

TRANSPORTATION SOLUTIONS TO ENHANCE PROSPERITY AND THE QUALITY OF LIFE

2003 Annual Report

Credíts

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Southwest Region University Transportation Center Annual Report 2003

Transportation Solutions to Enhance Prosperity and the Quality of Life

> Consortium Members: Texas A&M University System University of Texas at Austin Texas Southern University

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Message from the Director



In this annual report, accounts of many individuals and their efforts during the most recent year reflect some of the best highlights and success stories of SWUTC's activities. Since its beginnings, the SWUTC has identified and nurtured students, researchers, and professors in a unique enterprise with internal dynamics to produce new ideas, results, and people that will positively impact the transportation sector of this region and Nation. Our current "crop" of research, education, and technology transfer programs is the latest in a sequence of annual accountings that document the results of SWUTC resources expended to enhance existing programs of excellence at the three universities in our consortium.

Having served as director of the SWUTC for much of its existence, I'd like to preface this year's *Annual Report* with a message that includes a chronological overview of the Center's history. For it is in this context that one can better relate to the individual successes that occur every year when our students, researchers, and faculty members participate in this exciting

and innovative UTC program, which today includes twenty-seven centers nationwide. SWUTC is one of the ten charter members of this program that was authorized under STAA, expanded under ISTEA, and operates currently under TEA-21. And even more importantly, we look forward to participating in the future UTC program when it emerges at the completion of the current reauthorization process in Congress.

In the beginning.....

The Southwest Region University Transportation Center (SWUTC) was established at the Texas A&M University System in October 1988. The SWUTC remains comprised of a consortium of three universities: Texas A&M University System; University of Texas at Austin; and Texas Southern University, each of which has major transportation research and education enterprises.

The Texas Transportation Institute in the Texas A&M University System serves as the lead institution. The SWUTC has been continuously headquartered in College Station on the main Texas A&M campus.

The SWUTC has developed a stable, consistent program that has matured in its role as a center of excellence for transportation research and education in Federal Region 6. The theme for the SWUTC is **Transportation Solutions to Enhance Prosperity and the Quality of Life**. To put this theme into operation, the Center's scientists, engineers, and students focus their research expertise upon advancing four strategic thrusts for Region VI: support economic growth and trade; enhance mobility, accessibility and efficiency; promote safety and safe environment; and development of the transportation workforce. Our efforts have produced usable results in such areas as improving transportation activities along the Texas-Mexico border; innovative transit service programs; dynamic travel demand management; development of new solutions to realize safe communities; and educational outreach programs to build a diverse transportation workforce for the 21st Century.



While the U.S. DOT has furnished an annual grant of \$1 million (maximum) to operate the programs of the SWUTC, we have responded to the challenge to provide at least an equivalent amount of nonfederal funding as matching money for SWUTC functions. Throughout the period of operation under three federal grants, the SWUTC's nonfederal matching has been funded with general revenues from the State of Texas, Oil Overcharge Funds from the State Energy Management Office, as well as contributions of in-kind services provided by each member institution of the SWUTC. Typically, the efforts of SWUTC's members to secure non-federal funds have generated a full dollar-fordollar matching amount in so-called "hard dollars."

From 1988 - 2003....

The SWUTC programs have produced results which are highlighted with the following metrics in its research, education, and technology transfer activities.

Research Program Outputs

- 400 projects have been funded
- 115 individual Principal Investigators
- 1,128 students have contributed to SWUTC research work

Educational Program Highlights

- 308 individual students have received stipends
- 267 have graduated

Of those that have graduated 206 (87%) have been employed in the transportation sector

| Advanced degree program | 5% |
|-------------------------|-----|
| Government | 19% |
| Industry employment | 61% |
| Teaching/Research | 15% |

Technology Transfer Results

- 234 final technical reports published
- 669 papers presented
- 243 papers published
- sponsors conferences/workshops
- supports SWUTC website

Selected Initiatives Undertaken Center for Ports and Waterways CUNEY Homes Residential Mobility

Program Colonias Transportation Services Rail Research Center

Educational Outreach in Public Schools in Texas

In its macrotrends, SWUTC has created some notable successes

- Increased quality and quantity of students entering transportation curricula.
- Graduated and placed skilled professionals in transportation agencies, companies, and faculties.
- Developed research solutions that have supported transportation policies and programs.
- Implemented pilot studies in transit, highway, rail and intermodal to increase the resource base of other transportation programs.

Into the Future

As we see the SWUTC of tomorrow, we envision a consortium of universities focused on transportation solutions that will:

- Expand the SWUTC support of students.
- Broaden the consortium membership.
- Establish new liaisons in transportation sector using innovative public/private partnering.
- Expand the financial resource base of the SWUTC.

We in the SWUTC look forward to remaining an active member of a reauthorized UTC program as we continue to seek out the students, develop the programs, and create the educational/research initiatives to produce the ideas and leaders to guide our Nation's transportation enterprise.

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 Region 6 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.



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 Assistant 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. Most recently he received the Lamme Medal of the American Association for Engineering Education for leadership in engineering education.

Mr. G. Sadler Bridges, member

Mr. Bridges has more than thirty 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. Currently he serves on several SAE ITS Standards committees and is chair of the Public Safety Vehicle Committee. 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 presently 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. Dr. Christiansen is immediate 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 is served as President of the Council of University Transportation Centers (CUTC) in 2002 and is currently a member of the CUTC board.

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. He 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. During the latter period, he co-authored *Vehicle Operating Costs: Evidence from Developing Countries*, published by Johns Hopkins Press and contributed to a number of World Bank transportation sector reviews in Latin America, Africa, and the Russian federation.

Mr. Harrison is a past president of the U.S. Transportation Research Forum (TRF), and currently serves as an Associate Editor of the TRF quarterly publication. He is currently a member of the Transportation Research Board Committee on Motor Vehicle Size and Weight, serves as Secretary of the TRB Committee on International Trade and Transportation, serves as Secretary to the Task Force on Agricultural Transportation, and is the Chairman of the Committee on Intermodal Freight.

Dr. Naomi Ledé, member

Dr. Ledé is a *Senior Research Scientist* at the Texas Transportation Institute. Upon her retirement from Texas Southern University during the 1996-97 academic year, the University bestowed upon her the title, Executive Director (Emeritus) of the Center for Transportation Training and Research at Texas Southern University. She retired from her tenured position as Chairperson of the Department of Transportation Studies and Distinguished Professor of Transportation after having served 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.

Dr. Ledé is a national and international scholar in transportation planning and management. She is the author of 10 books and more than 300 research studies, articles and professional papers on urban planning, community development, education, and transportation issues and problems. Her achievements involve working with the Texas Transportation Institute in a series of urban initiatives, including the development of innovative programs for elementary, secondary, pre-college and college students. These initiatives are designed to increase the number and quality of individuals entering transportation careers. In recognition of her outstanding contributions to the field of transportation science, Dr. Ledé has been the recipient of numerous awards including the Transit Research of the Century Award awarded in 1999 by the Greater Houston Chapter of the Conference of Minority Transportation Officials (COMTO); the Outstanding Leader of the Century, awarded in 2000 by the Metropolitan Transit Authority of Houston (METRO) and the Sharon D. Banks Award for Innovative Leadership in Transportation presented by the National Academy of Sciences, Transportation Research Board in 2002.

