emissions at the El Paso-Ciudad Juarez Border Location" contributed to his success in obtaining an additional $3 million project from the U.S. Environmental Protection Agency's new SmartWay Transport Partnership, which focuses on reducing truck engine idling emissions.

SWUTC Project #473700-00075/P.I. Rob Harrison

A major result of the SWUTC project "Dray Operations at Intermodal Sites on Texas Transportation Corridors" was to stimulate further research through the Texas Department of Transportation's Research Technology and Implementation Division with a new $89,999 study entitled "Impacts of Dray System Along Ports, Intermodal Yards and Border Ports of Entry".

SWUTC Project #473700-00080/P.I. Arif Chowdhury

Preliminary results from the SWUTC study "Review of Warm Mix Asphalt in the U.S." helped Dr. Chowdhury write an excellent research proposal for the Texas Department of Transportation on the topic. As a result, Dr. Chowdhury was awarded a two-year $270,000 study titled "Evaluation of Warm Mix Asphalt New Technology" which will evaluate three different warm mix asphalt technologies. This

TxDOT sponsored study starting in September 2006 will attempt to make a more comprehensive evaluation of warm mix asphalt by laboratory testing and field demonstration projects.

TSU's Transportation Studies Department Acquires Advanced Lab Equipment

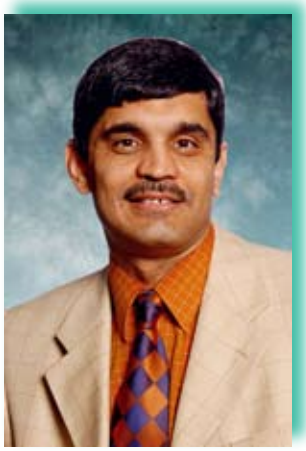

TSU Driving Simulator

The Transportation Studies Department has purchased advanced transportation lab equipment for education and research from DriveSafety, Inc. The new equipment includes a Full-Moon Flight Simulator - a state-of the-art flight simulator; an Autoscope Traffic Monitoring Mobile Van - a van equipped with two Autoscope Solo Pro cameras with computer and video recording equipment needed to process, record and store traffic data; a Driving Simulator - to be used to assess Intelligent Transportation System Concepts and conduct accident analysis and develop crash avoidance counter-measures; and a Real-Time Traffic Monitor System - by which TSU researchers and students will be able to access the real-time image and traffic data through an agreement with TxDOT and Houston TransStar

On April 20, 2006, Dr. Lei Yu, Chair of Transportation Studies at TSU, introduced these new state-of-the-art simulators to faculty, staff and students by giving demonstrations of their high tech capabilities. This new equipment will provide the SWUTC researchers at TSU with greatly increase research opportunities and capabilities.

SWUTC Colleagues Recognized for Research Contributions

Chandra Bhat - University of Texas at Austin



Dr. Chandra R. Bhat, Professor of Civil Engineering at the University of Texas at Austin, and key SWUTC researcher has been named chairman of the International Association of Travel Behavior Research. The IATBR is an international non-profit professional association of academics and practitioners who are interested in research that advances understanding of the link between individuals' activities, information exchange and travel behavior.

Association members around the world chose Bhat for the chair position, which will last for two years, in a direct secret ballot election.

Dr. Bhat uses mathematical modeling to study how people make decisions about their activities and travel choices. His research makes possible evaluations of the effectiveness of traffic alleviation strategies such as telecommuting, work schedule changes and ridesharing.

Carol Lewis - Texas Southern University

Hurricane Katrina and Rita in the early fall of 2005 added new dimensions to the Center for Transportation Training and Research's broad reaching spectrum of transportation initiatives. In addition to the research programs already underway for 2006, Dr. Carol Lewis was nominated by Houston Mayor Bill White to serve on the Governor's Task Force for Evacuation, Transportation and Logistics. This Advisory Group evaluated the events of late September 2005 in the context of the entire Texas Coast and submitted recommendations in four categories - Command, Control & Communications; Fuel Availability; Traffic Control and Transportation; and Special Needs Groups. State level preparation for a future event is being supplemented by intensive provisions by local governments.

Randy Machemehl - University of Texas at Austin

Dr. Randy Machemehl, Nasser I. Al-Rashid Centennial Professor in Transportation Engineering at the University of Texas at Austin and SWUTC Associate Director for Research at UT-Austin and key SWUTC researcher, was chosen as the recipient of the 2005 *S.S. Steinberg Award* by the members of the Research and Education Division of the American Road & Transportation Builders Association (ARTBA). This award is presented each year by ARTBA to an outstanding teacher in the field related to transportation construction.

C. Michael Walton - University of Texas at Austin

Dr. Michael Walton, Ernest H. Cockrell Centennial Chair in Engineering at the University of Texas at Austin and SWUTC Executive Committee member and key SWUTC researcher received the Council of University Transportation Centers award for *Distinguished Contributions to University Transportation Education and Research* at its January 2006 meeting. This award was in recognition of Dr. Walton's significant and outstanding contributions to university transportation and education and research resulting in a lasting contribution to transportation.

Travis Waller - University of Texas at Austin

Dr. Travis Waller, SWUTC researcher from the University of Texas at Austin, was the recipient of the 2006 Council of University Transportation Center's *Young Faculty Award*. This award recognizes Dr. Waller's outstanding teaching and research contributions to transportation systems engineering.

SWUTC Student Researcher Achievements

Perry Miller - Texas Southern University

The Transportation Studies Department at Texas Southern University has many successful alumni. Mr. Perry Miller, former SWUTC student researcher, is no exception. While at TSU, he gained valuable experience through the SWUTC program while conducting research with Dr. Naomi Ledé on her study "Baseline Projections on the Effects of Socio-Demographic, Economic, and Technological Trends". During the pursuit of his undergraduate degree in Airway Science with a concentration in Management, he also earned numerous university awards of scholarship for academic achievements, as well as recognition and scholarship awards from the Conference of Minority Transportation Officials (COMTO), Institute of Transportation Engineers (ITE) and the Houston Citizen Chamber of Commerce (HCCC). During his undergraduate matriculation, Mr. Miller was employed as a student intern at the Houston Airport System and upon graduation continued working for the Houston Airport System as a Management Intern in the Properties Division. In 1993, he became a full-time employee of the Houston Airport System and was hired as a Management Analyst, working with the Management Team at George Bush Intercontinental Airport in Houston.

