

# Region 2 News

UNIVERSITY TRANSPORTATION RESEARCH CENTER

## Member Universities

City University of New York  
Columbia University  
Cornell University  
Dowling College, NATC  
New York University  
Polytechnic University  
Princeton University  
Rensselaer Polytechnic Institute  
Rutgers University  
State University of New York  
Stevens Institute of Technology  
University of Puerto Rico

## About UTRC

The Region 2 Transportation Research Center, in one of the ten original National Centers established in 1987, in recognition that transportation plays a key role in the nation's economy and in the quality of people's lives. University faculty provide a critical link in resolving our national and regional transportation problems while training the professionals who address our transportation system and their customers on a daily basis.

Over the years, the Center has developed better relationships with local sponsors by being more responsive to their needs. As a result, state and local transportation agencies seek the center's help continuously, to deal with research and training problems that require academic inputs, and/or the application of state-of-the-art technologies. It is expected that more public agencies and private organizations will participate in the research program making it easier to secure matching funds for future projects.

## Research

UTRC conducts research in critical areas to transit intermodalism, infrastructure funding and pricing. To develop the annual research agenda, UTRC organizes a "Regional Research Conference" which brings together mid-to-upper level agency managers and university researcher to determine regional research needs. In addition to providing updates on research progress to sponsoring agencies, UTRC works with regional organizations to provide technical briefings on a wide range of topics. UTRC is more and more responding to specific request for academically-oriented, yet agency or joint agency specific, research and analysis.

## Education

UTRC provides support to traditional and non-traditional education and training through scholarships, outreach to junior high school, high schools, community colleges, undergraduate students, graduate students, and professional development programs. The UTRC advanced institute for transportation education (AITE) provides. Scholarships for graduate students through its consortium member schools. As December 1998, 161 graduate students have participated in the program, which began 1991, and 84 have received their master's degree.

## Technology transfer

UTRC's Technology Transfer program is supported by regional agencies, and literally reach thousand of professionals, students, and lay people. Technical briefings are presented at agencies, upon request, and serve as a stimulus for further interaction between UTRC study teams and regional agencies. UTRC technical meetings have become place to interact and discuss regional issues in a constructive way. Not always possible in an office setting. UTRC sponsors, BI-monthly, along with the port authority of New York and New Jersey, Parsons Brinckerhoff, Inc. and Frederick R. Harris, a "visiting Scholars Seminar Series" these seminars focus on themes of international and national impacts of transportation investments. The UTRC's visiting scholar seminar series have covered topics from clean air to travel demand, and from London transport to the French Toll Motorway system. In addition, these seminars provide a unique opportunity to network, not only among UTRC students, agency professionals, and academicians, but among cluster of regional professional with similar interests.

## New Jersey Link to the 21st Century: Maximizing the Impact of Infrastructure Investment Objectives, Approach and Structure of Study

University Transportation Research Center, Region 2  
City College of New York, CUNY • Dowling College • Rutgers University

*Partial support for this study has been provided by the United States Department of Transportation and the New Jersey Department of Transportation. The views and opinions stated herein are the opinions of the authors.*

The overall goal of this project is to assess the impact of planned transport infrastructure investment projects on travel behavior and economic development in New Jersey. The proposal for this research project discusses 5 main objectives for this study. The purpose of this working paper is to review these objectives, provide basic definitions, highlight key issues and suggest methodologies to accomplish these objectives. It should be understood that while each objective is stated separately, they all are interconnected in that they focus on the relationship between infrastructure investment and transportation, land use and economic development.

### THE RELATIONSHIPS BETWEEN TRANSPORT INVESTMENT AND ECONOMIC DEVELOPMENT

The fundamental assertion of this study is that planned and in progress transportation infrastructure investment projects in New Jersey have the potential to engender economic development in the state. This economic development will be manifested primarily in the form of land use activity changes, improved environment, and increased employment. These effects, in turn, will transpire mainly from improved accessibility and from the non-transportation impacts of the investments. For this study the key question then is how to define and quantify these impacts and how to model the functional links between the investment projects and the resultant economic development.

### OBJECTIVES

**Objective 1:** To describe, quantify and assess the nature and impact of current and

proposed transportation infrastructure investments upon accessibility and economic development.

**Objective 2:** To review and quantify recent and proposed land-use changes and developments, and evaluate such changes as a response to investment and accessibility.

Whereas the first objective was to propose how improved accessibility from infrastructure projects can affect land-use, this objective aims at reviewing land use changes and ascertaining the degree to which they were caused or affected by accessibility changes.

**Objective 3:** To develop analytical tools to assess the ties of investment to accessibility to assist in policy decisions concerning future infrastructure investments and development projects. These tools will be especially useful to assess New Jersey's potential for growth within the highly competitive region.

**Objective 4:** To conduct the above assessment looking at all modes, freight and passenger; understanding that both are essential for economic well being and that investment strategies must examine means of providing both.

**Objective 5:** To study the above in a joint academic - NJDOT setting, providing training and education for the professionals who will eventually be responsible for infrastructure and land use planning and implementation. Some may be agencies and firms today; others may be students, soon to be employed by agencies.

