

# UTRC

Annual Report  
2007





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*This report represents activities of UTRC from October 1, 2006 to October 3, 2007.*



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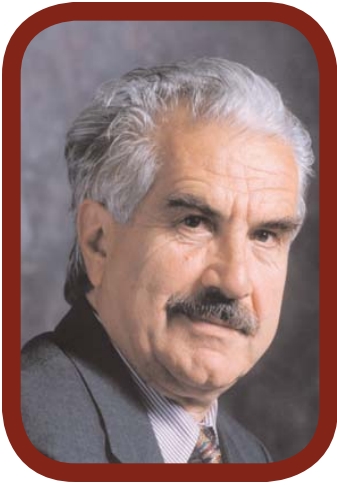


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Dr. Daniel B. Hess,  
Assistant Professor,  
University of Buffalo,  
is recipient of the 2007  
UTRC Best Paper

# Chairman's Message



**John  
Falcocchio**

Over this summer and fall, we at the UTRC have been busy shaping and organizing our work program for the coming year within the context of our vision: a regional source of new professionals; a source of transportation knowledge for practicing professionals, elected officials, and other regional stakeholders; partnerships between UTRC universities, the region's public agencies and the private sector that address transportation needs and encourage innovative approaches in meeting these needs.

Our past record of superior performance gives us confidence that our work program for the coming year will bring us closer to achieving this vision. Our incredible pool of professional talent and students will be working with our public and private partners in addressing some of the most challenging transportation problems in our region: growing congestion, infrastructure protection, sustainable land development and population growth, and environmental sustainability. And last, but not least, the superior organizational structure and management of the UTRC will propel our vision to reality.

I am sure that when you will read this annual report you will agree with me that we are well on our way to achieving the vision.

*John C. Falcocchio  
Professor of Transportation Planning and Engineering  
Director, Urban ITS Center  
Polytechnic University*

# Director's Message

The recent award of the Nobel Peace Prize to the Intergovernmental Panel on Climate Change and Al Gore has capped a year in which issues of climate change and global sustainability have captured the public's attention for the first time in a long while. Global warming, energy shortages and efficiencies, safer, cleaner environment – all are now daily phrases heard not only by academicians and citizens groups, but also by political leaders and the media. UTRC and our transportation colleagues throughout the US and around the world have wrestled with questions of sustainability for some time and find that more and more of our work tries to address these seemingly intractable issues. Can we have sustainability and economic growth; what is the role of the motor vehicle in the coming decades; how does this interact with the fiscal needs and constraints of our public agencies; and how do non-transport issues impact our work – land use, job creation, growth of the internet and on and on.

Many UTRC faculty members are involved within their institutions addressing sustainability programs, ranging from operational efficiencies to local parking strategies, new transit plans, economic incentives, and new energy technologies, as well as the more traditional curricula revisions and new research programs. But sustainability is a movement that has strength from our students and their insistence that both their education and careers address the world, its changes and their roles in it.

In transportation, we are all examining curricula to make sustainability an integral and not an add-on part of course work. Our research programs now address improved transport models, goods movement, transit-oriented development, transit investments, non-motorized vehicle use and growth and the underpinnings – individual choices and travel behavior. Many of our self-initiated studies deal with these issues and – we are pleased to note – our younger faculty have embraced this thrust. UTRC faculty and students are participating in and working to improve public understanding of PlaNYC, the NYC Mayor's growth and sustainability plan for 2030. The plan includes a congestion zone in Manhattan – a bold step for a city that has nearly 1 million motor vehicle entries each day. Our graduates will be entering work in this climate of change, and have the challenge of improving their own future.

UTRC begins new programs – it seems – almost every day! We are tasked by our partner agencies at the local, regional and state levels not only to do research, but also to provide interns, carry out modern training (on these very issues), bring in scholars for state of the art seminars, and help them set their own agendas. While this report is a summary of the past, exciting year, our web page [www.utrc2.org](http://www.utrc2.org) will bring the reader up to date with our work. We invite you to explore it, have conversations with us and add to the important dialogues concerning sustainability in Region 2.

***Robert E. Paaswell, Distinguished Professor of Civil Engineering***



**Robert E.  
Paaswell**

# 2007 Highlights

## RITA's Administrator Visits UTRC



On October 3, 2007, the new Administrator of the Research and Innovative Technology Administration (RITA) of U.S. DOT, Paul R. Brubaker, visited UTRC and met with faculty students, and agency partners

from across Region 2. Participants in the meeting provided highlights of some of the innovative research taking place within the UTRC consortium, and discussed how these efforts could help advance national strategic objectives.