Mr. Miller furthered his academic pursuits by achieving a M.S. in Transportation Planning and Management from Texas Southern University in 1996. Since the inception of his career with the Houston Airport System, he has worked in several capacities at the airport. Perry successfully completed the three phases of the American Association of Airport Executive (AAAE) Accreditation Process in 2003 and earned the distinction of Accredited Airport Executive. By fulfilling all the requirements leading to this title, Perry became a member of an elite group of only 10 percent in the AAAE's membership through the country.

Mr. Miller is currently employed as Airport Manager of Ellington Field in Houston. The Airport Manager is responsible for preparing annual budgets and staffing levels in accordance with City of Houston and departmental policies and procedures, as well as planning, directing and implementing through subordinate personnel, activities concerned with construction, maintenance and operations of airport facilities.

Zhirui Ye - Texas A&M University

Doctoral student and SWUTC researcher, Zhirui Ye, won the Jacobs Engineering, Inc. Scholarship partially due to his good work on SWUTC project #167761 "Accurate Speed Estimation Using Single Loop Detector Data" this also led to a TRB paper. The paper he co-authored with the project principal investigator, Dr. Yunlong Zhang, was titled "An Unscented Kalman Filter Method for Speed Estimation Using Single Loop Detector Data" and was presented at TRB in January 2006. It has also been accepted for publication in the *Transportation Research Record*. Mr. Ye has also co-authored another paper based on his work with this project titled "Estimation of Large Truck Volume Using Single Loop Detector" . This paper has been submitted to the *Journal of Computer-Aided Civil and Infrastructure Engineering* (CACAIE) for publication.

Pradeep Gulipalli - University of Texas at Austin

Master's student Pradeep Gulipalli has been selected to receive the *Milton Pikarsky Award for Outstanding M.S. Thesis in Science and Technology* from the Council of University Transportation Centers at the annual meeting of the Transportation Research Board in January 2006. This award honors a thesis containing important research that made a significant impact in the transportation field.

Pradeep worked closely with principal investigator and Associate Professor Kara Kockelman on her SWUTC research project "Credit-Based Congestion Pricing: Implementation and Welfare Calculations". His winning thesis is titled "Credit-Based Congestion Pricing: Impact Assessment for the Dallas-Fort Worth Region and Policy Recommendations".

Congestion pricing involves charging drivers who used congested roads to alleviate congestion since some drivers would change their route, travel mode or departure time to avoid a toll. According to credit-based congestion pricing drivers would get "travel budgets" to pay for tolls, but would have to pay out of pocket once their budgets have been used. Mr. Gulipalli's thesis described research regarding the effectiveness of such a policy by modeling travel behavior and predicting traffic, environmental, and economic impacts under such a policy.

Mr. Pradeep Gulipalli has since graduated from the University of Texas at Austin and currently works as a consultant for Marketing and Planning Systems in Boston, where he analyzes and models consumer behavior.

Technology Transfer Activities

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. Since the fall of 1999, SWUTC research has generated 138 final technical reports. SWUTC researchers and students have presented 292 technical papers at national/international forums, and published 128 technical papers in professional journals. 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.

Selected Technology Transfer Highlights

SWUTC Researcher Interviewed for T.V. News Report

SWUTC Project #473700-00033/P.I. Joe Zietsman

On November 15, 2006, KFOX TV-14 out of El Paso, TX ran a 10:00 news story concerning the impact on air quality in El Paso from idling trucks on the international bridges.

In the story, news reporter Arleene Barrios recounted that nearly 2,500 trucks come into El Paso from Mexico on a daily basis making trucks a major player on air quality in the local area. The wait time to pass through the border crossings can be three hours or longer as a result of vigorous inspection due to the threat of terrorism or illegal activities. Joe Zietsman was interviewed for this story because of the knowledge gain from his SWUTC study that examined truck idling issues on the Bridge of the Americas and the Zaragoza Bridge in El Paso. This study documented the total amount of nitrous oxide produced from those trucks while waiting in line to cross the bridges and the impact on air quality in El Paso. His study determined that these two bridges produced approximately 24 metric tons of nitrous oxide on an annual basis, which is considerable for such a small geographic area. This study also determined that Mexican trucks are no more likely to exceed EPS emission standards than U.S. trucks.

The report concluded by highlighting some possible idle emission reduction options. The Free and Secure Trade (FAST) program provides a dedicated lane to pre-approved trucks to pass through border crossings reducing wait time to approximately 15 minutes. In addition to the FAST program, this report also recommends holding areas for trucks to wait in prior to being call for inspection. And the utilization of ITS to provide truck drivers

information on current bridge congestion.

To view this news segment in its entirety, visit http://swutc.tamu.edu/emissionsvideo.wmv

SWUTC Sponsors Freight Performance Measures Workshop

SWUTC Project #473700-00073/P.I.: Rob Harrison

A major element of the SWUTC study "Developing Highway Freight Corridor Performance Measures in Texas" was to support a Texas Department of Transportation (TxDOT) workshop on freight performance measures (FPMs). This workshop was undertaken in Austin on May 12, 2006 and was chaired by the Principal Investigator Rob Harrison.

Crystal Jones of the FHWA Freight Operations Department addressed the group and described the origins of the interest in FPMs and the current work being sponsored by FHWA. Next a detailed presentation by Jeffrey Short, of the American Transportation Research Institute, described results from both the early stage - termed "proof of concept" - and more recent work looking at seven interstate highways across the U.S. Finally, the graduate research assistant on the project, Michael Schofield, presented his work focusing on some Texas analysis that was carried out when Jeffrey Short visited Austin as part of the SWUTC project several weeks prior to the workshop.