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## Director's Column

UTRC has received notice from USDOT that it will continue its designation as the Region 2 (NY, NJ, PR, VI) University Transportation Center. Under TEA21 all ten Regional Centers had to recompetite within their regions. With the tremendous help and support of our colleagues and associates we are pleased that we won the award. In preparing for the competition our Executive Committee met and we had the opportunity to rethink our mission and programs. Our theme for the Center is now "Planning and Management of Regional Transportation Systems".

There are three overarching concerns, addressing planning and management, that UTRC will address as part of its mission. The first is institutional change; are the current transportation agencies, individually and collectively, structured to address, plan for and implement change - change as demanded by regional stakeholders. The second concerns financing the change. The financing methods that were appropriate to build the interstate system now seem inadequate or outdated. Further, public confidence must be placed behind innovative methods needed for the billions of dollars of investment in all modes and intermodal facilities in Region 2. The ability to implement a project will become as important part of a professional's capabilities as is the ability to plan it. The third is the nature of the emerging technologies themselves. We know our transportation systems, rapidly incorporating I.T. and other ITS tools into their operations will begin to look dramatically different when TEA21 expires - but how so is a significant question. And more significant - with new types of system performance information available, much in real time, what skills will our system managers and operators need?

To address these difficult questions, UTRC has added new partners, and you will be hearing more about them in future newsletters, seminars and forums. They are Columbia University - led by a group at the Lamont Dougherty Earth Observatory. And The NAT Center of Dowling College. Through our new members we can begin to study natural hazards and risks and utilize the tools of modern 3-D and 4-D graphic simulation.

We look forward to continuing to work with all of our regional colleagues and associates and to serve as a place to focus discussion on important transportation issues.

### Agency Industry Council

#### Council on Transportation, Council Members

Steve Greenfield, *Chairman*

Constantin Sidamon-Eristoff, *Vice Chairman*

Elliot G. Sander, *Director of Center for Transportation Policy and Management*

### Sponsors

New Jersey Dept. of Transportation (NJDOT)

New York City Dept. of Transportation (NYDOT)

New York City Transit Authority (NCTA)

New York Metropolitan Transportation Council (NYMTC)

New York State Dept. of Transportation (NYSDOT)

New York State Energy R&D Authority (NYSERDA)

Niagara Frontier Transportation Authority (NFTA)

Parsons Brinkerhoff, Inc. (PB)

Port Authority of New York and New Jersey (PANY/NJ)

Puerto Rico Dept. of Transportation and Public Works (PRDOT)

The Council for Transportation (COT)

Triborough Bridge and Tunnel Authority (TBTA)

US Virgin Islands Dept. of Public Works (VIDPW)

### UTRC Central Staff

Dr. Robert E. Paaswell, *Director*

Darlene Williams, *Assistant Director*

Frederick Brodzinski, *Business Manager*

Kimberly Fant, *Information Coordinator*

Camille Kamga, *Budget Analyst & Research Associate*

Andrew Sakowicz, *Assistant Director for Research*

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## FYI!

The Permanent Citizens Advisory Committee to the MTA invited Dr. Robert E. Paaswell, Director of the University Transportation Research Center to give an overview of the various research studies that the center is conducting. One is exploring how transit systems must adapt to meet the changing needs and travel patterns of users. Some of the areas that the study is looking at, including automated fare collection and up-to-the-minute travel information, are ideas that the PCAC has recommended.



## USDOT's University Transportation Research Center, Region 2 Student of the Year JASON YOUNG

As a graduate of economics from Rutgers College, I soon discovered that it was important to narrow my focus and concentration to a field of interest. In the process of exploring the various options, I began in the Health Insurance industry. Recognizing the need to further my education in order to become a highly skilled professional, I decided to direct my energies in a field in which I could continue to grow and find outlets of interests in the future. I found the field of transportation to be exciting and dynamic. Since



LEFT TO RIGHT: KELLY COYNER, USDOT/RSPA ADMINISTRATOR, JASON YOUNG, REGION 2 STUDENT OF THE YEAR, MORTIMER DOWNEY, JR. USDOT DEPUTY SECRETARY

beginning my studies in the S.U.N.Y. Maritime Masters program in transportation, I have gained an interesting enthusiasm and motivation to further my knowledge of the diverse field of transportation. While at S.U.N.Y. Maritime College I have had the unique opportunity to earn an advanced degree and at the same time experience the rigors of the maritime industry in three summer semesters at sea. My time at sea will culminate into Merchant Marine's 3rd Mate License. In addition to my study in the field of Marine Transportation, I have been able to study highway systems in depth through the course of my thesis seminar. My studies have enabled me to expand my abilities and gain a comprehensive understanding and knowledge of a fascinating and energetic industry. In the more distant future, I intend to increase my skills and expertise, to a level where one may be considered a leader of an area in the transportation industry.

