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ESITAC

Safety, Infrastructure Renewal, and Environmental

Eastern Seaboard Intermodal Transportation Applications Center E-Newsletter

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Director's Welcome

I am glad to present the first issue of the ESITAC e-newsletter. We are honored to receive funding from RITA to establish a Tier II UTC at Hampton University's School of Business. Our Center's theme is *to enhance regional intermodal transportation systems by improving safety and efficiency while minimizing environmental impacts*. The goal is to implement a comprehensive program of research, education, and technology transfer through a unique multiparty arrangement.

Our Strategic Plan was approved in December 2007. Since then, the Center has been engaged with planning and organizing activities that have been proposed in the approved Plan. It has assembled a multidisciplinary team of scholars from aviation, business, and engineering to implement the program's activities. An important accomplishment in March 2008 was forming the Transportation Steering and Research Selection committees. The Transportation Steering Committee serves as an advisory body to govern activities of the Center. The Research Selection Committee will assist and advise the Center on selection of research projects that fit the theme, expertise of the University, and the regional needs. Both these committees consist of University representatives, and external transportation experts from federal, state and city governments, and transportation industries. We received encouraging responses from the committee members who are listed in subsequent sections of this newsletter.

The research at ESITAC will be conducted by Hampton University researchers. Currently, our research efforts are focused on safety, infrastructure renewal, and environmental stewardship. We are concurrently implementing transportation education, training, and workforce development programs.

I encourage you to review the articles presented in this newsletter, and contact us if you need more information. You are welcome to visit our website for updated information on ESITAC's activities.

Kelwyn D'Souza, Ph.D.
Director, ESITAC, School of Business
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About ESITAC

Hampton University has been awarded funding from the Research and Innovative Technology Administration (RITA), U. S. Department of Transportation (DOT) to implement and operate a University Transportation Centers Program (Tier II UTC). The Eastern Seaboard Intermodal Transportation Applications Center (ESITAC) located in Hampton Roads, will utilize resources of the University in partnership with state and city governments, private industries, regional universities, and local transit organizations to conduct research on current transportation problems facing this Region, and provide students with special emphasis on minorities and women, the opportunities to pursue transportation careers. This Region is at the crossroad of air, rail, road, and water modes providing intermodal transportation systems for passengers and freight. The recent growth in all these modes of transportation has added pressure on our highways and environment, resulting in traffic congestion and air pollution. The Center will address these challenges through a combination of research, education, and technology transfer programs. The goal is to advance U. S. technology and expertise in transportation that will provide safe, secure, efficient, and interconnected transportation systems.

The Center's main research and technology focus is on safety, infrastructure renewal, and environmental stewardship. The research programs will be integrated with the University's existing transportation curricula to offer students from varied disciplines an interdisciplinary transportation education. The research results and education modules produced by the Center will be disseminated within the Region and nationwide to users and decision makers involved with the design of safe and environmentally clean transportation systems. Additionally, the Center will create a model and the resources for further development of the Region's universities in transportation.

Please visit our website for up to date information.

ESITAC Directory

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Dr. Sid Credle	Budget Executive	Credle	757-727-5472
Dr. Kelwyn D'Souza	Center Director	Dsouza	757-727-5037
Mr. Carey Freeman	Associate Director	Freeman	757-727-5519
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ESITAC Committees

The **Transportation Steering Committee** will advise the Center on establishing project goals and implementation schemes, coordinating of partnership activities, and funding opportunities. The following is a list of Transportation Steering Committee members.

Member	Title/Organization
Dr. Moges Ayele	Senior Liaison for Higher Education, FHWA, USDOT.
Mr. Michael Chapman	Assistant Deputy Director for Aerospace Testing, NASA Langley
Dr. Sid Credle	Dean, School of Business, Hampton University
Dr. Michael Demetsky	Professor and Chair, Civil & Environmental Engineering, UVA
Dr. Kelwyn D'Souza	ESITAC Director, Hampton University
Mr. David Gehr	Senior Vice President, Parsons Brinkerhoff
Dr. Asad J. Khattak	Frank Batten Endowed Chair Professor, Civil & Environmental Engineering Department, Old Dominion University
Dr. Eric Sheppard	Dean, School of Engineering and Technology, Hampton University
Mr. Everett Skipper	Director, Department of Engineering, City of Newport News
Mr. Michael Sprinkel	Associate Director, Virginia Trans Research Council, VDOT
Dr. Roger Stough	Associate Dean for Research, Dev, and External Relations, GMU
Mr. Bill Thomas	Associate Vice President, Gov Relations, Hampton University

The **Research Selection Committee** will assist and advise the Center on selection of research projects that fits its theme, personnel expertise, and the regional needs. The Center's Associate Director (Research) will serve as Chairperson of the Committee. The following is a list of Research Selection Committee members.