Dr. Ledé served on the Board of Directors of the Metropolitan Transit Authority of Harris County (Houston METRO) for six years, 1984-1990. She served as Vice Chair of the Governor's Public Transportation Advisory Committee; as a member of the Technical Task Force of the National Research Council, National Academy of Science, Transportation Research Board; and a member of the Urban Affairs Association. Her community service activities have been numerous. She served 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 (YWCA) and the Editorial Committee of the Houston Public Library, and as President of the Common Heritage Association - an organization

that provides scholarships to worthy high school students. She was appointed to the Texas Board of Protective and Regulatory Services to serve a term that ends in 2003. She serves as President of the National Alumni Association of Mary Allen College, and is a past board member of the University of Texas at Arlington Alumni Association.

Dr. Carol Lewis, member

Carol A. 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 Smart Growth in Southwest States, Impacts of Freeway Ramp Locations on Land Use and Development, and Socio-economic and Land Value Effects of Elevated and Depressed Freeways. Lewis also assisted with the citizen involvement portions of Major Investment Studies for the Metropolitan Transit Authority (Houston) and TxDOT.

Dr. Lewis was recently appointed to the Board of Directors of the Metropolitan Transit Authority of Harris County by Mayor Lee P. Brown. She also chairs the Technical Advisory Council 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.

Dr. Laurence Rilett, member

Dr. Rilett is the *E.B. Snead II Associate Professor* in the Department of Civil Engineering at Texas A&M University, and an Associate Research Engineer at the Texas Transportation Institute. He received his

B.A.Sc. degree (1987) and his M.A.Sc. degree (1988) from the University of Waterloo and his Ph.D. degree (1992) from Queen's University. He has held academic positions as an Assistant Professor (1992-1995) and an Associate Professor (1995) at the University of Alberta. In the past 12 years he has taught seven different undergraduate courses and four different graduate courses that cover a variety of topic areas including statistics, risk analysis, and transportation planning. He has served as chair on 6 Ph.D. dissertation committees and 17 Masters committees and is currently supervising 8 Ph.D. students and 6 Masters students. In addition, he has authored or coauthored 32 refereed journal papers and 40 conference papers that were based on his research.

Dr. Rilett has been a principal investigator or coprincipal investigator on over 20 research projects. Dr. Rilett's field of research is in the transportation system analysis area and his specific research may be divided into two main areas: ITS applications and transportation system modeling.

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 and former Chairman of TRB. He is a founding member of the Intelligent Transportation Society (ITS) of America and currently serves as chair on the Board of Directors. Dr. Walton has received awards including 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 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. Lei Yu, member

Lei Yu is Professor and Chairman of the Transportation Studies Department at Texas Southern University. As a professor at Texas Southern University, he has been teaching the courses in Highway Traffic Operations, Travel Demand Forecasting & Analysis, Transportation Design & Engineering, Computer Applications in Transportation, and Quantitative Analysis in Transportation. He obtained his Ph.D. in Civil Engineering from Queen's University (Canada) in 1994. His research interests and expertise involve transportation modeling, the ITS related technologies and applications, dynamic traffic assignment and simulation, vehicle exhaust emission modeling, highway traffic control and operation strategies, travel demand forecasting models, and air quality issues in transportation. In the past years, Yu has been the Principal Investigator of more than 25 research projects that were sponsored by various agencies such as Texas Department of Transportation (TxDOT), Federal Highway Administration (FHWA), Federal Transit Administration (FTA), Southwest Region University Transportation Center (SWUTC) program, National Institute of Standards and Technology (NIST), City of Missouri City, Harris County Improvement District #1, etc. Dr. Yu has published more than 50 research papers in scientific journals and conference proceedings, and project reports. In addition, he has served many times as the distinguished lecturer for the high-level Chinese Transportation

Executives and Administrators. In September 2000, he was awarded the Cheung Kong Scholar 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 also holds membership on numerous committees, councils, and task forces in the regional, state, national and international organizations.

Dr. Zhanmin Zhang, member

Dr. Zhang is an *Assistant Professor* in Transportation Engineering at the University of Texas at Austin. He obtained his Ph.D. at the University of Texas at Austin and has significant teaching and research experience elsewhere. Dr. Zhang has been actively conducting research in the engineering and management of transportation infrastructure and the applications of advanced database and information systems to pavement management for more than 16 years here in the United States and abroad.

Dr. Zhang's research experience is characterized by a unique combination of his theoretical knowledge in pavement engineering and hands-on computer skills. He has conducted extensive research in the analysis, modeling, operation, and management of pavement and infrastructure systems, using advanced computer technologies such as Geographic Information Systems (GIS), knowledgebased systems (KBS), and relational database management systems (RDBMS).

Dr. Zhang is actively involved with several professional committees under the Transportation Research Board (TRB) and American Concrete Institute (ACI). He also serves as a member of the Technical Advisory Panel (TAP) for the Research Management Committee (RMC) 1 of the Texas Department of Transportation (TxDOT).

Key SWUTC Departures

Dr. Susan Handy

After serving on the SWUTC Executive Committee since 1994, in September of 2002, Dr. Handy accepted an Associate Professor position at the University of California - Davis in the Department of Environmental Science and Policy and Institute of Transportation Studies. At UC-Davis, Dr. Handy plans to continue her research on the relationships between transportation and land use, including the impact of land use on travel behavior and the impact of transportation investments on land development patterns. In addition, her work will be directed towards strategies for enhancing accessibility and reducing automobile dependence, including land use policies and telecommunications services.

Ms. Penny Beaumont

After serving on the SWUTC Executive Committee since 1996, Ms. Beaumont has retired from her position as Associate Agency Director of the Texas Transportation Institute. After some extensive summer travel, Penny plans to return to TTI on a part-time basis in mid-September 2003. In her new capacity, she will assist Herb Richardson and other members of TTI's Management Team in the upcoming Legislative Appropriations Request and strategic planning processes as well as in the preparation of various presentations. Penny will also assist in the development of TTI policies and procedures. Penny and her husband Roger, professor emeritus of history, are also working on a book *Invisible Empresses: The Vicereines of India*, based on research they did in the United Kingdom.

Dr. Hani Mahmassani

After serving as Associate Director for the Advanced Institute for Transportation Infrastructure Engineering and Management at the University of Texas since 1990, Dr. Mahmassani left the faculty position he held for 20 years at the University of Texas in August 2002 and joined the faculty of the University of Maryland. At the University of Maryland, he is the first holder of the *Charles Irish Sr. Chair in Civil and Environmental Engineering* and is also the founding Director of the Maryland Transportation Initiative, a new crossdisciplinary institute for transportation systems research and education. Dr. Mahmassani will continue to specialize in multimodal transportation systems analysis, planning and operations, dynamic network modeling and optimization, transit network planning and design, dynamics of user behavior and telematics, telecommunication-transportation interactions, large-scale human infrastructure systems, and real-time operation of logistics and distribution systems.

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 research career at the Institute, he has served as the Study Supervisor or co-supervisor of over 50 research projects, authored or co-authored 90 research reports and papers, and has made over 60 presentations on a wide variety of transportation related issues since joining TTI in 1969. He is the 1998 recipient of the TTI/Trinity Career Achievement in Research award.

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.



SWUTC Administrative Staff: Dock Burke, Amy Engelbrecht and Barb Lorenz

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 35 years. He has over 40 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 15 years of teaching and administrative experience at Texas Southern University. He holds a BS in Civil Engineering Technology and a MS in City Planning. He is coordinator of the 2-week Texas Summer Transportation Institute that has been held in Houston, at Texas Southern University. In addition he spearheads the Transportation Studies Mentorship Program. Mr. Godazi has coordinated numerous conferences for the Center for Transportation Training and Research. Mr. Godazi has extensive



experience in transportation research and has served as Principal Investigator on numerous SWUTC projects. Mr. Godazi teaches transportation students in various Transportation Software and Quantitative Statistics.