## The University Transportation Research Center, Region 2 Welcomes the Mathematics-Economics Students of The University of Aarhus, Denmark

UTRC hosted a reception and visit for 30 Mathematics-Economics students from the University of Aarhus, Denmark on Tuesday October 12, 1999. The goals of this visit were to give the students a broader insight in daily routines and problem solving of transportation. Presentations were given on topics such as trip length distri-

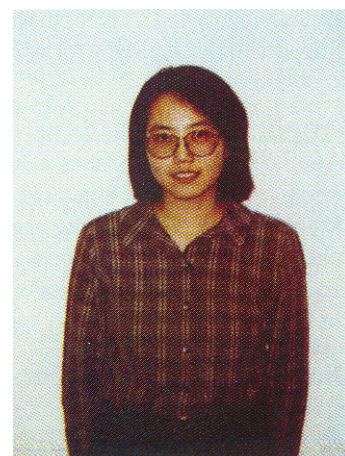
butions, container trip generation, decision making patterns of trucking companies, the study of the "Hunts Point Market", and optimal pricing theory. The study of Mathematic-Economics educate national economists, graduates of finance and operational research with a sound knowledge within the fields of mathematics, statistics and mathematical programming. These graduates are employed in both public and private industry.

UTRC welcomed this and every opportunity it has to encourage technology transfer, both nationally and internationally.

## PERSONAL STATEMENT

My involvement with transportation started when I entered the graduate program of Transportation Engineering at Southwest Jiaotong University in 1989. After I got my Master's degree in Transportation Engineering in 1992, I stayed on at the university as a lecturer in the Department of Transportation Engineering. During this period, I was teaching some transportation related courses, such as Introduction to Transportation Engineering, Traffic Management and Control, and Urban Light Rail System. At the same time, I also participated in many transportation projects, including the comprehensive transportation planning of Chengdu City, the decision support system for urban traffic management, urban passenger transportation system analysis, and urban light rail transit system planning. Through these teaching and research activities, I realized the significance of transportation to society. I also realized that the field of transportation was exciting and challenging and that the opportunity would exist for transportation professional to improve the efficiency of the transportation system, resulting in increasing social productivity and quality of life.

Desiring to improve my professional skills, I entered the Ph.D. program of Transportation Engineering at the Institute for Transportation, New Jersey Institute of Technology in 1995. Aside from taking courses to fulfill the requirements for the degree, I have been working as a research assistant closely with faculty of the institute and other universities on a variety of transportation research projects. These projects include developing an integrated congestion pricing and traveler information system, developing an Internet-based advanced traveler information system, and the right of way impact analysis. Particularly, my research on the design of (continued on page 5)



# Spotlight on Education *(continued)*

## ADVANCED INSTITUTE FOR TRANSPORTATION EDUCATION GRADUATE SCHOLARS PROGRAM

Financial support for Masters students in transportation is available for outstanding students who attend a participating university; see list on the reverse of this sheet. Scholarships are available both to people entering the transportation field for the first time and to people already working for transportation agencies and companies. The scholarship provides:

### For full time students:

Free tuition for three semesters or up to a value of \$10,000  
Monthly stipend for one year (total value **up** to \$10,000)  
Experience in transportation research

Professional exposure and recognition  
For employees of participating agencies:

Free tuition for four semesters or **up** to a value of \$10,000  
Ten hour per week paid work release during semester  
For specific details consult the coordinator at the relevant university.

### Requirements for applicants:

The applicant must be a U.S. citizen or permanent resident.  
The applicant must have a bachelors degree (recommended grade point average of 2.7 or better).  
The applicant must be admitted as a matriculated student to one of the participating universities.

### Requirements for AITE scholars:

The scholar must attend graduate school on a full time basis.  
The scholar must complete the AITE curriculum with a 3.0 GPA.  
The scholar must complete a project.  
For full time students - The scholar must participate in an approved research project.

### Basis for scholarship awards:

Grade point average in previous degrees  
Communication skills in English  
Dedication to and interest in a transportation career  
Support from employer for applicants currently working in transportation

### Application procedure:

Applications for the next academic year (for entrance in the Fall semester) usually are available in the November of the preceding year. Employees in participating agencies can obtain applications through the agency; see list on reverse. Full time student applicants can obtain an application at the address below. The application deadline will be in February.

### For further information,

Contact Dr. Claire McKnight, AITE Coordinator at by phone at (212) 650-8059, by e-mail at [mcknight@ce-mail.engr.ccny.cuny.edu](mailto:mcknight@ce-mail.engr.ccny.cuny.edu) or by mail at:  
AITE Graduate Scholars Program  
University Transportation Research Center  
City College of New York  
New York, New York 10031

### Sponsored by:

Region II University Transportation Research Center and U.S. Department of Transportation Advanced Institute for Transportation Education.