Member	Title/Organization
Dr. Guzin Akan	City Transportation Engineer, City of Norfolk, Division of Transportation
Dr. Jale Akyurtlu	Associate Director (Research), ESITAC, Hampton University.
Mr. Lynn Allsbrook	Traffic Engineer and Operations Manager, City of Hampton, Dept of Public Works
Mr. Thomas Ballou	Virginia Department of Environmental Quality (VDEQ).
Mr. Lorenzo Casanova	Programs and Technology Engineer, FHWA, Virginia District Office
Ms. Lisa Colbert	FTA, Head Office, Washington D. C.
Mr. Jim Ponticello	Air Quality Program Manager, VDOT
Dr. Camelia Ravanbakht	Principal Transportation Eng, Hampton Roads Planning District Commission
Dr. Stephen Sharp	Research Scientist, Virginia Transportation Research Council, VDOT
Dr. John Sokolowski	Research Professor and Director of Research, Virginia Modeling and Simulation Center, ODU

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Research Proposals

The ESITAC outreached towards its partners to identify research areas that support the national strategy for surface transportation research related to safety, infrastructure renewal, and environmental stewardship. Our research team visited city transportation divisions in the Region, VDOT, and VDEQ to identify potential research areas. Dr. Jale Akyurtlu, Associate Director for Research and the other research team members are finalizing proposals for presentation to the Research Selection Committee. These research proposals will be evaluated based on predetermined criteria. A summary for each of the proposed research follows:

Safety

The objective of this proposed research is to develop statistical predictive models for vehicular traffic accidents at signalized intersections in the City of Norfolk, VA. The current studies show that traffic accidents are largely caused due to traffic volume and driver actions. However, the reviewed literature indicates that intersection topography/design factors and traffic management rules may also contribute significantly to traffic accidents. A pilot study conducted in the City by Hampton University's Transportation Center in 2005-2006 showed that these factors may be contributing to the traffic accidents at signalized intersections. Hence, there is a need to conduct further investigation of these controllable factors that cause traffic accidents at the intersections. The proposed research will expand upon the work completed in the pilot study, and delineate significant controllable factors contributing to traffic accidents at signalized intersections in the City.

The major deliverables from the proposed research will include the following:

A list of signalized intersection topographical/design and traffic management factors which show significant correlation with the traffic accidents in the City.

A predictive statistical model for the traffic accident rate which would include the significant topographical/design and traffic management factors.

Infrastructure Renewal

The objective of this proposed research is to utilize Non-Destructuve Testing Technologies (NDT) for monitoring the structural health of two bridges in the Region. 1. A bridge on I-164 at the Coast Guard Blvd. in Portsmouth, VA. It is located in an area of heavy cargo transportation. In 2004, the average daily traffic on the bridge was 11,337 with 4% truck traffic. 2. A bridge in the city of Williamsburg handling an average daily traffic of 2,230 vehicles with 5% daily average of truck traffic according to 2004 data.

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The study will involve monitoring the health of metal and non-metal (e.g. concrete) bridge structural components using NDT of Acoustic Emission (AE).

The major deliverables from the proposed research will include the following:

Establish inspection procedures and methodology based on the studies during lean and peak traffic intervals. Investigate the role of thermal factors and incorporate them in the inspection procedures.

Provide analysis and research procedures including simple bridge health grading criteria.

Simplify the AE technology application for VDOT data review and decision making such that if problems are identified with AE, a dedicated system could be put into place for online monitoring.