This workshop successfully educated approximately 100 transportation professionals to freight performance measure issues. Following the workshop, TxDOT agreed that they would be one of the seven state DOT's to participate in the next phase of the FHWA sponsored research on FPMs. This is a classic case of where a small well-focused study produced a major impact of benefit to the state, region, and in this case, the federal transportation agencies.

SWUTC Sponsors White Paper and Video on the Interstate Highway System and It's Impact on Texas

SWUTC Project #473700-00086/P.I. Penny Beaumont

Funded in September 2005, the SWUTC research project "The Economic, Social, Environmental and Transportation Impacts of the Interstate Highway System in Texas" produced a white paper and a video on the subject for the Texas Transportation Institute's tribute to the 50th Anniversary of the Interstate System. The white paper's web address is http://tti.tamu.edu/interstate_anniversary/ and the video can be located at http://tti.tamu.edu/interstate_anniversary/presentation/. The paper and video titled "From Anywhere to Everywhere: The Interstate Highway System in Texas" provide unique and important historical documentation of Texas's role in the interstate highway system, including the significant role played by individual Texans on the national system. This project documents the dramatic improvements in highway safety resulting from research conducted at Texas Transportation Institute and other Texas universities, much of which was implemented on the interstate system. It also provides information on the significant positive impacts of the interstate system on the Texas economy, emphasizing the importance of a sustainable, safe and well-maintained highway system to the state's economic future.

Ultimately, the deliverables from this project serve as a guide for transportation professionals and political leaders seeking to gain public support for transportation mega-projects.

This research was summarized in an article for the May 2006 issue of ARTBA's *Road Builder* magazine. The entire report was published in a four-color brochure and provided to the more than 2,000 attendees at the Texas Transportation Summit held in Austin in June 2006, and was also published by the AGC of Texas in their magazine *Infrastructure*. In addition, the final report will be excerpted in the upcoming September issue of *Systemwide*, the newsletter for the A&M System employees and retirees.

It is important to note that the white paper generated by this project and available on the TTI website is the only information in the state on this topic. TxDOT's interstate anniversary website offers no information other than a link to the TTI site. A similar situation exists on the FHWA 50th anniversary page: TTI's website is one of only five anniversary sites listed, and a direct web link is provided.

3D Traffic Simulator Offers GIS Extended Learning

SWUTC Project #167652/P.I.: Sharon Adams-Boxill

The SWUTC-developed 3D Traffic Demonstration Simulation Lab at TSU has begun to offer extended learning sessions to transportation studies graduate students. The lab will supplement classroom theory with hands on GIS training. The lab is a Registered Research Laboratory (RRL) for the GeoMedia Corporation. The objective of the extended learning experience is to provide participants with the basic knowledge of GIS and its relationship to transportation and to provide the transportation student with skills that can enhance their productivity and marketability.

SWUTC Project Produces Statistics Text for Transportation Students

SWUTC Project #167763/P.I.: Cliff Spiegelman

Currently, there are no textbooks suitable to teach transportation statistics to today's transportation students. The ultimate goal of Cliff Spiegelman's SWUTC project was to fill that void and develop a statistics textbook that would exclusively target transportation engineering students and professionals. This textbook covers topics not normally contained in other teaching aids that are essential to the transportation profession such as Micro-Simulation and designing computer experiments, computer aided design of experiments, MCMC methods, and/or bootstrapping and jackknife methods. Examples in the textbook were drawn from years of transportation research at the Texas Transportation Institute by the three primary authors, Dr. Cliff Spiegelman, Dr. Larry Rilett and Dr. Eun Sug Park.

This text has been added to the spring 2007 curriculum of Texas A&M University's CVEN 648 Advanced Numerical Methods in Geotechnical Engineering class.

New SWUTC Projects

Number	P.I.	University	Project Title
473700-00037	Jeff Borowiec/ Jeff Warner	TAMU	Evaluation of the Role and Needs of Air Cargo in Texas
473700-00080	Arif Chowdhury	TAMU	Review of Warm Mix Asphalt in the US
473700-00082	Susan Chrysler	TAMU	Assessing Driver Distraction Due to In-Vehicle Video Systems through Field Testing at the Southwest Center for Transportation Research and Testing at Pecos
473700-00084	William Stockton	TAMU	Estimation of Toll Road Users Value of Time
473700-00086	Penny Beaumont	TAMU	The Economic, Social, Environmental and Transportation Impacts of the Interstate Highway System in Texas
473700-00052	Carol Lewis	TSU	An Examination of Density and Ridership in New Light Rail Cities
473700-00053	Gwen Goodwin	TSU	Assessing Transit Ridership in Selected Suburban to Urban Areas
473700-00074	C. Michael Walton	UT-Austin	Commercial Vehicle Security: Practices & Technologies
473700-00075	Rob Harrison	UT-Austin	Dray Operation at Intermodal Sites on Texas Transportation Corridors
167761	Yunlong Zhang	TAMU	Accurate Speed Estimation Using Single Loop Detector Data
167762	Shawn Turner	TAMU	Development of the WALKSAFE Pedestrian Safety Testbed in College Station
167763	Cliff Spiegelman	TAMU	Writing a Statistics Text for Transportation Students
167764	Darrell Borchardt	TAMU	Data for Evaluation Transportation Information Systems in HURREVAC
167765	Jodi Carson	TAMU	Developing a "Recruitment Toolbox" for Transportation Professionals
167766	Mark Burris	TAMU	The Impact of Variable Pricing on Traveler Mode Choice and Time of Departure
167860	Chandra Bhat	UT-Austin	A Comprehensive Analysis of Neighborhood Physical Environment Characteristics on Auto Ownership Levels
167861	Leigh Boske	UT-Austin	The Impact of China's and Brazil's Trade on the Southwest Region's Transportation Corridors and Economy
167862	Kara Kockelman	UT-Austin	Microsimulation for Models of Travel & Location Choice Behavior
167863	Randy Machemehl	UT-Austin	Adaptive Traffic Signal Control: Advancing the Concept (continuation of 167553 funded in FY05)
167864	Randy Machemehl	UT-Austin	Predicting the Relationship Between Vehicle Tire Pressure and Pavement Distress
167865	Tracy McMillan	UT-Austin	Quantifying the Impact of School Siting Policies Using Health Impact Assessment
167866	Jorge Prozzi	UT-Austin	Design-Build Agreements: How to Ensure Transportation Agencies Receive an Asset