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 150 papers and reports. Recently 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 and the Transportation Research Forum. 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 10)



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. This investment in human capital creates 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. 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 first 4 years of 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/cpd/education/. Another initiative was the development of road-show promotional materials for use at career fairs to encourage 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. 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.

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The SWUTC continues to support the two week **Texas Summer Transportation Institutes** held annually at Paul Quinn College in Dallas, and Palo Alto College in San Antonio. The four week **Houston National Summer Transportation Institute** conducted at Texas Southern University remains an award-winning program in the national STI initiative.

Each of these STI programs 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,



HNSTI Graduation Ceremony at TSU with keynote speaker Dr. Ilene Payne, FHWA-Washington.

strengthen the links between the transportation sector and public/private institutions. Through the course of the program, all modes of transportation are address and augmented with hands-on technical activities, lectures by transportation professionals and field trips to such places as 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.

This program continues to be a huge success and this year sponsored 48, primarily minority, students. Historically, near 90% of participating students go on to college with a majority indicating that they are currently pursuing careers in mathematics, science, business, technology and transportation engineering.

New Pre-College Initiatives for 2003

SWUTC Project Tests Transportation Career Guide for the Non-Traditional Student SWUTC Project #167723/P.I. Debbie Jasek

The transportation industry needs to attract non-traditional students to fill technical, paraprofessional and professional jobs that are necessary to design, plan, manage, operate and maintain the transportation network and its systems on a daily basis. In order to reach these students the industry must define available job opportunities and the skills needed to successfully meet the requirements for those jobs. This SWUTC project's goal is to develop a transportation career guide for use at career fairs that will help lead



Debbie Jasek distributing career guides at job fair in Laredo

high school students towards setting their career goals and objectives within the area of transportation.

At two separate career fairs, a bound guide and separate one page career guide handouts were test marketed to determine which item would be selected and taken home by the students. Almost 100 percent of the students visiting the table selected at least one of the one-page handouts to take with them. Approximately 25 percent of the students took a copy of the bound guide without prompting. When teachers visited the booth the exact opposite results were noted. The result of this marketing experiment was that the team changed the layout of the guide so that each career section featured in the guide could also be utilized as a stand-alone handout.

Once fully developed, the transportation career guide and the one page flyers will be available for use by transportation professionals nationwide via the Texas Transportation Institute's Center for Professional Development web site as well as distributed to predetermined users such as members of University Outreach, previously identified high school vocational teachers and counselors, and members of the Texas Rural Systemic Initiative (TRSI) and South Texas Rural Systemic Initiative (STRSI) which are TAMUS initiatives to improve the mathematics and science performance of Texas public school students.

This project will ultimately increase the general awareness of transportation as a profession. Increase the awareness of non-traditional students about transportation career opportunities. And increase the number



of non-traditional students pursuing transportation careers. Thus, ensuring the necessary qualified transportation workforce to sustain the nation's mobility and economic strength for the future.

SWUTC Developing Procedures for Implementation of a Transportation Scholars Program SWUTC Project #167922/P.I. Khosro Godazi

As the "baby boom" generation nears retirement age, many industries anticipate the loss of technical expertise that accompanies a significant employee turnover. New recruitment into the transportation industry is further complicated by the misperception that employees of the public transportation industry, for example, merely drive buses, or that state department of transportation employees merely build roads. This current SWUTC project examines a new strategy to enable the transportation industry to complete and be considered as an "employer of choice" by qualified young people as they begin their educational careers.

Researchers at TSU are examining the model of the military ROTC scholarship program in Texas and hoping to apply it as a transportation industry recruitment tool. Ultimately, the goal is to enlist operating agencies in the transportation industry to offer scholarships to outstanding students to pursue careers in transportation. This project will also identify and build a database of high school students who express an interest in a career in transportation and would be potential candidates for a transportation scholarship. One source of such students would be those who have participated in the various Transportation Summer Institutes operating throughout Texas. The end objective is to offer these outstanding students scholarships after they attain 60 semester hours. In return the students are obligated to work for the supporting agency for a set number of years. Ultimately, this research will provide another instrument for the transportation industry to use in its pursuit to develop the necessary workforce for the future.

SWUTC Summer Undergraduate Fellows Program

The SWUTC Summer Fellows Program at the University of Texas and Texas A&M University continues to

be extremely successful in attracting a diverse group of students into the graduate programs in transportation. Each year, the Summer 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. At the end of the summer term, the students make oral presentations on their research and produce a paper for publication. During the summer 2003 session, six undergraduate fellows participated in the program at TAMU. Eight participated in the UT-Austin program.



UT-Austin 2003 Summer Undergraduate Fellows

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. Since the beginning of this current grant in the fall of 1999, 92 students have been supported thorough the SWUTC education programs. Of those students, 50 have since graduated with 94% entering into the field of transportation either with the government or private industry sectors, or into an academic/teaching environment.

2003 TAMU Mentors Program Highlights

As part of the TAMU Advanced Institute program, the 13th Annual TAMU Mentors Program was conducted during the 2003 summer session. This highly successful program brings leading practitioners in the field of traffic operations, traffic management and intelligent transportation systems (ITS) together with Advanced Institute students and state department of transportation employees in a summery long learning program. This year, twelve world" solutions and learn to communicate effectively with top-level transportation professionals.

The program begins with a three-day session on TAMU's main campus and continues through the summer as participants work on cutting edge transportation issues. Initially, research proposals are developed by



13th Annual TAMU Mentor Program Participants

the students. Then the participants work with the mentors and class instructor to research and develop their ideas into papers and presentations.

Near the end of the summer academic session, mentors, graduate students and DOT employees gather on campus for formal presentations of the papers by the participants. Final papers are compiled and published in a compendium. Many students have had papers accepted for presentations at professional national and international meetings. For example, Kristin Turner, participant in the 2003 Mentor's Program, has just had her paper accepted for a poster presentation at the 83rd Annual Transportation Research Board meeting in January 2004. Her paper is titled

Evaluation of the Effectiveness of Roundabouts in an Arterial Network - A Case Study Using Microsimulation.



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 SWUTC Ph.D. Student Award and the Robert Herman Outstanding Student Award comes with a \$1,000 cash award.

Robert Herman Outstanding Student Award

For 2003, the *Robert Herman Outstanding Student Award* was awarded to Pamela Murray from the University of Texas at Austin. Pamela has long been interested in the fields of transportation engineering

and emergency medicine. At sixteen, she joined her town's volunteer rescue squad, gaining experience in the medical field and an appreciation for the impact of traffic on emergency situations. Entering Duke University with the intention to become a surgeon, Pamela developed an increasing interest in civil engineering. She graduated in the engineering program while pursuing volunteer activities as a certified emergency medical technician (EMT) with two emergency medical services (EMS) units.

Pamela completed her masters in transportation engineering at UT-Austin and is currently a Ph.D. candidate at the University. She has been able to intertwine her two professional interests that had developed ten years ago. Pamela's current project, sponsored by the SWUTC and under the direction of Dr. Mahmassani, is entitled *Disaster and Major Emergency Management Using Dynamic Modeling Approaches and ITS Technologies.*

Given the events of September 11, 2001 and her research interests, Ms. Murray plans to work for a federal agency, perhaps



Pamela Murray accepting award from FHWA Deputy Administrator Richard Capka at 12th Annual UTC Student Award Ceremony

FEMA, Defense, or Homeland Security. After gaining field experience, she intends to seek an academic position in Transportation Engineering to share her expertise with students. Pamela has maintained an outstanding academic record while pursuing innovative research, authoring numerous publications and presentations, and displaying a passionate dedication to improving transportation services for emergency situations. Pamela represented all of the SWUTC students at the USDOT special awards ceremony in Washington, DC in January 2003.