RITA is the agency responsible for coordinating and reviewing DOT's roughly \$1 billion investment in research, development and technology, and is charged with advancing technologies that will improve the nation's transportation system. In addition to overseeing the University Transportation Centers, RITA oversees the Bureau of Transportation Statistics, Intelligent Transportation Systems program, Transportation Safety Institute, the Volpe Center, and numerous cross-modal research initiatives.

Before taking up his position at RITA, Mr. Brubaker held various executive positions within the public and private sectors. For example, he served as CEO of Procentrix, a firm that helps organizations plan, manage and achieve measurable performance improvement through the effective use of process and technology. His diverse background and expertise positioned him with the ability to empower public sector transformation and drive new models for government efficiency.



He served as Deputy Assistant Secretary and Deputy Chief Information Officer at the U.S. Department of Defense (DoD) where he was the Department's second highest-ranking technology official and supervised DoD's \$50 billion annual Information Technology expenditure. He drove the transformation of many of DoD's business and supervised the Department's electronic business activity. He was awarded the Distinguished Public Service Medal for his efforts on behalf of the Department.





## Symposium on the Future of Urban Transportation

On May 18th 2007, the University Transportation Research Center gathered some of the leading scholars and practitioners in the transportation field for a discussion of the forces shaping the future of urban transportation and the strategies for managing transportation systems to address these changes. The event was held in celebration of the contributions of Robert E. Paaswell on the occasion of his 70th birthday.

The symposium began with welcoming remarks by Joseph Berechman, Professor and Chair of the City College Department of Economics; Gregory H. Williams, President of the City College; and Neville Parker, Herbert Kayser Professor of Civil Engineer-



ing, CCNY and Director of CUNY Institute for Transportation Systems. Subsequently, there was a panel discussion moderated by John Falcocchio from Polytechnic University, on "Confronting Urban Transportation Challenges." Panelist Michael Meyer, from the Georgia Institute of Technology, discussed how transportation agencies are redefining their missions and organizational structures, forming institutional partnerships at larger geographic levels, and seeking new financing strategies in order to address emerging transportation challenges. Genevieve Giuliano of the University of Southern California discussed how the ports of Long Beach and Los Angeles are adopting congestion pricing strategies in order to manage growth and its environmental impacts. Will Recker, Professor of Civil Engineering at the University of California, Irvine followed

with "Meeting the Technological Challenges of Traffic Management". Finally, Martin Wachs of the RAND Corporation discussed the concept of equity and how it is and is not addressed in contemporary transportation planning.

The keynote address was delivered by Jay Walder of McKinsey & Company. As a former Managing Director of Finance and Planning at Transport for London and Executive Director and Chief Financial Officer at the Metropolitan Transportation Authority in



New York, Walder has a unique perspective on the planning, operational, and capital management issues facing transit systems in these two global financial capitals. In his address, "The Transport Challenges of Growth: A London Perspective," Walder described why the financial and business services sectors are expected to continue to drive London's growth, even as the geographic focus of these sectors migrates to new business centers in the eastern parts of the city. Residential and employment in and around London are intensifying the re-



gion's existing radial commuting patterns, straining a transit network that has seen decades of underinvestment. To address these challenges, the region has taken on major new initiatives, including the London Congestion Charging Plan, and massive new investments in transit capacity and infrastructure renewal. Walder was introduced by Peter Derrick from the Bronx Historical Society.

Following the keynote address, Allison L. C. de Cerreño of New York University moderated a second panel discussion, on the topic, "Managing the Transportation Systems of the Future." Isaac Takyi of MTA NYC Transit started off the panel with an overview of Transit's various technology initiatives, and the management challenges that they have posed to the authority. Next, Sue McNeil of the University of Delaware examined the challenges we face in rehabilitating and replacing our aging infrastructure systems, and how an Asset Management framework can help in weighing and prioritizing the many complex decisions that need to be made. Rachel Weinberger of the University of Pennsylvania reframed the future of urban transportation as a land use and space management problem, as seen from the perspective of the year 2060. Finally, Wil-



liam Millar, President of the American Public Transportation Association, presented a optimistic portrait of the health of the public transit industry and its potential to play an ever more central role in the urban transportation systems of the future.

The symposium concluded, with brief re-



caps and tributes to Buz Paaswell by José Holguín-Veras of the Rensselaer Polytechnic Institute and Joseph Berechman of the City College of New York. The symposium was sponsored by the CCNY Department of Civil Engineering, the CCNY Grove School of Engineering, the CUNY Office of the Chancellor, the CCNY Office of the President, the CCNY Office of the Provost, the Rensselaer Polytechnic Institute, and the University Transportation Research Center.