New SWUTC Projects (Continued)

Number	P.I.	University	Project Title
167867	Travis Waller	UT-Austin	Multimodal Network Models for Robust Transportation Systems
167868	C. Michael Walton	UT-Austin	A Critical Examination of Multimodal Analysis Freight Tool
167869	Ming Zhang	UT-Austin	Can Transit-Oriented Development (TOD) Reduce Austin's Traffic Congestion
167870	Zhanmin Zhang	UT-Austin	Develop a System to Support Preparation of Life-Cycle Budget Needs for Highways (continuation of 167558 funded in FY05)
167960	Gwen Goodwin	TSU	Evaluation of the Safe Routes to Schools Programs in San Antonio, TX
167961	Sharon Boxill/ Khosro Godazi	TSU	An Analysis of Primary Applications of Emerging Traffic Management Technologies
167962	Sharon Boxill	TSU	3-D Traffic Simulation Professional Development Seminars (continuation of 167652 funded in FY05)
167963	Fengxiang Qiao	TSU	Using GPS and ITS Data to Calibrate the Micro Simulation Model VISSIM

Ongoing SWUTC Projects

Number	P.I.	University	Project Title
473700-00023	Steve Schrock	TAMU	Development of Secondary Task Tools for Laptop-Based Driver Surveys to Correlate Results with the Driving Simulator
473700-00031	Byoung-Suk Kweon	TAMU	Children and Transportation: Identifying Safe and Unsafe Environments for Walking and Biking to School
473700-00048	Carol Lewis	TSU	After the Opening: Integrating Light Rail into a Traditional Bus City - A Case Study
473700-00049	Lei Yu	TSU	Measurement and Evaluation of On-Road Vehicle Emissions at Signalized Intersections
473700-00050	Carol Lewis	TSU	Moving Toward Implementation: An Examination of the Organizational and Political Structures of Transit-Oriented Development (Continuation of 167341 funded FY04)
473700-00051	Gwen Goodwin	TSU	Update: A Longitudinal Assessment of the Relationship Between Land Use, Land Values, and Bus Facilities
473700-00068	Rob Harrison	UT-Austin	Strategic Transportation Challenges and Issues Facing US Agriculture and Rural Industry: A Methodology to Prioritize Rural Transportation Needs
473700-00070	Tracy McMillan	UT-Austin	Understanding Children's Activity for Transportation Planning and Health
473700-00071	Rob Harrison	UT-Austin	Evaluating Mexican Truck Safety at the Texas Mexico Border
473700-00072	C. Michael Walton	UT-Austin	An Investigation on the Environmental Benefits of Variable Speed Control Strategy
473700-00073	Rob Harrison	UT-Austin	Developing Highway Freight Corridor Performance
167142	Susan Chrysler	TAMU	Traffic Engineering Applications of Driving Simulation
167143	Debbie Jasek	TAMU	Establish a Texas Rural Summer Transportation Institute
167225	Randy Machemehl	UT-Austin	Characterizing Transit Passenger Access Decisions (Continuation of 167806 funded in FY00)
167553	Randy Machemehl	UT-Austin	Adaptive Traffic Signal Control: Advancing the Concept (Continuation of 167243 funded in FY04, 167823 funded in FY03, 167524 funded in FY02, 167224 funded in FY 01 & 167805 funded in FY00)
167558	Zhanmin Zhang	UT-Austin	Develop a Dynamic System to Simulate the Life-Cycle Performance of Pavements (Continuation of 167249 funded in FY04, 167832 funded in FY03, 167533 funded in FY02, 167232 funded in FY01, 167803 funded in FY00)
167321	Ron Goodwin	TSU	An Evaluation of Alternative Fuels Usage by Public Transit Agencies
167342	Khosro Godazi	TSU	Procedures for the Implementation of a Transportation Scholars Program (Continuation of 167922 funded in FY03)
167459	Debbie Jasek	TAMU	Go Girl! Exploring Transportation Career Horizons
167550	Chandra Bhat	UT-Austin	On Examining Household Vehicle Holdings and Usage Decisions

Ongoing SWUTC Projects (Continued)