Naomi Lede Outstanding Master Student Award

Gozen Amber Basar from the University of Texas at Austin was selected as the winner of the 2003 *Naomi Ledé Outstanding Master Student Award*. Amber has been chosen to receive this award in recognition of her excellent academic, leadership and research performance while at the University of Texas at Austin.



Gozen Amber Basar

After attending school in Valbonne, France and Urbana, IL, Amber began her undergraduate studies in Civil and Environmental Engineering at the University of Illinois at Urbana-Champaign. During the summer of her junior year, she participated in the Summer Internship in Transportation at the University of Texas at Austin and decided to begin her Master's study at UT-Austin a year later. While pursing her masters degree, Amber was elected President of the Institute of Transportation Engineers at the University of Texas at Austin. During her term, she has succeeded in providing students the opportunity to examine all aspects of transportation by inviting speakers from industry, government and academia to meet with the student body. Amber's current research interests include air travel behavior and its implications; specifically, which airports and airlines passengers choose and why. Understanding the underlying reasons why air passengers make the decisions they do can aid the airlines, airports, and everyone else involved in the air transportation network to better plan facilities, schedules, ground access to airports, level of service of aircraft, etc. To put her research interests to practice, Amber teamed up with Dr. Chandra Bhat and made significant contributions to his SWUTC research

study *Air Travel: A Systematic Analysis of Traveler Choices*. Amber has recently graduated and taken a position with McKinsey and Company, an engineering consulting firm that offers travel and logistics services to airlines and airports, where she is employed as a transportation engineer.

SWUTC Ph.D. Student Award

The 2003 SWUTC Ph.D. Student Award winner was Grant Schultz from Texas A&M University. A graduate of Brigham Young University, Grant is currently pursing his Ph.D. degree in Civil Engineering at Texas A&M University. While maintaining an excellent academic record, Grant is employed as a Graduate Research Assistant at the Texas Transportation Institute and is currently working on a Texas Department of Transportation sponsored project Techniques for Managing Access of Arterials. This research work mirrors his personal areas of interest which include traffic operations, transportation planning and traffic safety. Throughout his academic and professional career, Grant has been actively involved in the Institute of Transportation engineers where he is an Associate Member and has prepared papers for presentation at the National, District, Section and Local Chapter levels. Grant is also an Associate Member of the American Society of Civil Engineers, and a member of the Golden Key National Honor Society. Grant was chosen to receive this award for his academic accomplishments, his superior research contributions and his continuing leadership in professional organizations.



Grant Schultz



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 2003 Research Highlights

SWUTC Project Simulating Pedestrian Behavior

SWUTC Project #167722/P.I. Harlow Landphair & Shawn Turner

For this SWUTC study, the driving simulator at the Texas Transportation Institute has been modified to provide the capability to model pedestrian situations. The pedestrian simulator (PedSim) is used to investigate a variety of issues related to pedestrian interaction in the roadway environment and other situations. To use the PedSim, the driving simulator test vehicle is moved to the back of the room, and the human subject replaces the car. Using a joystick, subjects can navigate a virtual world as seen from a pedestrian viewpoint. The speed and eye level are adjusted to coincide with those of a pedestrian.

The goal of this study is to help researchers and practitioners in both health and transportation fields deliver and design roadway and sidewalk environments that facilitate and encourage walking and cycling. Study researchers are looking particularly at pedestrian behavior at intersections and what their decisions are, learning more about their gap acceptance and how to signalize for visually impaired. Ultimately, results of this study will help determine how safe pedestrians actually are in various situations.

In addition to the simulator experiment, the research team is also conducting focus groups with parents of children that attend elementary schools. Topics discussed in the focus groups include children's health, walking and the perception of safety in the pedestrian environment of the neighborhood. Based on the information gathered from the focus groups, a procedure and scale will be developed for measuring the presence or absence of features that encourage or discourage walking.

What makes this research unique is the idea of a pedestrian laboratory which includes the



Subject using pedestrian simulator

simulator environment. This research will hopefully lead to the development of an outdoor facility at full scale to parallel the pedestrian simulator.



SWUTC Study Develops Deeper Understanding of Travel Behavior SWUTC Project #167522./P.I. Susan Handy

From just about all accounts, Americans are driving more than ever, not just to work, but to shopping, to school, to soccer practice and band practice, to visit family and friends, and so on. Americans also seem to be complaining more than ever about how much they drive – or, more accurately, how much everyone else drives. However, the available evidence suggests that a notable share of their driving is by choice rather than necessity. Yet the distinction between choice and necessity is not always so clear. The distinction is important, though, for policy makers. For necessary trips, planners can explore ways of reducing the need for or length of the trip or ways of enhancing alternatives to driving, and everyone benefits if the planners are successful. For travel by choice, the policy implications are much trickier and touch on basic concepts of freedom of choice.

The goal of this research project was to explore the choices that individuals and households make about driving for nonwork activities, in particular, the boundary between driving by choice and driving by necessity. Further, this exploration will develop a deeper understanding of travel behavior and provide a basis for developing policy proposals directed at reducing the growth in vehicular travel. Dr. Handy, the study's principal investigator, successfully developed a framework for categorizing the reasons for and types of excess driving and then used qualitative research techniques to test and refine this framework. The results of this study provide transportation planners additional insight into understanding travel behavior. This study also pointed to further areas for research, primarily the need to categorize the potential sources of excess driving, develop effective techniques for identifying excess driving, and quantify both the amount of excess driving and the contribution of various explanatory factors.

A technical paper generated by this study and prepared for the Transportation Research Board can be viewed at http://swutc.tamu.edu/Reports/167522TP.pdf.

SWUTC Completes "After" Evaluation of Corpus Christi Livable Communities Initiative SWUTC Project 167422/P.I. Laura Higgins

The Livable Communities Initiative (LCI) was begun in 1995 by the Federal Transit Administration (FTA), under authorization from the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA). This grant program was designed to improve mobility and community vitality by strengthening the links between



Six Points Station Transit Center after enhancements

transit facilities and neighborhoods, by improving access to jobs and education via public transportation services, and by encouraging community participation in neighborhood planning.

In the 1996 SWUTC research report *Public Transit and Livable Communities: An Evaluation of the LCI Demonstration Project in Corpus Christi*, researchers evaluated conditions in two areas of Corpus Christi before enhancements were made to the neighborhoods. One of these areas—the Six Points Station transit center—is positioned at the center of a busy hub of residential and commercial activity in downtown Corpus Christi. This neighborhood has a number of well-established businesses and the potential for attracting more, but the area had become

difficult to travel on foot or by transit. Enhancements to this area included better pedestrian connections to the transit center, such as crosswalks, street medians, and wider sidewalks; traffic calming measures; security lighting; and landscaping and building facade improvements. This current report focused on the



Six Points Station neighborhood, comparing crime rates, bus ridership, and responses from pedestrian and business surveys to the results of the "before" survey.

This study determined that overall, the LCI enhancements to the Six Points neighborhood have had positive effects, primarily relating to economic revitalization of the neighborhood and decreased crime rates. The study helped to identify areas for possible future improvements that include additional measures to reduce traffic speeds, signs to direct drivers to additional parking areas behind Six Point stores, and increased security lighting (already in progress as part of a scheduled renovation of the transit center). This report is available in it's entirety on-line at http://swutc.tamu.edu/Reports/167422-1.pdf.