Environmental Stewardship

The proposed project will measure and estimate through the use of models, the NO_x concentrations over the area adjacent to a major roadway. The NO_x emissions that will be monitored and predicted are expected to be higher than the values measured by the stationary monitoring stations. These results will be highly useful in determining the possible health and environmental effects of these emissions and will help in determining possible land use restrictions in areas adjacent to major roadways, and prediction of the effects of transportation policies on the air pollution that may affect the health of sensitive populations who are living in close proximity to roadways.

The major deliverables from the proposed research will include the following:

A mobile NO and NO_2 measurement unit with the associated weather monitoring instrumentation.

Coordinated measurements of NO and NO_2 concentrations and meteorological conditions at varying distances from the roadway, together with the traffic volume and vehicle type data.

CALINE4 results to estimate the NO_2 concentrations at receptors located at the measurement points.

Analysis of data obtained to elucidate the adequacy of CALINE4 in predicting the local NO_2 concentrations near roadways and perform a sensitivity analysis to suggest possible improvements.

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Highlight

Transportation Education

The School of Business at Hampton University offers transportation technology and management curriculum through existing course work and co-ops/internships in transportation organizations. During the spring 2008 semester, the School offered a Logistics and Transportation Management course at the MBA level. This course focused on logistics and supply chain management applicable to air, surface, and water transportation modes. The course used business settings to explain transportation models. The course material was delivered mainly through case studies in logistics and transportation management. Twenty-nine graduate students attended this course conducted by Dr. Sharad Maheshwari, Associate Director for Technology Transfer. The School has recently received funding from Prudential Financial to enhance its computer technology in the electronic classroom and computer laboratory used in the conduct of graduate transportation courses and research projects.

Graduate Students in the Logistics and Transportation Management Course making Case Presentations.

Workforce Development

As a leading Historically Black College and University (HBCU), Hampton University has been designated to establish a Dwight D. Eisenhower Transportation Fellowship Program to advance transportation workforce development. The Department of Aviation and Department of Management students have participated in the Dwight D. Eisenhower Transportation Fellowship Program since the early 1990's.

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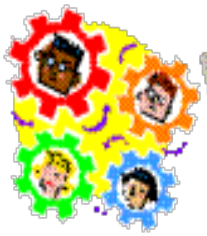
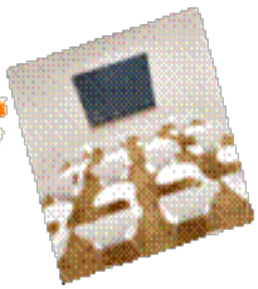
The purpose of this fellowship is to provide students with additional opportunities to enter careers in transportation. Our Dwight D. Eisenhower Transportation Fellowship graduates are employed at various levels in the transportation industry, from Airport Management and Air Traffic Control, to FHWA Regional Offices. The ESITAC assisted the Aviation Department in identifying and selecting students for this fellowship program. The following table shows the number and amount of fellowships that have been awarded during the past three years.

Academic Year	Number of Fellowships	Amount of Fellowships
2008-2009	3	$22,500
2007-2008	4	$20,000
2006-2007	3	$45,000

Transit Interns

Training a student to be successful in the transportation field cannot be accomplished by classroom lectures alone. On-site experience-based learning is an essential component of the training process, and co-op/internship has proven to be an effective method to achieve this goal. Recognizing the importance of on-site experience-based learning and with a focus on increasing transit ridership, the Center developed a transit internship program in collaboration with Hampton Roads Transit (HRT). The objective of the internship is to supplement student classroom knowledge through independent projects conducted under the guidance of HRT mentors.

Two students from the School of Business participated in the transit internship program at HRT in spring 2008. One of the students interned in HRT's Accounts and Finance Department concentrating on grants and fund management projects. The other student interned in HRT's Organizational Development Department in the area of statistical reporting. Both students acquired transit work experience and an opportunity to use state-of-the art software programs.

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Spring 2008 Transit Interns: Mr. Devin Jones (left) and Mr. Richard Nelson (right) at HRT Hampton location.

87th Annual TRB

For each of the last three years, Hampton University students have been selected to present their research to the Transportation Research Board (TRB). According to the TRB, more than 10,000 transportation professionals from around the world gather in Washington, D.C., to participate in the world's largest forum designed specifically for formal and informal exchanges of information among transportation researchers and practitioners. Our students thrive in this competitive transportation environment.