Number	P.I.	University	Project Title
167555	Jorge Prozzi	UT-Austin	Characterizing Highway Traffic in the U.S.-Mexico Corridor Based on the Damaging Effects on Surface Transportation Infrastructure
167556	Travis Waller	UT-Austin	Robust Design and Evaluation of Transportation Networks with Equilibrium Under Demand Uncertainty: Developing Dynamic Traffic Assignment Methods (Continuation of 167246 funded FY04)
167557	C. Michael Walton	UT-Austin	Privacy vs ITS: Institutional and Societal Barriers to Implementation of On-Board Technologies in Commercial Vehicles in the United States
167620	Carol Lewis	TSU	A Longitudinal Assessment of the Relationship Between Land Use, Land Values, and Bus Facilities
167621	Sharon Boxill	TSU	An Evaluation of 3-D Traffic Simulation Modeling Capabilities (Continuation of 167923 funded in FY04)
167622	Ron Goodwin	TSU	Analysis of Federal and State Discretionary Funding of Highway and Transit Projects
167650	Lei Yu	TSU	Analyzing Truck Idling Emission Characteristics Under Altered Testing Conditions
167651	Fengziang Qiao	TSU	ITS Data Compression Using Advanced Signal Processing Techniques
167653	Carol Lewis	TSU	TEA 21 and ISTEA: Examination of CMAQ & STP Spending
167726	Russell Henk/ Shaw-Pin Miaou	TAMU	A Guide to Intelligent Strategies for Transportation Infrastructure Protection and Transportation Security-Related Research
167806	Randy Machemehl	UT-Austin	Characterizing Bus Transit Passenger Boarding and Deboarding Processes
167807	Hani Mahmassani	UT-Austin	Integrating Real-Time Information with Dynamic Fleet Decision Systems for Intermodal Freight Mobility (Continuation of 167228 funded in FY00)
167824	Randy Machemehl	UT-Austin	Using Simulated Annealing Algorithms for Optimizing Transit Network Patterns with Variable Demand
167900	Khosro Godazi	TSU	A Comparative Assessment of Emerging Transportation Techniques: A Seminar for Professional and Student Exchange
167903	Ron Goodwin	TSU	Evaluation of the Potential to Link Rural Communities with their Urban Neighbors
167921	Edward Owens	TSU	An Evaluation of Environmental Justice Programs: Laws and Issues that Affect Minority and Low-Income Populations
167922	Ron Goodwin/ Sharon Boxill	TSU	Procedures for the Implementation of a Transportation Scholars Program

Completed SWUTC Projects

Number	P.I.	University	Project Title
473700-00005	Bill Eisele/Larry Rilett	TAMU	Examining Information Needs for Efficient Motor Carrier Transportation Logistics
473700-00007	Russell Henk	TAMU	Evaluate Strategies for Using the Transportation Management Infrastructure in the Role of National Defense Preparedness
473700-00009	Russell Henk	TAMU	Assess the Potential of Transportation Management Centers in Improving Hurricane Evacuation Operations
473700-00011	David Bierling	TAMU	Current and Future Rail Access Corridor Needs of Southern Texas Ports
473700-00013	Steve Roop	TAMU	Port of Houston Maritime Security Study
473700-00015	Larry Rilett	TAMU	Modeling Passenger Car and Truck Interaction (2nd year continuation of 167427 funded in FY02)
473700-00017	Larry Rilett	TAMU	Strategic Planning for the Transportation Systems Group
473700-00019	Steve Roop	TAMU	Establishing "Best Practices" in a University Setting for Testing, Evaluation, and Management of Standards-Setting for Products and Processes Related to Homeland Security
473700-00021	Jim Kruse	TAMU	Analysis of Start-up Cross Gulf Shipping Activities with Mexico Since 1990: Problems and Opportunities
473700-00025	Zong Tian	TAMU	Development and Evaluation of a Framework for Selecting Operational Strategies for an Integrated Ramp Metering-Diamond Interchange Control System
473700-00027	Jeff Warner	TAMU	Importance of Short Line Railroads to Texas
473700-00029	David Willis	TAMU	Remedial Driver Education: Does it Do Any Good?
473700-00033	Joe Zietsman	TAMU	Mexican Truck Idling Emissions at Major Texas Border Locations
473700-00042	Carol Lewis	TSU	An Examination of the Smart Growth Initiative and Its Application to Region VI Communities
473700-00043	Sharon Adams	TSU	The Integration of GIS and Transportation Modeling: A State-of-the-Practice Review
473700-00044	Carol Lewis/ Khosro Godazi	TSU	State of the Industry Overview - A Transit-Oriented Development Conference
473700-00045	Lei Yu	TSU	Evaluation and Combined Use of TRANSYT-7F and CORIM in Traffic Signal Optimization and Simulation
473700-00046	Carol Lewis	TSU	An Examination of Successful Mixed Used in Transit Oriented Development
473700-00047	Khosro Godazi	TSU	Conference on Regionalism
473700-00062	Rob Harrison	UT-Austin	Inland Ports and their Contribution to Transportation Efficiencies
473700-00063	Michael Walton	UT-Austin	Evaluating Operating Strategies and Transportation Control Measures which Reduce Air Pollution at Airports
473700-00064	Hani Mahmassani	UT-Austin	Real-Time Traveler Information Systems for Non-Commuting Trips

Completed SWUTC Projects (Continued)

Number	P.I.	University	Project Title
473700-00065	Hani Mahmassani	UT-Austin	Emerging Models for Provision of Real-Time Traveler Information Services: Transportation System Management Implications
473700-00066	Rob Harrison	UT-Austin	Using the Gulf Intracoastal Waterway (GIWW) to Move Containers to Gulf Ports
473700-00067	Rob Harrison	UT-Austin	Monitoring U.S. Safety Rules for Mexican Trucks
473700-00069	Michael Walton	UT-Austin	Virtual Truck Weigh Station Concepts
167121	Jeff Borowiec	TAMU	Evaluation of the Economic Growth, Air Quality and Noise Impacts of Regional Jet Service at Commercial Airports Serving Small Cities
167122	Laura Higgins	TAMU	Vanpools as Alternative to Fixed-Route Service
167123	Debbie Jasek/ Beverly Kuhn	TAMU	Develop a Transportation Science Competition and Career Fair for Junior High and High School Students
167124	Rodger Koppa	TAMU	Adaptive Equipment to Enhance Older Driver Performance
167125	Reza Langari/ James Ochoa	TAMU	Development of Integrated Rollover Warning and Active Control Systems (RWCS) for Tractor-Semitrailers
167126	Michael Manser	TAMU	Identification and Evaluation of In-Vehicle Distractors on Driving Performance
167128	Josias Zietsman	TAMU	Sustainable Transportation Performance Measures for Developing Communities
167130	Naomi Lede	TAMU	A Proposal to Conduct an Institute to Prepare High School Students for Transportation Careers in Texas
167141	Darbha Swaroop	TAMU	Modeling and Control of Air Brakes in Commercial Vehicles
167144	Beverly Kuhn	TAMU	Innovative Solutions to Transportation Needs in the Colonias
167145	Shaw-Pin Miaou	TAMU	Applications of Geocoded Traffic Crash Records and Crash-Risk Mapping Technology in Roadway Safety Improvements Projects
167146	G. Curtis Herrick	TAMU	Standards Testing Clearinghouse
167147	Robert Brydia	TAMU	Real-Time Performance Measures Workshop
167148	Laura Higgins	TAMU	Alternative to Fixed Routes-Feeder and Flex-Route Transit Service in Texas
167149	Debbie Jasek	TAMU	Integrating the Transportation Road Show and Library and Transportation Career Guide into Center for Professional Development Web Site
167150	Curtis Morgan	TAMU	Development and Implementation of High-Speed Rail (HSR) Systems in Texas
167151	Beverly Kuhn	TAMU	Workshop to Assess Innovative Solutions to Transportation Needs in the Colonias
167220	Chandra Bhat	UT-Austin	A Methodology to Analyze the Effectiveness of Roadway Pricing Control Strategies Using Travel Survey Data