SWUTC Research Provides Valuable Learning Experiences for Students

SWUTC Project #167824/ P.I. Randy Machemehl

A continuing, vital part of the SWUTC research program is to provide the opportunity to students to participate in sponsored research while completing their academic endeavors. The student gains valuable real world research experience, in addition to sharpened communication skills. The faculty - student interaction also helps to develop networking and friendships that last a lifetime.

Highlighted this year is Mr. Wei Fan, a doctoral student at the University of Texas at Austin. Mr. Fan under the supervision of Dr. Randy Machemehl participated in the research activities of the SWUTC project *Using Simulated Annealing Algorithms for Optimizing Transit Network Patterns with Variable Demand*. His work on this project has contributed significantly to the goal of minimizing overall transit system costs. Mr. Fan has systematically examined the underlying characteristics of optimal bus system routing and scheduling problems. Combining the approach that employed a genetic algorithm, a simulated annealing algorithm was employed to implement solutions to optimal bus transit network design problems. All algorithms have been identified in both ideal and practical conditions (namely, fixed demand and variable demand). A series of procedures and overall schemes have been developed. Demand equilibration procedure, network analysis procedure, and frequency setting procedure have been accomplished. A C++ program has been developed to implement a solution algorithm with variable demand using two experimental networks. Current numerical results indicate that a simulated annealing algorithm performs very well. Mr. Fan expects to graduate during the summer of 2004 with the hopes of gaining employment with a transportation engineering consulting firm.

SWUTC Research Excellence Recognized

Dr. Chandra Bhat - University of Texas at Austin

Through his three SWUTC projects to examine individual activity-travel patters and travel choice patterns, Dr. Chandra Bhat, at the University of Texas at Austin has refined a computer model of human behavior that has fundamentally changed the ability to build realistic models of behavior in a broad number of disciplines. Bhat's methods of predicting human decisions in transportation are now applied routinely to problems in economics and marketing.

His research accomplishments have also garnered Dr. Bhat an 18-month, \$230,190 grant from the National Science Foundation to study how people change their intercity and urban travel behavior in the aftermath of an extreme event, such as the tragedy of September 11, 2001. Dr. Bhat's work will document both the long- and short-term choices made by disaster victims. "The focus," says Bhat, who will collaborate with Dr. Jose Holguin-Veras of the Rensselaer Polytechnic Institute, "is to



Dr. Chandra Bhat





try to see how people have changed their behavior after 9/11. In particular, we are studying if the way people are making travel mode choices (traveling by air, rail, bus or car) between cities has changed after 9/11."

Dr. Kara Kockelman - University of Texas at Austin



Dr. Kara Kockelman (left) accepting New Faculty Award at CUTC banquet

Dr. Kara Kockelman, a key researcher for the SWUTC from the University of Texas at Austin, was the inaugural recipient of the Annual New Faculty Award. This award is sponsored by the Council of University Transportation Centers (CUTC) and American Road and Transportation Builders Association (ARTBA), recognizing "outstanding teaching and research contributions to the transportation field". She was presented with this award in Washington, D.C. in December of 2002. Dr. Kockelman has participated in the SWUTC research program since the fall of 2000. Her research projects focusing on congestion pricing and land use-transport models have produced five widely requested final technical reports.

Dr. Carol Lewis - Texas Southern University

Dr. Carol Lewis, a senior researcher for the SWUTC from Texas Southern University has been appointed to the METO Board by Houston Mayor Lee P. Brown to serve as Chairman of the Future Programs Committee. Dr. Lewis' past SWUTC research examining such issues as Transit Oriented Development, Smart Growth, The Integration of Light Rail into a Traditional Bus City and Criteria Used for Transit Friendly Decision-Making attributed to her being tapped for this appointment.

A priority for Mayor Brown is that the Board understand the urgency of making rial a key component of our transportation system completing METRO's current light rail project on time and within budget. The Board will be tasked to continue ongoing studies of future transit alternatives in major corridors and, if a study states a rail line is the best solution, work to get the voters to approve it. The Board will also be expected to ensure that Houston gets the funding it deserves for future transportation needs, and build consensus among local communities and other stakeholders in support of rail for Houston's future.

UT-Austin Doctoral Student Receives Prestigious Award for Her SWUTC Research

University of Texas at Austin student, Miss Chiung-Yu Chiu, received the 2002 C.V. Wootan Award for her policy and planning achievements presented in her doctoral dissertation, *Impacts of New Iarge Aircraft on Passenger Flows at International Airport Terminals.* She and her supervisor, Professor C. Michael Walton, have made several written and oral contributions related to her doctoral work, including the presentations, *New Large Aircraft and International Passenger Terminals: A Method for Assessing Operational Compatibility*, at the 27th International Air Transportation Conference, ASCE, Orlando Florida, in July 2002, and *Planning for New Large Aircraft Operations at International Passenger Terminals*, at the European Transport conference 2002, Cambridge, England, in September 2002. Miss Chiu was honored and received her award at the 2003 CUTC Awards Banquet, January 11, 2003 in Washington, D.C.



Chiung-Yu Chiu and Dr. Mike Walton



Technology Transfer

Current information, timely delivered to the right people is the desired outcome for the SWUTC's technology transfer program. Both educational and research program activities pursue vital aspects of technology transfer. Educationally, the student/professor relationships are the principal loci of technology transfer activities — knowledge exchanged between professor and students in classroom and research endeavors. In the research program, technology transfer outcomes are typically associated with the delivery of research products (papers, lectures, presentations, reports, video/media) — for individual research projects — to potential and interested users and colleagues. Since the fall of 1999, SWUTC research has generated 74 final technical report. SWUTC researchers and students have presented 186 technical papers at national/international forums, and published 88 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/reports.html.

Selected Technology Transfer Highlights

SWUTC Hosts Conference on Regionalism SWUTC Project #473700-00047/P.I. Khosro Godazi

Transportation is a key element in the region's economic development. Like many other regions in the country, the Houston metropolitan area depends on state and federal funds for implementing many of its transportation projects; however, funding is limited and METRO's 2003 referendum and the reauthorization of TEA-21 are key elements in future funding of the region's transportation infrastructure. In 2003, METRO expects to have the support of voters to approve a referendum that will provide needed funding for transit improvements. In 2003, TEA-21 will be reauthorized determining the funding mechanism for

financing the future of the country's transportation infrastructure for the next six years. It is also a fact that current funding levels do not match the nation's transportation needs and competition for federal and state funds is steep. As a result, public agencies are looking at alternative funding strategies.

Various regions of the country are developing innovative ways to address their transportation needs. California has a statewide freight and passenger rail plan which is attracting a tremendous amount of federal funding to the state. States in the northeast are developing a high-speed passenger rail. Dallas/Fort Worth is implementing a multi-million-dollar regional transportation system. The Alameda Corridor in Los Angeles, a public/private enterprise, has addressed the congestion of 20 miles of local automobile and rail traffic by implementing a grade separated transportation corridor. Boston's Big Dig has become an incredible engineering project if not the most expensive at over \$14 billion.

In April of 2003, the SWUTC through the Center for Transportation Training at Texas Southern University joined the TSU School of Public



Khosro Godazi provides dynamic leadership to TSU's SWUTC Technology Transfer Program



Affairs in sponsoring an Open Dialog Conference on Regionalism "Does Our Region Need a Regional Transportation Authority?" The event was held at Texas Southern University and over 120 transportation professionals, policy makers, community leaders and other stakeholders participated. This event was co-hosted by the City of Houston transportation, Technology and Information Committee. The purpose of this conference was to bring together transportation agencies to address current transportation needs in light of new national transportation initiatives, develop further cooperation between public agencies and private entities who are stake holders in the region's transportation infrastructure and create awareness about current and future transportation needs in the region.