### Participating Transportation Agencies:

Metropolitan Transportation Authority	Nelly Egbuchulam	212/878-7459
New Jersey Department of Transportation	William D. Bennett	609/530-2954
New Jersey Transit	Joseph Boscia	201/378-6619
New York City Department of City Planning	Floyd Lapp	212/566-0370
New York City Department of Transportation	Josephine O'Connell	212/442-7832
New York City Transit Authority	Donald Cohen	718/694-4547
New York Metropolitan Transportation Council	Norma Hessic	212/938-3342
New York State Department of Transportation	Donald V. Hannon	518/457-2942
Puerto Rico Highway and Transportation Authority	Doris Rochet	787/729-1531

### Participating Universities:

City University of New York Prof. Claire E. McKnight Design, Management, Planning, Policy	212/650-8050
Polytechnic University Prof. Elena Prassas Design, Management, Planning, Policy, Safety	718/260-3788
Rensselaer Polytechnic Institute Prof. Jeffrey Adler Design, Management, Planning, Policy, Safety	518/276-6938
Rutgers University Prof. Ali Maher Design, Planning	908/445-2485
State University of New York at Albany Prof. Ray Bromley Planning, Policy	518/442-4770
State University of New York Maritime College Prof. Shmuel Yahalom Management, Policy	718/409-7285
University of Puerto Rico Prof. Benjamin Colucci-Rios Design, Management	787/834-6385

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# Spotlight on Education

## STATUS OF 1999 AITE GRADUATE SCHOLARS

Name	Agency Affiliation	School
Ellen Thorson	Student	City College of New York
Michael Vigna	New York City Transit Authority	
Robert E. Morley	New Jersey Dept of Transp	New Jersey Institute of Technology
Nichola O. Fraser	Student	Polytechnic University
Abdul Khalid	New York City Dept of Transp	
Carlos Rivera	New York State Dept of Transp	Rensselaer Polytechnic Institute
Ryan Lund	New York State Dept of Transp	Rensselaer Polytechnic Institute
Hudson V. Jackson	Student	Rutgers University
William A. Cao	Student	Rutgers University
J. Todd Nelson	Student	State University of New York @ Albany
Michael Wyatt	New York State	State University

## PERSONAL STATEMENT *(continued from page 3)*

Meeting of TRB), and my dissertation, based on this work, is in its final writing stage.

In addition to the research assignments from the university, I also got involved in some community work for a nonprofit organization. Specifically, as a volunteer, I helped the Community Board of Greenpoint, New York to prepare their 197-A comprehensive plan. I provided the analysis of the current transportation system in the area, as well as the traffic operational and management suggestions on how to improve the efficiency of the system.

In the course of doing congestion pricing research, I realized that any infrastructure expansion is more and more unlikely to effectively provide traffic congestion reduction in metropolitan areas. With the development of new technology, I believe an advanced traveler information system combined with congestion tolls collected electronically could provide for a new-generation method for congestion reduction. Therefore, my career goals in transportation would mostly focus on the development of new methodologies to provide real time traveler information, incorporated with the design of a congestion pricing policy that would be both politically and technically feasible. I believe the most effective way for me to achieve this goal is by seeking employment as research associate in an academic setting.

In addition to my studies and research, I am also an active member

## TRAC BRIEF '99

After a productive fall and spring, the CUNY Institute for Transportation Systems (CUNY-ITS) anticipates increased success as it moves the TRAC (Transportation Research activities Center) program ahead into its eighth year of operation. The TRAC New York Regional Center represents a component of the ITS Transportation Careers Pipeline Initiative Program, and is operated with funding support from UTRC, Region 2.

In March this year, TRAC concluded its seventh 'Engineering and Computer Applications' course, which was held as part of the Scholars' program of the Girl Scout Council of Greater New York. Thirty-eight girls completed the eight-session course, with another forty expected to participate in the program as we enter the new millennium. Also, from the Barnard College Liberty Partnerships Program, twenty-one students received certificates after successful completion of a 12-week program. TRAC activities and equipment are also earmarked to be used in stimulating interest in Transportation careers to high school students in the CUNY-ITS's Summer Transportation Institute program starting July 6, 1999.

Throughout the year, TRAC continued to provide participation support for events held by CCNY's Office of Student Programs. One event of special note was "NASA in New York Day". Teachers and students from various high schools in the New York metropolitan area participated in the one-day event.

Following the 1998, 3rd Annual TRAC National Train-the-Trainer Workshop and Conference in Denver, Colorado, it was decided that additional TRAC equipment would be purchased for implementation in select schools. A. Philip Randolph Campus High School in Manhattan was selected to be the first addition to the program, with TRAC classroom implementation by the end of 1998. TRAC equipment is now used to motivate and expose students to Transportation and Engineering careers and research. Tutoring 9th to 12th grade students has also been part of the program's mentoring and career development activities.

With increased TRAC involvement from the NYSDOT, and the maintenance of our established relationships, the TRAC program can continue to benefit the youth of our region. For more information on the program, contact Dr. Neville Parker, the Project Director, or Victor Ochieng, the Program Coordinator, at

WTS. Particularly, I helped the founding of the WTS NJIT Student Chapter and served as its first president. Our student chapter has recently been designated as the first student chapter in the nation. I believe that my deep involvement with transportation over the past nine years and my determination to dedicate myself to the improvement of transportation system in the future would make me a com-



# Technology Transfer

## Dowling College National Aviation and Transportation Center, Directed by Clifford R. Bragdon

### DOWLING

**D**owling College's National Aviation and Transportation Center is a unique 105 acre, \$42 million intermodal transportation facility entirely devoted to education, research, and professional development. It is the host for the School of Aviation and Transportation which offers with the School of Business nine Bachelor of Science Degrees in aviation and transportation, and one Masters Degree in aviation management. The total enrollment in these ten academic degree programs exceeds 300 students (part-time/full-time).