# Center's Theme

The organization and mission of UTRC are designed to address the distinct transportation challenges facing Region 2. This complex region contains:

- The New York Metropolitan Area, the nation's largest metro region and financial capital. To serve the region's 10 million workers and their households, the region provides 1/3 of the nation's transit trips, and moves 500 million tons of freight annually. The conflicts between moving goods and moving people have created new challenges for understanding and alleviating congestion, including integrating new technologies, building new infrastructure, and finding new ways and institutional arrangements to sustain the region's global economic competitiveness.
- Continually growing suburbs that must address the land/transportation interface, sustainability and the environment. Many of the region's suburbs are served by aging arterials that have inefficient designs and low capacities, leading to significant localized congestion and safety problems.
- Smaller metropolitan communities and large rural areas, many of which have struggled economically for a long time. Some, like Buffalo and Trenton, are working to realign their economies after suffering the loss of their manufacturing base. Others, like communities in the Adirondacks and the New Jersey Pine Barrens, are dependent on tourism. All are working to discover how transportation improvements can assist their economic revitalization efforts.

Region 2 is an international crossroads, a hub for both domestic and international travel of people and goods, dependent on global interconnectivity for its livelihood. Yet it has also been the site of two major terrorist attacks in as many decades, and faces an overarching need to operate its transportation systems efficiently while learning to address security better – both at points of entry (the Port of New York and New Jersey, Playa de Ponce, and the Cana-

dian border crossings) and within systems themselves (bridges and transit systems).

Though they are unique in many ways, Region 2's transportation challenges reflect the same issues being faced around the nation – the impact of congestion on freight and passenger movements, air quality, security and emergency preparedness and response, energy consumption, pricing, rising project costs, and new sources of funding.

Region 2's primary focus is the stewardship, management, and future evolution of its already mature transportation systems, in the face of emerging policy challenges.

*UTRC has unique capabilities to provide students and professionals with the knowledge and skills they need to adapt as the region's needs evolve.*

The region's transportation agencies must continually adjust to the nature of the economy and its evolving transportation requirements; their emerging understanding of what is required to protect public safety and security; and new challenges, such as global climate change. As advances in technology continually redraw the boundaries of what is possible, transportation agencies also face the daunting challenge of revisiting how they define their missions, serve the public and conduct their routine business. Because this region has historically faced so many transportation challenges, it has a tradition of innovation in transportation. Yet as early solutions become institutionalized, they tend to slow the absorption of new lessons from elsewhere. To become better able to manage its systems effectively in the face of change, the region's agencies need to become more dynamic in their approaches to the management of information and technology.

UTRC’s theme – “Planning and Managing Regional Transportation Systems in a Changing World” encompasses three broad thematic areas:

**Planning** today, in Region 2, requires knowledge of multi-modal and intermodal systems serving both freight and passenger movements. Planning in the region involves not only MPOs, but all of the many agencies taxed with the need to move people and goods 24/7. Planning is constrained by institutional mandate and history, the need to catch up with a backlog of capital needs, and a chronic shortage of



adequate funds for both maintaining and building the infrastructure. UTRC’s role is to provide through academic programs, a solid base on which planning decisions can be made.

**Management** today, in Region 2, means knowledge of interaction among complex multi modal systems, budgeting, system operations and performance targets, customer needs, the need to address security, and – when fighting fires stops – a

sense of vision of system performance and regional change. Management takes place at every level: from agency board members to line operators. UTRC works to develop education and training programs to improve the state of knowledge and practice at all of these levels.

*UTRC strives to assist transportation agencies to achieve organizational change responsive to new missions.*

**Responses to change:** As the world changes, the demands on the transportation system change as well. Tomorrow’s transportation systems will need to be more secure, more resilient to natural hazards, less damaging to the environment, and better able to use available capacity efficiently. Emerging transportation systems rely on real time technology and rapid transfer of operational information. The institutions that have traditionally operated the regional assets must, themselves, begin to change. They must think multimodally, with integrated operating systems.

# Management Structure




UTRC has adopted a corporate style of management. In this style, the UTRC Board provides policy guidelines, and approval of UTRC activities. Dr. Robert E. Paaswell, Distinguished Professor of Civil Engineering at The City College of New York, serves as Chief Executive Officer, overseeing day-to-day operations and providing a bridge between UTRC policies and the activities and resources used to carry out those policies.


The Board of Directors, chaired by Dr. John Falocchio of Polytechnic University, conducts its business through a well-organized committee structure. The Board (Committee of the whole) reviews Center Objectives and Programs, approves budgets, and reviews and recommends actions forwarded by its two major working committees.

The two committees, Research and Technology Transfer, chaired by Dr. Ali Maher of Rutgers University, and Education and Training, chaired by Dr. Neville A. Parker of The City College of New York are the working hearts of the Board. Each is responsible for developing the yearly program of activities, overseeing the selection of projects, and recommending to the full Board the programs of projects commensurate with the budget.