SWUTC Graduate Student Accepts Faculty Position



Dr. Randy Machemehl and Dr. Michael Hunter

SWUTC Project 167524/P.I. Randy Machemehl

While a pursuing his Ph.D. as a participant of the Advanced Institute at the University of Texas at Austin, Michael Hunter was a key member of the research team on Dr. Randy Machemehl's SWUTC project *Adaptive Traffic Signal Control Development and Evaluation*. A project that developed a adaptive signal control algorithm that is currently being tested. And is using an innovative adaptation of a simulator called ARENA developed for manufacturing processes, as a testing facility. During his work on the project, Michael coauthored with Dr. Machemehl four technical papers and presented them to national meetings such as the Transportation Research Board and had papers published in the Transportation Research Record and the 2000 CSCE Annual Conference Proceedings.

Michael received his Ph.D. in July of 2003. After graduation he accepted a teaching position as an Assistant Professor in Environmental and Civil Engineering at Georgia Tech University. By accepting this position, Michael will be directly transferring the knowledge he acquired through the SWUTC program from his faculty-supervised research work and academic studies to a whole new set of aspiring young transportation professionals.

SWUTC Researcher Invited to Conduct Seminar on SWUTC Research Results

SWUTC Project 473700-00067/P.I. Robert Harrison

Robert Harrison from the University of Texas at Austin was invited to be a guest lecturer at Northwestern University's Transportation Center *Transportation/Logistics Seminar Series* on May 15, 2003. Mr. Harrison's presentation *Allowing Full Cross-border Access to Mexican and U.S. Truckers* is based on his SWUTC research work and technical report titled *Opening the Border to Cross-National Traffic: the Texas Perspective.*

His presentation to students and faculty at Northwestern University focused on the issues associated with opening the Texas-Mexico border to cross-national truck traffic. Economic, environmental, social and safety issues illustrated the possible benefits and costs for the citizens of Texas. The study concluded that an open border produces winners and losers. Although an open border will be a net benefit fo the state, transportation-dependent border economies will suffer in the short-term once open border trucking operations take effect.



A complete copy of Mr. Harrison's technical report on this subject can be viewed in it's entirety at http://swutc.tamu.edu/Reports/473700-00067-1.pdf.

New Web Site Developed by SWUTC Research

SWUTC Project 473700-00007 & 473700-00009/P.I. Russell Henk

A new SWUTC website was recently deployed to disseminate information gathered by two SWUTC projects that shared the common theme of: (1) maximizing the full potential of our transportation infrastructure during major emergencies; and (2) how best to balance the "recurrent" needs of the general public and commerce with the "emergency" needs that are regional and/or national in scope. This web site focuses upon providing information to users concerning emergency evacuation/response and issues affecting homeland security. The website accomplishes this mission by addressing two key items in the topic area of transportation system management during major emergencies. First, the website identifies key operating agencies and related entities–namely, the new Department of Homeland Security and in the area of military deployment, the United States Transportation Command (USTRANSCOM). Secondly the website presents current state-of-the-practice in research and development activities. For instance, the development of evacuation traffic information systems (ETIS) represents ongoing efforts to develop a tool for forecasting travel demands in "real-time" for a large regional transportation network. Traffic management centers (TMCs) are a key source of real-time data available to feed such systems and/or tools as ETIS. This new website can be viewed at http://transportationsecurity.tamu.edu.

RSPA Acting Administrator Visits the SWUTC

On May 1 of 2003, the SWUTC had the opportunity to present to Mr. Sam Bonasso, Acting Administrator of USDOT's Research and Special Programs Administration, a summary of SWUTC activities and the numerous research capabilities of the Texas Transportation Institute. Included in the afternoon long session was an overview of SWUTC research and education achievements. A presentation by Debbie Jasek addressed the SWUTC transportation and educational outreach programs. Also, Mr. Bonasso (a former professor at the University of West Virginia) was shown an overview of some current TTI activities such as Dr. Roger Bligh's crash test work on the protection of facilities and transportation infrastructure. Additional tours of various TTI facilities including the Translink laboratory and the driving simulator completed Bonasso's visit.

New Projects

Number: 473700-00013 Title: *Port of Houston Maritime Security Study* P.I.: Steve Roop/David Bierling, TAMU

Number: 473700-00015 Title: *Modeling Passenger Car and Truck Interaction* (2nd year continuation of 167427 funded in FY02) P.I.: Larry Rilett, TAMU

Number: 473700-00046 Title: *An Examination of Successful Mixed Used in Transit Oriented Development* P.I.: Carol Lewis, TSU

Number: 473700-00047 Title: *Conference on Regionalism* P.I.: Khosro Godazi, TSU

Number: 473700-00068 Title: *Strategic Transportation Challenges and Issues Facing US Agriculture and Rural Industry: A Methodology to Prioritize Rural Transportation Needs* P.I.: Rob Harrison, UT-Austin

Number: 167721 Title: *3D Visualization as a Tool to Evaluate Sign Comprehension* P.I.: Sue Chrysler, TAMU

Number: 167722 Title: Correlates of Environmental Constructs and Perceived Safety Enhancements in Pedestrian Corridors Adjacent to Urban Streets P.I.: Harlow Landphair/Shawn Turner, TAMU

Number: 167723 Title: *Develop a Transportation Career Guide for the Non-Traditional Student* P.I.: Debbie Jasek, TAMU Number: 167724 Title: *Methodology for the Development of Binational Driver and Vehicle Databases* P.I.: Juan Carlos Villa, TAMU

Number: 167725 Title: *Quantifying Access Management Performance Measures and Incorporating Them into the Transportation Planning Process* P.I.: Bill Eisele/Larry Rilett/Bill Frawley, TAMU

Number: 167726 Title: A Guide to Intelligent Strategies for Transportation Infrastructure Protection and Transportation Security-Related Research P.I.: Shaw-Pin Miaou/Russell Henk, TAMU

Number: 167820 Title: *Analysis and Modeling of Individual Activity Travel Patterns During Weekends* P.I.: Chandra Bhat, UT-Austin

Number: 167821 Title: *Evolving Maritime Corridors and their Port Networks: Enhancing and Securing Hemispheric Trade with the Southwest Region* P.I.: Leigh Boske, UT-Austin

Number: 167822 Title: Investigation of Credit-Based Value Pricing of Congested Roadways P.I.: Kara Kockelman, UT-Austin

Number: 167823 Title: *Adaptive Traffic Signal Control Development and Evaluation* (Continuation of 167524 funded in FY02, 167224 funded in FY 01 & 167805 funded in FY00)

P.I.: Randy Machemehl, UT-Austin

Number: 167824 Title: Using Simulated Annealing Algorithms for Optimizing Transit Network Patterns with Variable Demand

P.I.: Randy Machemehl, UT-Austin



Number: 167825 Title: *Disaster and Major Emergency Management Using Dynamic Modeling Approaches and ITS Technologies* (Continuation of 167528 funded in FY02) P.I.: Hani Mahmassani, UT-Austin

Number: 167826 Title: *Modeling Environmental Impacts of Intelligent Transportation System Approaches* P.I.: Hani Mahmassani, UT-Austin

Number: 167827 Title: *Methodology for Quantifying Pavement Damage Caused by Different Axle and Load Configurations* P.I.: Jorge Prozzi, UT-Austin

Number: 167828 Title: *Framework for ITS Deployments to Enhance Safety of Our Highway System* P.I.: C. Michael Walton, UT-Austin

Number: 167829 Title: *Analyzing the Impact of Traffic on Air Quality with GIS* P.I.: C. Michael Walton, UT-Austin