The NAT Center research initiatives exceed \$8 million with diverse projects in four continents related to intermodal transportation involving air, land, and sea associated with planning, simulation, visualization, conflict/dispute resolution and economic development. This includes state of the art 3D/4D virtual, real-time, interactive immersive sensory simulation (using visual, acoustical, olfactory, and vibration) to create scenarios, modeling transportation problems and solutions applied in our \$7 million Intermodal Transportation Simulation System (ITSS) Laboratory which just received a U.S. Government Patent (# 5,863,203 - January 26, 1999). Beside the ITSS Laboratory, The NAT Center also is the host for The NAFTA Intermodal Transportation Institute designated by Congress (\$5.5 million funding).

Dowling's partners include STAR (Specialized Training in Aeronautics and Research) which includes 22 countries, 140 universities and businesses supported by the European Union, with STAR USA headquartered at The NAT Center; United Nations Sustainable Transport; along with Brookhaven National Laboratories, Auburn University, Kansas State University, Georgia Tech in addition to

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### COLUMBIA



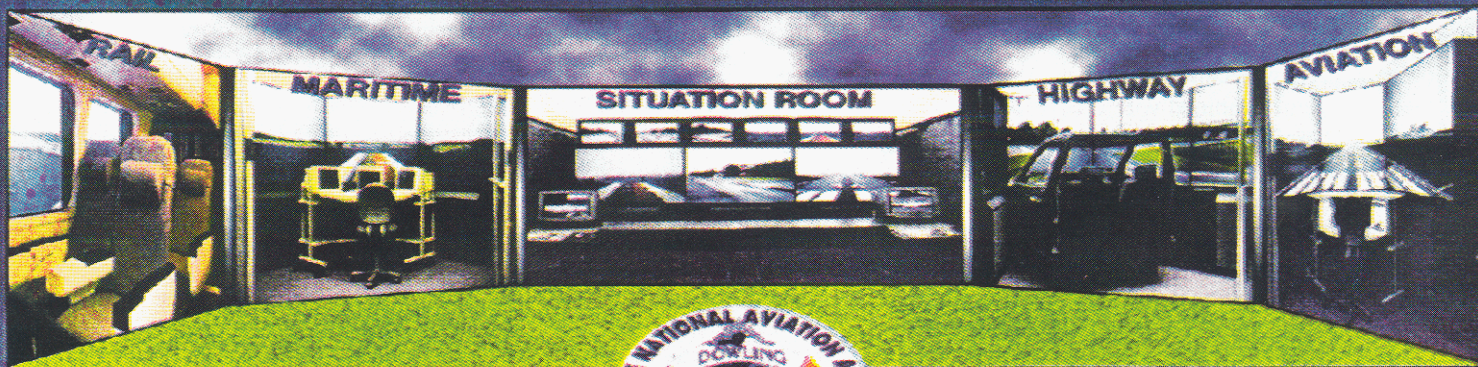
**C**olumbia University (Lamont-Doherty Earth Observatory, represented by Klaus H. Jacob and Arthur Lemer-Lam). Lamont-Doherty Earth Observatory is a research institute of Columbia University employing approximately 120 scientists and 110 graduate students devoted to the study of the Earth's natural processes, and their interactions with human systems.

These include the long term trends in atmospheric, oceanographic, and solid earth dynamics that may impact human systems through climate change, sea-level rise, and coastal erosion, as well as the sudden events such as earthquakes, landslides, severe storms and other natural disasters that cause direct and indirect damage to the built environment and regional economies. In the course of studying these phenomena, scientists at Lamont have explored the frontiers of predictive capability, producing seminal work in the forecasting of event occurrence and the prediction of human impacts for specific scenarios.

In particular, our solid earth sciences and climate groups have explored the quantification of natural hazard, that is, the space-time distribution of natural events. These groups are leaders in the quantification of earthquake and landslide hazard in the New York Metropolitan region, and in the prediction of inundation from storm surge and other severe weather events. These predictions are usually probabilistic, and can be cast in terms of the annual probability of exceeding some level of hazard. Current research also is directed

*(continued on page 7)*

## INTERMODAL TRANSPORTATION SIMULATION SYSTEM\*



**SOLUTIONS**



**INTEGRATOR™**

# Technology Transfer

## **DOWLING** *(continued from page 6)*

major national corporations (EDS, Silicon Graphics, etc.) plus incubator companies. A more unique project is the world's first magnetic levitation passenger/freight intermodal demonstration, now being constructed (guideway) in partnership with Florida DOT and MagLev 2000.

Dr. Clifford R. Bragdon is now the Director of The National Aviation and Transportation Center. Previous to this he was Dean of The School of Aviation and Transportation and Vice President of Advanced Technologies at Dowling College. Prior to this Dr. Bragdon spent 22 years at Georgia Tech where he was a Full Professor City Planning, Associate Dean, Associate Vice President and Assistant to the President. Beside being involved in over \$15 million of research related to urban planning, transportation, environmental and virtual simulation, last year he received the New York Distinguished Engineer Achievement of the Year Award. He also recently received the patent as the inventor of the first intermodal transportation simulator system to deal with holistic transportation problems and solutions.