Ms. Whitney Blackburn, a senior Aviation Management major attended the 87th annual TRB Conference in Washington D.C. on January 13-17, 2008. She participated in transportation related seminars, ranging from aviation to the evolution of rail systems. She presented her research at an afternoon poster session. Whitney's research focused on the increase usage and congestion of airports as well as what needs to be done to help achieve airport expansion. Her research project illustrated how important it is for airports to grow and expand as their usage increases.

Whitney's research led her to suggest the following possible solutions for the airport systems problems:

1. Get airlines involved in airport expansion by way of incentives.

2. Exhaust all revenue making opportunities by installing people traffic counters in airport terminals. This will allow airport management to charge the maximum amount of rent for high traffic areas.

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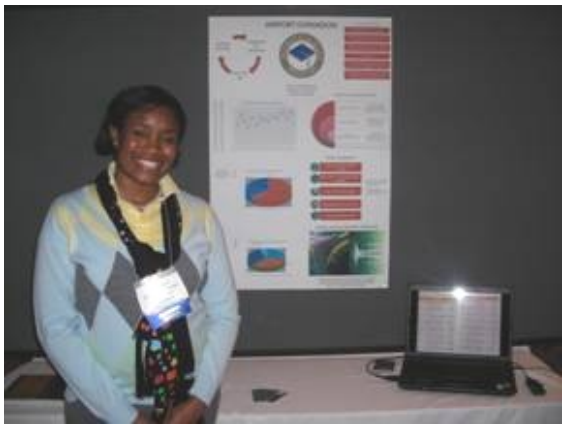
Ms. Blackburn was successful in finding additional funding sources at the TRB convention, the American Association of Airport Executives Convention and the Global Airport Expansion Conference.



Whitney Blackburn with the Research Poster at the TRB Conference

Student Research

Mr. Christopher Santiago, a chemical engineering sophomore works with ESITAC researchers, Drs. Ates and Jale Akyurtlu, on modeling of the dispersion of transportation pollutants on I-64. In Spring 2008, he did research on air pollution modeling and the equipment needed to measure pollutants. Mr. Santiago will be involved in collecting traffic data, making environmental measurements, and doing a literature search. This will help implementation of research into education and increase awareness of issues involved in making transportation policy decisions.

Mr. Christopher Santiago, a Chemical Engineering Sophomore making a Presentation on Air Pollution Modeling

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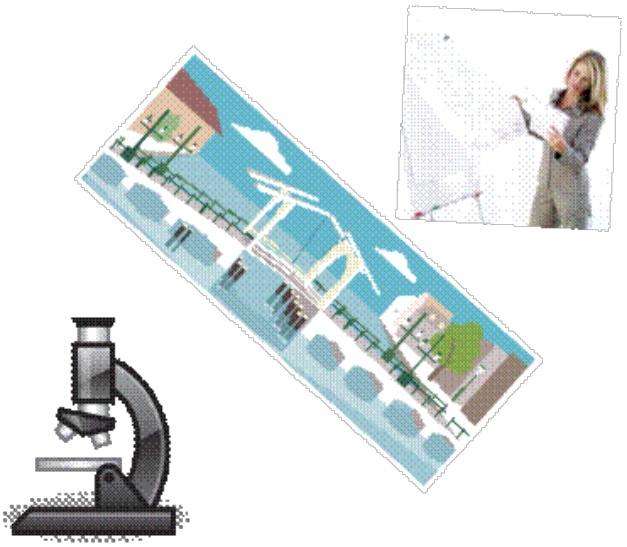
Ongoing Research Project -- Evaluation of Bridge Cables

With 14% - 16% of highway bridges falling into the *functionally obsolete and structurally deficient* categories, there is a need to develop advanced technologies that structural engineers may utilize for health assessment and monitoring of highway bridges. The ESITAC has taken a lead in this important research area by contracting with the Virginia Transportation Research Council (VTRC) to conduct a study on the *Short term Evaluation of Bridge Cables Using Acoustic Emission Sensors*. This contract, fully funded by VTRC is being implemented by ESITAC researcher, Dr. Devendra Parmar. The on-going study focuses on the Varina-Enon Cable Stay Bridge in Virginia to determine corrosion on single stay cables and evaluation of signature sounds from cables. The Acoustic Emission (AE) technique is being used on the bridge to investigate fatigue, corrosion, initiation of cracks and imperfections.