Number: 167830 Title: *An Identification of Equipment Needs at Marine Terminals for Efficient Handling of Cargo* P.I.: C. Michael Walton, UT-Austin

Number: 167832 Title: *Develop a Dynamic System to Simulate the Life-Cycle Performance of Pavements* (Continuation of 167533 funded in FY02, 167232 funded in FY01 & 167803 funded in FY00) P.I.: Zhanmin Zhang, UT-Austin

Number: 167920 Title: *Evaluation and Combined Use of TRANSYT-7F and CORIM in Traffic Signal Optimization and Simulation* (Continuation of 473700-00045 funded in FY02) P.I.: Lei Yu, TSU Number: 167921 Title: *An Evaluation of Environmental Justice Programs: Laws and Issues that Affect Minority and Low-Income Populations* P.I.: Edward Owens, TSU

Number: 167922 Title: *Procedures for the Implementation of a Transportation Scholars Program* P.I.: Ron Goodwin/Sharon Boxill, TSU

Number: 167923 Title: *An Evaluation of 3-D Traffic Simulation Capabilities* P.I.: Sharon Boxill, TSU

Ongoing Projects

Number: 473700-00007 Title: Evaluate Strategies for Using the Transportation Management Infrastructure in the Role of National Defense Preparedness P.I.: Russell Henk, TAMU

Number: 473700-00009 Title: Assess the Potential of Transportation Management Centers in Improving Hurricane Evacuation Operations P.I.: Russell Henk, TAMU

Number: 473700-00011 Title: *Current and Future Rail Access Corridor Needs of Southern Texas Ports* P.I.: David Bierling, TAMU

Number: 473700-00043 Title: *The Integration of GIS and Transportation Modeling: A State-of-the-Practice Review* P.I.: Sharon Adams, TSU

Number: 473700-00045 Title: *Evaluation and Combined Use of TRANSYT-7F and CORIM in Traffic Signal Optimization and Simulation* P.I.: Lei Yu, TSU

Number: 473700-00065 Title: *Emerging Models for Provision of Real-Time Traveler Information Services: Transportation System Management Implications* (Project funded in FY02 & FY01) P.I.: Hani Mahmassani, UT-Austin

Number: 167121 Title: *Evaluation of the Economic Growth, Air Quality and Noise Impacts of Regional Jet Service at Commercial Airports Serving Small Cities* P.I.: Jeff Borowiec, TAMU

Number: 167127 Title: *Commercial Transportation Safety and Operations Workshop* P.I.: James Ochoa/Dan Middleton, TAMU Number: 167224 Title: *Adaptive Traffic Signal Control Development and Evaluation* (Continuation of 167805 funded in FY00)

P.I.: Randy Machemehl, UT-Austin

Number: 167225

Title: *Characterizing Transit Passenger Access Decisions* (Continuation of 167806 funded in FY00) P.I.: Randy Machemehl, UT-Austin

Number: 167228

Title: Integrating Real-Time Information with Dynamic Fleet Decision Systems for Intermodal Freight Mobility (Continuation of 167807 funded in FY00) P.I.: Hani Mahmassani, UT-Austin

Number: 167232 Title: *Develop a Dynamic System to Simulate the Life-Cycle Performance of Pavements* (Continuation of 167803 Funded FY00) P.I.: Zhanmin Zhang, UT-Austin

Number: 167320 Title: *Analysis of Texas' Speed Limit Laws and Fatality Accident Rates* P.I.: Ron Goodwin/Sharon Boxill, TSU

Number: 167321 Title: *An Evaluation of Alternative Fuels Usage by Public Transit Agencies* P.I.: Ron Goodwin, TSU

Number: 167322 Title: An Assessment of Examination Criteria Used for Transit Friendly Decision-Making P.I.: Carol Lewis, TSU

Number: 167421 Title: *Dissemination of Data and Training in the Analysis of Critical Transportation Planning Information for Small Texas Cities and Counties* P.I.: David Ellis, TAMU

Number: 167423

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Title: Develop a Transportation Road Show and Library of Promotional and Marketing Materials to Encourage Development of a Transportation Workforce

P.I.: Debbie Jasek, TAMU

Number: 167424 Title: *Providing Personalized Traffic Safety Information to the Public Using Web-Based Geographical Information System (Web-GIS) Technologies* P.I.: Shaw-Pin Miaou, TAMU

Number: 167427 Title: *Simulation Modeling of Passenger Car and Truck Interaction* P.I.: Larry Rilett, TAMU

Number: 167520 Title: *Air Travel: A Systematic Analysis of Traveler Choices* P.I.: Chandra Bhat, UT-Austin

Number: 167521 Title: *Making Transportation Corridors Work: The Potential for Integration Roundtables at Southwest Seaports* P.I.: Leigh Boske, UT-Austin

Number: 167522 Title: *The Case of the Soccer Mom and Other Stories: Travel by Choice or Necessity?* P.I.: Susan Handy, UT-Austin

Number: 167524 Title: *Adaptive Traffic Signal Control Development and Evaluation* (Continuation of 167224 funded in FY 01 & 167805 funded in FY00) P.I.: Randy Machemehl, UT-Austin

Number: 167525 Title: *Optimizing Transit Network Patterns* P.I.: Randy Machemehl, UT-Austin

Number: 167526 Title: *Real-Time Integrated Management of Intermodal Fleet Operations* (Continuation of 167228 funded in FY01 & 167807 funded in FY00) P.I.: Hani Mahmassani, UT-Austin

Number: 167527 Title: *Shipper and Carrier Participation in Electronic Marketplaces and Implications for Freight Logistics* P.I.: Hani Mahmassani, UT-Austin Number: 167528 Title: *Disaster and Major Emergency Management Using Dynamic Modeling Approaches and ITS Technologies* P.I.: Hani Mahmassani, UT-Austin

Number: 167533 Title: *Develop a Dynamic System to Simulate the Life-Cycle Performance of Pavements* (Continuation of 167232 funded in FY01 & 167803 funded in FY00) P.I.: Zhanmin Zhang, UT-Austin

Number: 167620 Title: *A Longitudinal Assessment of the Relationship Between Land Use, Land Values, and Bus Facilities* P.I.: Carol Lewis, TSU

Number: 167621 Title: *An Evaluation of 3-D Traffic Simulation Modeling Capabilities* P.I.: Sharon Boxill, TSU

Number: 167622 Title: *Analysis of Federal and State Discretionary Funding of Highway and Transit Projects* P.I.: Ron Goodwin, TSU

Number: 167703 Title: *Developing a Sketch-Planning Technique Relating Economic Activity and Urban Mobility in Small and Medium-Sized Urban Areas* P.I.: David Schrank, TAMU

Number: 167705 Title: *An Assessment of U.S.-Mexico Trade Corridors and Border Infrastructure Development* P.I.: Felipe Zambrano, TAMU

Number: 167709 Title: *Carbon Dioxide Emission Reductions Through the Use of Fly Ash in Concrete Production* P.I.: Cindy Estakhri/John Overman, TAMU

Number: 167803 Title: *Develop a Dynamic System to Simulate the Life-Cycle Performance of Pavements* P.I.: Zhanmin Zhang/Ron Hudson, UT-Austin Number: 167805 Title: *Adaptive Traffic Signal Control Development and Evaluation* P.I.: Randy Machemehl, UT-Austin

Number: 167806 Title: *Characterizing Bus Transit Passenger Boarding and Deboarding Processes* P.I.: Randy Machemehl, UT-Austin

Number: 167807 Title: Integrating Real-Time Information with Dynamic Fleet Decision Systems for Intermodal Freight Mobility P.I.: Hani Mahmassani, UT-Austin