## **COLUMBIA** *(continued from page 6)*

toward developing methodologies for regional aggregate probabilities of natural hazard occurrence.

Risk is derived by convolving the spatial distribution of assets and their fragility with probabilistic hazard assessment. Risk thus is the natural hazard assessment modulated by estimates of the damage to human systems that might be caused by the natural events. Risk is the quantity that can be most directly related to policy needs and issues, and is one side of the cost-benefit analysis needed for mitigation and remediation measures for natural hazards. It is also natural to couple risk from natural hazards to risks from other variables, such as long-term deterioration or fatigue of built infrastructure, modal splits of transportation systems in response to economic and demographic changes, and so on. Thus knowledge of natural hazard systems, viewed with a risk metric, can contribute to the overall discussion of the evolution of transportation systems.

In addition to probabilistic hazard assessment, risk calculations require the assessment of infrastructure inventory for fragility and exposure to scenario events. Both of these items are areas of expertise for Lamont Doherty and the Department of Civil Engineering.

## PUBLISHED BOOKS

### **Feedback Control Theory for Dynamic Traffic Assignment (Advances in Industrial Control) by Pushkin Kachroo, Kaan Ozbay, The publisher, Springer Verlag**

Traditionally, traffic assignment and routing strategies have been developed using well-known optimization techniques that have very high computational overhead. However, feedback control techniques have recently been shown to be more suitable for real-time online traffic control applications. This book shows how to design feedback controllers to perform dynamic traffic routing and assignment, and presents the theory of feedback control as applied to this problem. The advances in the area of traffic sensors and control make it possible to apply these real-time feedback based techniques to the real-world problems. The book also discusses the real-world applications along with simulation results that support the understanding of theoretical models presented in the book. This book is the first book that is fully dedicated to the use of feedback control based algorithms for on-line control of traffic systems and is a valuable contribution to this popular subject.

Contents: Introduction; Traffic Flow Theory; Modeling And Problem Formulation; Dynamic Traffic Routing Problem in Distributed Parameter Setting; Dynamic Traffic Routing Problem in Distributed Parameter Setting Using Semigroup Theory; Fuzzy Feedback Control for Dynamic Traffic Routing; Feedback Control for Dynamic; Traffic Routing in Lumped Parameter Setting; Feedback Control For Network Level; Dynamic Traffic Routing.

### **Incident Management in Intelligent Transportation Systems (Artech House Intelligent Transportation Systems Library), The publisher, Artech House, December 22, 1998, by Kaan Ozbay, Pushkin Kachroo**

Effective incident detection, response, clearance, and recovery of traffic accidents can save countless commuter hours, gallons of fuel, and millions of dollars by substantially reducing traffic delays. In this book, the authors describe an integrated traffic incident management system and related software designed to facilitate interagency communication and help transportation officials coordinate response activities so that traffic flow is restored to normal as soon as possible. Using actual data models and based on real-world research, the book shows how to develop and implement an automated incident management expert - GIS system capable of displaying maps, handling network queries, dispatching response vehicles, estimating incident duration, generating response plans, recommending diversion plans, and facilitating interagency communication.

Contents: Introduction; Literature Review of Incident Management Systems; Wide-Area Incident Management Support System (WAIMSS) Software; Duration/Delay Prediction. Development of Incident Response Plan; Heuristic Network Generator; Real-Time Traffic Control Using Feedback Control Techniques; Conclusions and Future Research.



# Research Highlights

## New Jersey Link to the 21st Century *(continued from page 1)*

### KEY PREMISES THAT UNDERLIE THE PROPOSED APPROACH VIEW

The first premise contends that the state of New Jersey is part of a larger region including New York City metropolitan area parts of Pennsylvania and Connecticut. Hence, transportation and economic developments in New Jersey affect and are being affected by trends, investments and economic developments in other parts of this region. It is for this reason that major trends and transportation investment projects in neighboring areas should be examined as part of this study. The second premise is that we need to take a long-term view of the main issues under study. Often economic development factors (e.g., land use changes) transpire long after infrastructure investments are made. Therefore, we need to consider historical trends to correctly ascertain the relationships between the variables involved. We also need to choose a horizon year for our predictions, which will allow sufficient time to evolve for capturing all of the impacts from the investments.

While we do not propose to carry out cost-benefit analysis of any single infrastructure project, it still may become necessary to consider groups of benefits and costs such as increase in total employment or total time spent in travel.

The third premise of this study is that we evaluate infrastructure projects using a welfare approach where total benefits and costs and their distribution by location or population type are regarded.

The fourth major premise of this study is that some transportation facilities have a disproportionate impact on the economy of the state and the region than others do. Major examples are the seaport, the airport and some key rail facilities. Obviously, infrastructure developments at, say, the seaport will have very large impact on the highway system on freight movements and on employment. For this reason we propose that present and planned investments in these facilities will be studied with special attention and that attempts would be made to examine the overall impact of these facilities on the economy of the state.