Completed SWUTC Projects (Continued)

Number	P.I.	University	Project Title
167222	Susan Handy	UT-Austin	The Education of Transportation Professionals
167223	Kara Kockelman	UT-Austin	Uncertainty in Integrated Land Use-Transport Models
167224	Randy Machemehl	UT-Austin	Adaptive Traffic Signal Control Development and Evaluation (Continuation of 167805 funded in FY00)
167229	Michael Walton	UT-Austin	Design and Implementation of an Intelligent Parking System for a Major Activity Center (Continuation of 167811 funded FY00)
167230	Michael Walton	UT-Austin	Impact of New Large Aircraft on Arrival Passenger Flows at Airport Terminals
167231	Michael Walton	UT-Austin	Restricting the Use of Reverse Thrust as an Emissions Reduction Strategy for Airports
167240	Chandra Bhat	UT-Austin	Time of Day Modeling of Person Trips Using Revealed Preference and Stated Preference Surveys
167241	Leigh Boske	UT-Austin	Gauging the Impacts of Maritime-Related Foreign Trade on the Southwest Region's Economic Growth Prospects and Transportation System: A Methodology for Linking Trade, Transportation, and Logistics Data
167242	Kara Kockelman	UT-Austin	Credit-Based Congestion Pricing: Implementation and Welfare Calculations
167244	Randy Machemehl	UT-Austin	Using Random Search, Local Search and Exhaustive Search Methods to Optimize Transit Network Patterns (Continuation of 167824 funded in FY03)
167245	Jorge Prozzi	UT-Austin	Evaluation of the Joint Effect of Wheel Load and Tire Pressure on Pavement Response
167247	Michael Walton	UT-Austin	How to Use ITS Data to Support the Transportation Planning Process
167248	Michael Walton	UT-Austin	A Framework for Developing Integrated ITS Solutions to Improve Traffic Operations
167320	Ron Goodwin/ Sharon Boxill	TSU	Analysis of Texas' Speed Limit Laws and Fatality Accident Rates
167322	Carol Lewis	TSU	An Assessment of Examination Criteria Used for Transit Friendly Decision-Making
167340	Sharon Boxill	TSU	3-D Traffic Simulation Demonstration Lab: A Technology Transfer Initiative
167421	David Ellis	TAMU	Dissemination of Data and Training in the Analysis of Critical Transportation Planning Information for Small Texas Cities and Counties
167422	Laura Higgins	TAMU	Public Transit and Livable Communities: Corpus Christi After Evaluation
167423	Debbie Jasek	TAMU	Develop a Transportation Road Show and Library of Promotional and Marketing Materials to Encourage Development of a Transportation Workforce

Completed SWUTC Projects (Continued)

Number	P.I.	University	Project Title
167424	Shaw-Pin Miaou	TAMU	Providing Personalized Traffic Safety Information to the Public Using Web-Based Geographical Information System (Web-GIS) Technologies
167425	Jody Naderi	TAMU	Pedestrian Health and Safety: Case Studies and Simulation
167426	Cesar Quiroga	TAMU	Development of an Integrated Assessment of Transportation Data for the Texas-Mexico Border Region
167427	Larry Rilett	TAMU	Simulation Modeling of Passenger Car and Truck Interaction
167451	Laura Higgins	TAMU	Disregard for Traffic Controls - Driver Perceptions of Risk
167452	Paul Nelson	TAMU	Mining Microscopic Traffic-Flow Data
167453	Joe Button	TAMU	Fibers from Recycled Tires as Reinforcement in Hot Mix Asphalt
167454	Jim Kruse	TAMU	Effect of Security Requirements on Port Infrastructure Development and Funding
167455	Robin Rabinowitz/ Debbie Spillane	TAMU	Evaluating the Use of Pavement Markings in Making Streets Safer for Pedestrians and Bicyclists
167456	Debbie Jasek/ Jeff Borowiec	TAMU	Develop and Establish a Texas Summer Aviation Institute
167458	Penny Beaumont	TAMU	A History of the Interstate System in Texas
167520	Chandra Bhat	UT-Austin	Air Travel: A Systematic Analysis of Traveler Choices
167521	Leigh Boske	UT-Austin	Making Transportation Corridors Work: The Potential for Integration Roundtables at Southwest Seaports
167522	Susan Handy	UT-Austin	The Case of the Soccer Mom and Other Stories: Travel by Choice or Necessity?
167523	Kara Kockelman	UT-Austin	Uncertainty in Integrated Land-Use Transport Models: Simulation and Propagation (Continuation of 167223 funded in FY01)
167524	Randy Machemehl	UT-Austin	Adaptive Traffic Signal Control Development and Evaluation (Continuation of 167224 funded in FY01 & 167805 funded in FY00)
167525	Randy Machemehl	UT-Austin	Optimizing Transit Network Patterns
167526	Hani Mahmassani	UT-Austin	Real-Time Integrated Management of Intermodal Fleet Operations (Continuation of 167228 funded in FY01 & 167807 funded in FY00)
167527	Hani Mahmassani	UT-Austin	Shipper and Carrier Participation in Electronic Marketplaces and Implications for Freight Logistics
167528	Hani Mahmassani	UT-Austin	Disaster and Major Emergency Management Using Dynamic Modeling Approaches and ITS Technologies
167529	Michael Walton	UT-Austin	Regional Impacts on Congestion Pricing
167530	Michael Walton	UT-Austin	Evaluating the Performance of Arrival Passenger Processing Facilities for Increasing Aircraft Size (Continuation of 167230 funded in FY01)