Number: 167809 Title: From Information to Knowledge: Strategies and Techniques for Mining Real-Time Traffic Data Bases P.I.: Hani Mahmassani, UT-Austin

Number: 167900 Title: A Comparative Assessment of Emerging Transportation Techniques: A Seminar for Professional and Student Exchange P.I.: Khosro Godazi, TSU

Number: 167903 Title: *Evaluation of the Potential to Link Rural Communities with their Urban Neighbors* P.I.: Ron Goodwin, TSU

Number: 466610 Title: *Public Transportation for the Colonias* P.I.: Dock Burke, TAMU



Completed Projects

Number: 473700-00005 Title: *Examining Information Needs for Efficient Motor Carrier Transportation Logistics* P.I.: Bill Eisele/Larry Rilett, TAMU

Number: 473700-00042 Title: *An Examination of the Smart Growth Initiative and Its Application to Region VI Communities* P.I.: Carol Lewis, TSU

Number: 473700-00044 Title: *State of the Industry Overview - A Transit-Oriented Development Conference* P.I.: Carol Lewis/Khosro Godazi, TSU

Number: 473700-00062 Title: *Inland Ports and their Contribution to Transportation Efficiencies* P.I.: Rob Harrison, UT-Austin

Number: 473700-00063 Title: *Evaluating Operating Strategies and Transportation Control Measures which Reduce Air Pollution at Airports* P.I.: C. M. Walton, UT-Austin

Number: 473700-00064 Title: *Real-Time Traveler Information Systems for Non-Commuting Trips* P.I.: Hani Mahmassani, UT-Austin

Number: 473700-00065 Title: *Emerging Models for Provision of Real-Time Traveler Information Services: Transportation System Management Implications* P.I.: Hani Mahmassani, UT-Austin

Number: 473700-00066 Title: Using the Gulf Intracoastal Waterway (GIWW) to Move Containers to Gulf Ports P.I.: Rob Harrison, UT-Austin

Number: 473700-00067 Title: *Monitoring U.S. Safety Rules for Mexican Trucks* P.I.: Rob Harrison, UT-Austin Number: 167122 Title: Vanpools as Alternative to Fixed-Route Service P.I.: Laura Higgins, TAMU

Number: 167123 Title: *Develop a Transportation Science Competition and Career Fair for Junior High and High School Students* P.I.: Debbie Jasek/Beverly Kuhn, TAMU

Number: 167124 Title: *Adaptive Equipment to Enhance Older Driver Performance* P.I.: Rodger Koppa, TAMU

Number: 167125 Title: *Development of Integrated Rollover Warning and Active Control Systems (RWCS) for Tractor-Semitrailers* P.I.: Reza Langari/James Ochoa, TAMU

Number: 167126 Title: *Identification and Evaluation of In-Vehicle Distractors on Driving Performance* P.I.: Michael Manser, TAMU

Number: 167128 Title: *Sustainable Transportation Performance Measures for Developing Communities* P.I.: Josias Zietsman, TAMU

Number: 167130 Title: *A Proposal to Conduct an Institute to Prepare High School Students for Transportation Careers in Texas* P.I.: Naomi Ledé, TAMU

Number: 167220 Title: A Methodology to Analyze the Effectiveness of Roadway Pricing Control Strategies Using Travel Survey Data P.I.: Chandra Bhat, UT-Austin

Number: 167222 Title: *The Education of Transportation Professionals* P.I.: Susan Handy, UT-Austin Number: 167229 Title: *Design and Implementation of an Intelligent Parking System for a Major Activity Center* (Continuation of 167811 funded FY00) P.I.: C. Michael Walton, UT-Austin

Number: 167230 Title: *Impact of New Large Aircraft on Arrival Passenger Flows at Airport Terminals* P.I.: C. Michael Walton, UT-Austin

Number: 167231 Title: *Restricting the Use of Reverse Thrust as an Emissions Reduction Strategy for Airports* P.I.: C. Michael Walton, UT-Austin

Number: 167223 Title: *Uncertainty in Integrated Land Use-Transport Models* P.I.: Kara Kockelman, UT-Austin

Number: 167422 Title: *Public Transit and Livable Communities: Corpus Christi After Evaluation* P.I.: Laura Higgins, TAMU

Number: 167425 Title: *Pedestrian Health and Safety: Case Studies and Simulation* P.I.: Jody Naderi, TAMU

Number: 167426 Title: *Development of an Integrated Assessment of Transportation Data for the Texas-Mexico Border Region* P.I.: Cesar Quiroga, TAMU

Number: 167523 Title: *Uncertainty in Integrated Land-Use Transport Models: Simulation and Propagation* (Continuation of 167223 funded in FY01) P.I.: Kara Kockelman, UT-Austin

Number: 167529 Title: *Regional Impacts on Congestion Pricing* P.I.: C. M. Walton, UT-Austin Number: 167530 Title: *Evaluating the Performance of Arrival Passenger Processing Facilities for Increasing Aircraft Size* (Continuation of 167230 funded in FY01) P.I.: C. M. Walton, UT-Austin

Number: 167531 Title: *The Use of ITS Technologies to Improve Transport Efficiency for an Aging Population* P.I.: C. M. Walton, UT-Austin

Number: 167701 Title: An Internet Clearinghouse of Marine and Intermodal Information for Sustainable Transportation and Economic Development P.I.: John Basilotto, TAMU

Number: 167702 Title: An Analysis of the Market Potential for Distance Learning Opportunities in Transportation Professional Development P.I.: Beverly Kuhn, TAMU

Number: 167704 Title: *Transportation and Tourism Workshop* P.I.: Katie Turnbull, TAMU

Number: 167706 Title: *The Contribution of Hand-Held Cellular Phones to Vehicular Accidents* P.I.: Jason Crawford, TAMU

Number: 167707 Title: *Comprehensive Engineering Approach to Achieving Safe Neighborhoods* P.I.: James Bonneson, TAMU

Number: 167708 Title: *Automated Identification of Flow Patterns in Congested Traffic* P.I.: Paul Nelson, TAMU

Number: 167711 Title: *Agenda Setting in the Transportation Policy Domain* P.I.: Eric Lindquist, TAMU



Number: 167800 Title: *A Joint Model System of Mode Choice, Destination Choice, and Departure Time Choice for Nonwork Trips* P.I.: Chandra Bhat, UT-Austin

Number: 167801& 167221 Title: Impact of Latin American Trade on the Southwest Region's Economic Growth Prospects and Transportation System P.I.: Leigh Boske, UT-Austin

Number: 167802 Title: *Understanding the Growth in Nonwork VMT* P.I.: Susan Handy, UT-Austin

Number: 167804 Title: *The Propagation of Uncertainty in Multi-Stage Transport Demand Models* P.I.: Kara Kockelman, UT-Austin

Number: 167808 &167227 Title: Freight Transportation and Logistics Implications of Electronic Commerce and Virtual Supply Chains P.I.: Hani Mahmassani, UT-Austin

Number: 167810 Title: *The Implications of Data Usage and Privacy on ITS Organizations* P.I.: C. M. Walton, UT-Austin

Number: 167811 Title: *Intelligent Parking Systems* P.I.: C. M. Walton, UT-Austin

Number: 167901 Title: *Travel Demand Forecasting Models: A Comparison of EMME2/QRS* P.I.: Lei Yu, TSU

Number: 167902 Title: An Assessment of the Procedures for Integrating Taxicabs into an Urban Environment P.I.: Ron Goodwin/Carol Lewis, TSU

Funding Sources & Expenditures



Distribution of Funds



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