### WORKING TEAMS

To carry out the above tasks UTRC will establish 5 working teams:

1. Definition and calibration team. This team will be responsible for defining key variables and parameters such as the geographical boundaries of the region, modes of travel, time horizon, accessibility, employment and economic development. As data becomes available and models begin to be calibrated this team will need to continuously determine at what level the analysis will be carried out (e.g., SIC levels, or location sites).
2. Data team. This team will be in charge of all data collection activities including a survey of sources of data, data recording and storing and present and planned infrastructure transportation projects. This team will also be in charge of trend analysis and projection.
3. Transportation analysis team. This team will be in charge of developing the set of transportation models to be used, their adoption, calibration and use for prediction analysis.
4. Land use modeling team. This team will be in charge of deter-

mining which land use model will be adopted, its calibration and use.

5. Economic development analysis team. The responsibility of this team is to put together the analysis carried out by the other teams to determine the relationships between transportation infrastructure investment projects and economic development. This team will also be in charge of preparing the final report of this study.

6. Information dissemination team. This team will focus on producing reports, working papers and conducting seminars on the methods, data and findings of this study, to all parties involved.

### SUMMARY

In summary, the study will provide decision makers and planners in New Jersey working tools to assess the contribution of transportation infrastructure investment projects to the state's economic well-being and development. To that end an assessment of how such projects affect accessibility in the locale in which they are implemented. Subsequently, an examination on how improved accessibility affects land use distribution and economic general development in the state, given developments in adjacent states.

## UTRC Welcomes...Andrew Sakowitz, Assistant Director for Research

**ANDREW SAKOWICZ** received B.E. in Civil Engineering from City College of New York in 1994 and M.E. in Transportation Engineering from City College of New York in 1998. Prior to joining UTRC, he worked at the New York State Department of Transportation in Highway Design and in Traffic Signal Design and Operation groups. Currently, he is enrolled as a Ph.D. student. His research interests are in the areas of: Intelligent Transportation Systems (ITS), transportation planning, and traffic engineering and simulation.

## TRANSACTION 2000

New Jersey State Transportation Conference  
April 25, 26 & 27, 2000

Tropicana Resort & Casino  
Atlantic City, New Jersey

For Information call Frank T. Reilly  
908/903-1077



# Spotlight on Education – Tren Urbano

## A New Focus for the Professional Development of Our Students: Initiative Tren Urbano UPR/MIT/ TU

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### I. INTRODUCTION

The UPR/MIT/ Tren Urbano Professional Development Program is an innovative educational approach for the future professionals in Engineering, Business Administration, Architecture and Planning. This program is administered by the University of Puerto Rico (UPR) through the Technology Transportation Transfer Center (TTTC). The program is a joint effort among the University of Puerto Rico, the Center for Transportation Studies at the Massachusetts Institute of Technology (MIT), the Tren Urbano Office and the Puerto Rico Department of Transportation and Public Works (PRDTPW).



The Tren Urbano Project is a multiphase transit system developed to improve the mobility in the San Juan metropolitan region. Phase I of this project consists of 17.2 km (10.7 mi.) of double-track fixed guideway rail line with 14 stations. The alignment combines at-grade, elevated, below-grade (open cut) and underground structures. Construction of Phase I is approximately 60% completed and it is expected to be in full operation in 2002.

### II. Objectives

The three fundamental objectives of the UPR/MIT/ Tren Urbano Professional Development Program are:

- (1) To develop bilingual professionals capable of visualizing and understanding multiple aspects of planning, design, construction, and operation of an integrated public transportation system.
- (2) To establish an interdisciplinary model of education at the University of Puerto Rico including professors from the Engineering and Business Administration Faculties at Mayaguez.
- (3) Campus and from the Schools of Planning and Architecture at Rio Piedras Campus. To strengthen the education and applied research in the infrastructure area.

### III. PROGRAM ELEMENTS

Six key elements define the main activities of this Professional Development Program: (1) Orientation of the Tren Urbano Project and Public Transportation Course in Boston, Massachusetts, (2) The Encounter-Course on detailed aspects of the Tren Urbano Project and Public Transportation in San Juan, Puerto Rico, (3) Research project

(during one or two years), (4) Professional practice /Internship (Summer), (5) Visits to cities with rail transit systems, and (6) Employment opportunities with agencies and corporations of the Tren Urbano Project and Government Agencies. A brief explanation of each one of the elements is presented below.

(1) Orientation of the Tren Urbano Project and Public Transportation Course in Boston, Massachusetts

This activity covers the following aspects: An introduction to the Tren Urbano Project and to the Public Transportation System; history and development of the Traffic System in Boston; trips to the Boston rail system (park, maintenance workshop, controls room), the Tunnel / Boston Central Artery (the biggest transportation project in construction in the United States), the Investigation and Development Center of VOLPE, Smart Routes, and others trips; analysis and evaluation of advantages and disadvantages of the Boston Rail System and how to adapt the analysis to Tren Urbano; presentations of MIT students investigation; cultural immersion in a city that depends on an appropriate system of transportation; and cultural and recreational activities.

(2) The Encounter - Course on detailed aspects of the Tren Urbano Project and Public Transportation in San Juan, Puerto Rico

During this course, the following activities are included: progress reports of the Tren Urbano Project; technical meetings about traffic systems in different parts of the world; study of public transportation systems currently in operation in the Metropolitan Area of San Juan, Puerto Rico; exhibition of research posters; interviews with Tren Urbano personnel; visits to the Tren Urbano construction areas; a trip in helicopter to observe the route/alienation of the train, the development of the infrastructure and use of terrestrial bordering; cultural immersion (for the students of MIT); and recreational and cultural activities.