Varina- Enon Cable Stay Bridge.



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Ates Akyurtlu is a professor of Chemical Engineering and serves as Department Chair. His Ph.D. degree in chemical engineering is from the University of Wisconsin at Madison. His research areas are reacting flows (combustion, propulsion), catalytic reactions relevant to environmental cleanup (SO_2 and NO_x removal from stationary and mobile sources, catalytic wet oxidation), alternative energy resources (production of liquid fuels and /or chemicals from coal gas, biomass gas, and natural gas; reforming of diesel and kerosene for hydrogen production), and hydrogen storage in solids. He is a Co-PI in the NASA-funded HU Aeropropulsion Center. He is the founding advisor of the Hampton University Student Chapter of the American Institute of Chemical Engineers (AIChE).

Jale F. Akyurtlu is a professor at the Chemical Engineering Department. She has a Ph.D. in Chemical Engineering from the University of Wisconsin at Madison. Her research interests are in chemical reaction engineering; modeling of chemical reactors; catalytic and noncatalytic gas-solid reactions; above topics related to coal, general energy and environmental research; application of general purpose and design software to chemical engineering calculations; and undergraduate education in nanotechnology. Recently, she has performed research on Development of a Novel Catalyst for NO Decomposition, Development of Improved Catalysts for the Selective Catalytic Reduction of Nitrogen Oxides with Hydrocarbons, Zeolite-Supported Ruthenium Catalysts for Carbon Monoxide Hydrogenation Reaction, and Reforming of diesel fuel and jet fuel for hydrogen production, funded by DOE, NSF and NASA, respectively.

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Dr. Jale F. Akyurtlu is also the principal investigator on a project to introduce undergraduate engineering students to nanotechnology, funded by NSF-NUE program. She was the president of the Peninsula Engineers Council (PEC) in 2003 and is the founding advisor of the Hampton University Student Chapter of Society of Women Engineers (SWE).

Sid Howard Credle is the Dean, School of Business and Budget Executive for the ESITAC. He is a CPA and has a Ph.D. in Financial Accounting and Taxation from the University of Texas at Austin. He is a Board Member of Consolidated Bank & Trust since 2003, the Hampton Roads Urban League 2005, the Peninsula Economic Alliance, Omega Psi Phi, and Pershing Riflles Honor Society. Dr. Credle has numerous publications in the empirical and leadership enhancement fields.

Kelwyn A. D'Souza is a professor of Management at the School of Business. He has a Ph.D. degree in Industrial Engineering from the University of South Florida, Tampa and has over ten years of industrial experience. He teaches management science, operations management, and logistics and transportation management courses. His publications cover a range of issues including the modeling and analysis of business and transportation systems. Dr. D'Souza is the founding Director of ESITAC.

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Carey Freeman is an assistant professor in the Department of Aviation and serves as Department Chair. He's a retired U. S. Air Force pilot and Air Traffic Controller, with both national and international operational management experience in flight and air traffic control. He teaches flight, air traffic control, management, and safety courses. He has an Ed.S. (Educational Specialist) from George Washington University. He serves on several national/ international aviation related committees. He established a Federal Aviation Administration (FAA) approved testing center and administers required FAA test to the local aviation community.

Sharad K. Maheshwari is an associate professor of Business Administration. He has a Ph.D. in Industrial Engineering from the University of South Florida, Tampa. He teaches courses in the areas of system analysis, logistics and transportation, operations management, and information systems. His research interests include simulation, modeling of business and transportation systems, and other related areas. Dr. Maheshwari is the editor of Academy of Information and Management Science Journal.

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Devendra Parmar is a research professor at the Department of Electrical Engineering, Hampton University, and a research professor at the Department of Mechanical Engineering, Old Dominion University. Dr. Parmar received his Ph. D. degree in Physics with specialization in materials science. His current research emphasis includes material characterization, simulation, modeling and evaluation. Dr. Parmar is an Associate Fellow of the American Institute of Aeronautics and Astronautics (AIAA).

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