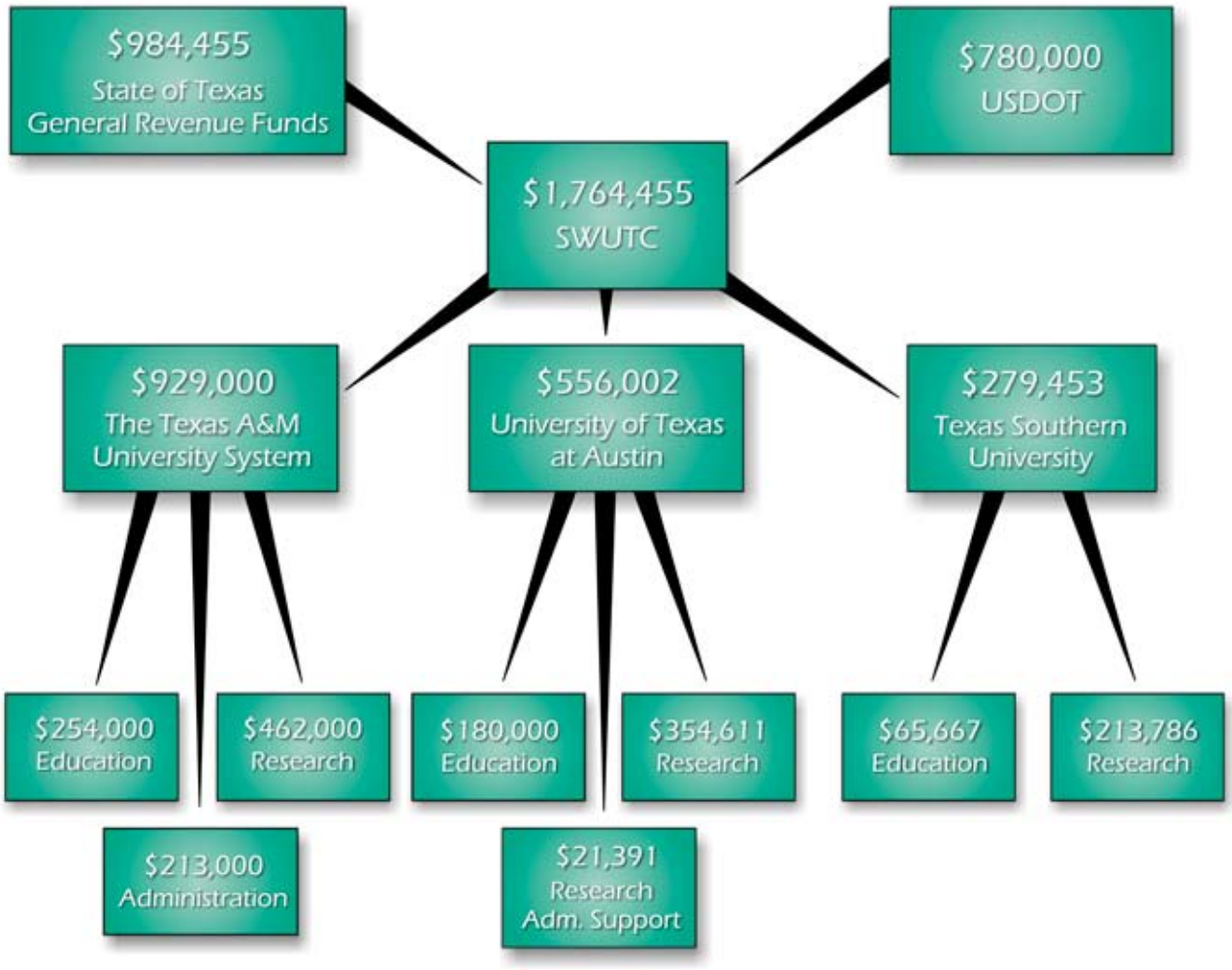
Completed SWUTC Projects (Continued)