(3) Research project (during one year or two years)

Research projects take place during one year for undergraduate students or two years for graduate students. The research topic is based on the needs of the Tren Urbano Project and on the student's interests. Faculty Members from various disciplines of the UPR campuses, serve as advisors of the students research projects.

(4) Professional practice / Internship school (Summer)

During the summer, each student participating on the program has the opportunity to participate in an internship with consultants, contractors and other agencies related to the Tren Urbano Project.

(5) Visits to cities with rail transit systems

These visits include Caracas, Venezuela; Medellin, Colombia; Miami, Florida, and New York. These cities have been visited in previous years to compare and contrast the system with the Tren Urbano Project. The activities during these trips also included technical meetings, visits to stations and maintenance shops, participation of the community, marketing strategies and the opportunity to share ideas with the professionals in charge of the system operation.

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## (6) Employment opportunities with agencies and corporations of the Tren Urbano Project and Government Agencies.

Once the students have participated in all the experiences provided through this process, there is the possibility of working with one of the companies involved with the project.

### V. BENEFITS

The UPR/MIT/ Tren Urbano Professional Development Program emphasizes the interdisciplinary nature of a project such that the students learn the importance of all the aspects of a project from its inception: how to design transportation systems including architecture, social factors, urban planning, marketing, financing, security and public participation. The students understand that a successful project requires a teamwork effort. The Professional Development Program UPR/MIT/Tren Urbano allows the students to visualize the project integrated, observing and participating in the dynamic interaction of several professionals involved directly in the project and representing diverse disciplines sharing different points of view. These experiences also develop the student's ability to work efficiently in a multicultural atmosphere in which the teamwork is totally essential. When completing the program, it is expected that the students become highly motivated and knowledgeable professionals eager to face similar projects in the future.



Students from UPR and MIT, develop research projects related to the Tren Urbano working individually or in collaboration with colleagues from any of the participant universities under faculty supervision. They also have the opportunity to work during the summer with companies that participate in the design and construction of the Tren Urbano Project. At the end a two-year program, the students have the opportunity to work with the government, with the consultants or with the contractors at least during one year.

Since the establishment of the program in 1994, approximately 120 students have participated in research projects in areas like urban renovation, case studies focused on the engineering, planning, architectural perspective of the stations, detection of vehicles and control systems, transportation systems integration, intermodalism, and innovative construction procedures for transportation systems underground.

In terms of the program exhibition in other academic and scientific forums, most of the students have presented the results of their research in forums like the "Junior Technical Meeting", and EPSCoR (Experimental Project to Stimulate Competitive Research) sponsored by the National Sciences Foundation of the United States; COINAR (Congress of Engineering and Surveying) sponsored by the College of

Engineers and Surveyors of Puerto Rico, ASME (American Society of Mechanical Engineers) and FoPER (Forum to Promote Engineering Research) sponsored by the Engineering Faculty of the University of Puerto Rico, Mayaguez Campus.

The UPR/MIT/ Tren Urbano Professional Development Program provides economic and Technical support to all interested students. They are able to present their results in these forums that are integral part of their professional development.

In addition, this new educational approach produces three significant benefits in the longrun. First, it strengthens the teaching and research programs in the Faculties of Engineering, Business Administration and Social Sciences and the Graduate Schools of Architecture and Planning. Second, our program expands the human resources significantly in the planning, urban design, transportation, and civil engineering areas. Third, it strengthens the abilities related with technical presentations in professional forums.

### VI. A LOOK TO THE FUTURE

The initiative of the UPR/MIT/Tren Urbano Professional Development Program opens new venues to be explored by other University programs. This approach may be implemented by the University Transportation Centers Program based on the requirements imposed and supported by the TEA-21. The incorporation of practical, bilingual and multi-disciplinary experiences into the academic life, allows Universities to produce well-rounded professionals with the necessary training to face the new millennium. In the same vein, this program allows the future professionals to put in perspective their desire of new knowledge and challenge them to learn more and serve better.

Even though, the future is not completely predictable, the advances in computers and telecommunications provide the basis of innovative ideas that we would like to develop. The combination of distance learning and the internet allows us to envision a virtual educational community that can be focused in professional development programs. It is desirable to have faculty members joining highly qualified practitioners to establish interactive conversations via dedicated chat rooms in the internet. Using these available technologies, the knowledge will reach new dimensions. Many ways can be used to implement professional development programs with the features of the program described herein, being multi-campus, interdisciplinary, bilingual with strong entrepreneurial commitment and bilingual, closing the gap between professional community and academia facing the new millennium.

### ADDITIONAL INFORMATION

For further information related to the Professional Development Program UPR/MIT/Tren Urbano, please contact (787) 834-6385, facsimile (787) 265-5695, e-mail: bcolucci@rmce02.upr.clu.edu y/o Tren\_Urbano@hotmail.com or our page in the internet <http://www.trenurbanoupr.net>