Number	P.I.	University	Project Title
167531	Michael Walton	UT-Austin	The Use of ITS Technologies to Improve Transport Efficiency for an Aging Population
167551	Leigh Boske	UT-Austin	The Impact of Trans-Pacific Trade on the Southwest's Transportation Corridors and Economy
167552	Kara Kockelman	UT-Austin	The Basis for Location Choice, Vis a Vis Transportation Demand
167554	Randy Machemehl	UT-Austin	Predicting Truck Tire Pressure Effects Upon Pavement Performance
167652	Sharon Boxill	TSU	3-D Traffic Simulation Professional Development Seminars
167701	John Basilotto	TAMU	An Internet Clearinghouse of Marine and Intermodal Information for Sustainable Transportation and Economic Development
167702	Beverly Kuhn	TAMU	An Analysis of the Market Potential for Distance Learning Opportunities in Transportation Professional Development
167703	David Schrank	TAMU	Developing a Sketch-Planning Technique Relating Economic Activity and Urban Mobility in Small and Medium-Sized Urban Areas
167704	Katie Turnbull	TAMU	Transportation and Tourism Workshop
167706	Jason Crawford	TAMU	The Contribution of Hand-Held Cellular Phones to Vehicular Accidents
167707	James Bonneson	TAMU	Comprehensive Engineering Approach to Achieving Safe Neighborhoods
167708	Paul Nelson	TAMU	Automated Identification of Flow Patterns in Congested Traffic
167709	Cindy Estakhri/ John Overman	TAMU	Carbon Dioxide Emission Reductions Through the Use of Fly Ash in Concrete Production
167711	Eric Lindquist	TAMU	Agenda Setting in the Transportation Policy Domain
167721	Sue Chrysler	TAMU	3D Visualization as a Tool to Evaluate Sign Comprehension
167722	Harlow Landphair Shawn Turner	TAMU	Correlates of Environmental Constructs and Perceived Safety Enhancements in Pedestrian Corridors Adjacent to Urban Streets
167723	Debbie Jasek	TAMU	Develop a Transportation Career Guide for the Non-Traditional Student
167724	Juan Carlos Villa	TAMU	Methodology for the Development of Binational Driver and Vehicle Databases
167725	Bill Eisele/Bill Frawley	TAMU	Quantifying Access Management Performance Measures and Incorporating Them into the Transportation Planning Process
167800	Chandra Bhat	TAMU	A Joint Model System of Mode Choice, Destination Choice, and Departure Time Choice for Nonwork Trips
167801 & 167221	Leigh Boske	UT-Austin	Impact of Latin American Trade on the Southwest Region's Economic Growth Prospects and Transportation System

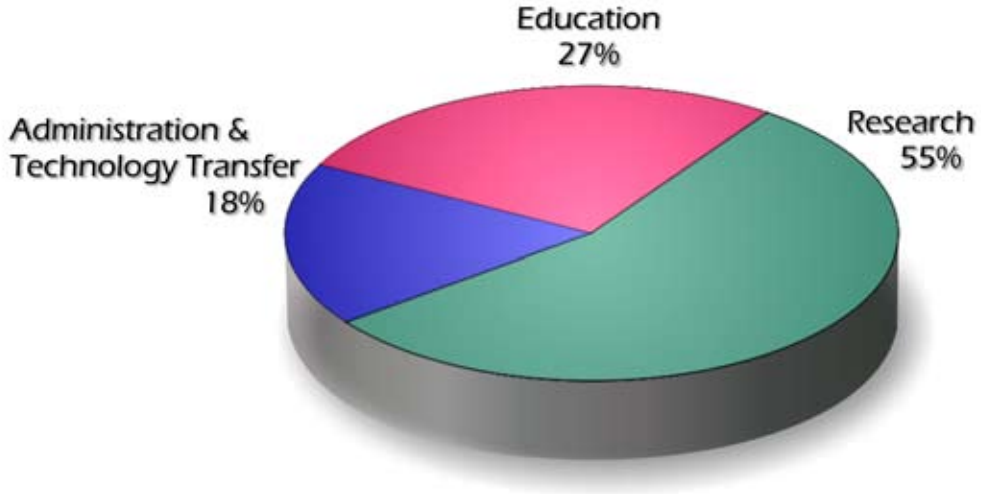
Completed SWUTC Projects (Continued)

Number	P.I.	University	Project Title
167802	Susan Handy	UT-Austin	Understanding the Growth in Nonwork VMT
167804	Kara Kockelman	UT-Austin	The Propagation of Uncertainty in Multi-Stage Transport Demand Models
167805	Randy Machemehl	UT-Austin	Adaptive Traffic Signal Control Development and Evaluation
167808 & 167227	Hani Mahmassani	UT-Austin	Freight Transportation and Logistics Implications of Electronic Commerce and Virtual Supply Chains
167809	Hani Mahmassani	UT-Austin	From Information to Knowledge: Strategies and Techniques for Mining Real-Time Traffic Data Bases
167810	Michael Walton	UT-Austin	The Implications of Data Usage and Privacy on ITS Organizations
167811	Michael Walton	UT-Austin	Intelligent Parking Systems
167820	Chandra Bhat	UT-Austin	Analysis and Modeling of Individual Activity-Travel Patterns During Weekends
167821	Leigh Boske	UT-Austin	Evolving Maritime Corridors and their Port Networks: Enhancing and Securing Hemispheric Trade with the Southwest Region
167822	Kara Kockelman	UT-Austin	Investigation of Credit-Based Value Pricing of Congested Roadways
167823	Randy Machemehl	UT-Austin	Adaptive Traffic Signal Control Development and Evaluation (Continuation of 167524 funded in FY02, 167224 funded in FY01 & 167805 funded in FY00)
167825	Hani Mahmassani	UT-Austin	Disaster and Major Emergency Management Using Dynamic Modeling Approaches and ITS Technologies (Continuation of 167528 funded in FY02)
167826	Hani Mahmassani	UT-Austin	Modeling Environmental Impacts of Intelligent Transportation System Approaches
167827	Jorge Prozzi	UT-Austin	Methodology for Quantifying Pavement Damage Caused by Different Axle and Load Configurations
167828	Michael Walton	UT-Austin	Framework for ITS Deployments to Enhance Safety of Our Highway System
167829	Michael Walton	UT-Austin	Analyzing the Impact of Traffic on Air Quality with GIS
167830	Michael Walton	UT-Austin	An Identification of Equipment Needs at Marine Terminals for Efficient Handling of Cargo
167901	Lei Yu	TSU	Travel Demand Forecasting Models: A Comparison of EMME2/QRS
167902	Ron Goodwin/ Carol Lewis	TSU	An Assessment of the Procedures for Integrating Taxicabs into an Urban Environment
167920	Lei Yu	TSU	Evaluation and Combined Use of TRANSYT-7F and CORIM in Traffic Signal Optimization and Simulation (Continuation of 473700-00045 funded in FY02)
466610	Dock Burke	TAMU	Public Transportation for the Colonias

Funding Sources & Expenditures



Distribution of Funds



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