# Center's Staff



*Dr. Robert E. Paaswell*  
Director, UTRC  
Distinguished professor of  
Civil Engineering



*Dr. Camille Kamga*  
Associate Director of  
Administration and  
Information Technology



*Dr. Claire McKnight*  
Assistant Director of  
education and Training  
Associate Professor of  
Civil Engineering,



*Dr. Todd Goldman*  
Associate Director of New  
Initiatives



*Herbert Levinson*  
UTRC Icon Mentor  
Transpiration consultant  
and Professor Emeritus of  
transportation



*Dr. Ellen Thorson*  
Senior Research Fellow



*Jose Pillich*  
Communications and  
Outreach Coordinator



*Nadia Aslam*  
Administrative Assistant



*Robert F. Baker*

*Assistant Director  
Research  
(Retired in 2007)*



*Anthea Pierre*

*Student Intern  
Research Assistant*



*Patrick Issac*

*Student Intern  
Publications*



*Leana Marvin*

*Student Intern*



*Angel Dionisio*

*Student Intern  
Information Technology*

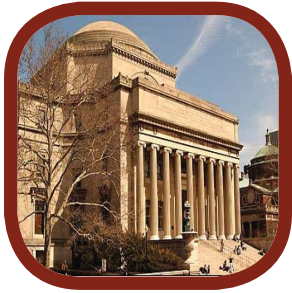


# Member Universities



## The City University of New York

The City University of New York is the nation's largest urban university. CUNY, with more than 100 nationally recognized research centers, institutes and consortia, is also one of the nation's major research institutions. Due to its urban context, many of CUNY's campuses are involved in transportation research and education. CCNY is UTRC's host campus. Faculties within several departments are actively involved in transportation research and the activities of UTRC. CCNY is also home to the CUNY Institute for Transportation Systems and the CUNY Institute for Urban Systems.



## Columbia University

Columbia University was founded in 1754 and is the oldest institution of higher learning in the state of New York, with enrollments of over 23,000 students in 16 schools and colleges. Columbia conducts transportation-related research through its strong departments of Urban Planning, Civil Engineering, and Industrial Engineering and Operations Research. Columbia is also home to the Earth Institute, which houses The Center for Sustainable Urban Development.



## Cornell University

Founded in 1868 and being first university in the eastern United States to admit women, Cornell University today encompasses thirteen undergraduate, graduate, and professional colleges and schools. Cornell is a unique combination of public and private divisions, being both a private, nonsectarian university and the land-grant institution of New York State. Cornell is home to the Transportation Infrastructure Research Center and the Cornell Local Roads Program, New York State's Local Technical Assistance Program center.



## New Jersey Institute of Technology

NJIT is a public research university enrolling nearly 8,100 students in 92 degree programs. NJIT has built its research program around multi-disciplinary centers that encourage partnerships among various disciplines, educational institutions, private enterprise and government agencies. NJIT is home to the National Center for Transportation and Industrial Productivity, the International Intermodal Transportation Center, and the New Jersey TIDE (Transportation Information and Decision Engineering) Center.



## New York University

Founded in 1831, New York University is one of the largest private universities in the United States, with nearly 51,000 students. NYU is home to the Robert F. Wagner Graduate School of Public Service, which engages transportation issues through programs in Urban Planning, Public Management and Finance, and Negotiation and Conflict Resolution. NYU also is host to the Rudin Center for Transportation Policy and Management and the Institute for Civil Infrastructure Systems.



## Polytechnic University

Polytechnic University, the nation's second oldest private engineering university, was founded in 1854 in Brooklyn, New York. Today, it is the New York metropolitan area's preeminent resource in science and technology education and research. In the transportation field, Polytechnic has strengths in Traffic Models, Highway Capacity and Traffic Operations, and Intelligent Transportation Systems. It is home to the Urban ITS Center, funded by the New York City Department of Transportation.



### **Rensselaer Polytechnic Institute**

RPI was established in 1824 and has the oldest program in Civil Engineering in the English-speaking world. RPI provides vast leadership in research relating to intelligent transportation systems, transportation modeling, traffic operations, intermodal freight transportation, transportation economics, and analytical approaches to emergency management. RPI hosts the Center for Infrastructure and Transportation Studies, The Intermodal Center for Freight Security and the Lighting Research Center, which has a dedicated Transportation Lighting Group.



### **Rowan University**

Established in 1923, Rowan is a comprehensive public university serving nearly 10,000 students in a Graduate School and several Colleges. Rowan's Civil and Environmental Engineering Department conducts transportation research in the areas of pavement design, materials, rail crossing safety, structural design of bridges, and structural design and testing of transit vehicles. Other areas of transportation research include renewable energy technologies, diesel combustion, distributed instrumentation systems and smart sensors, and vehicle systems integration.



### **Rutgers University**

Rutgers University is one of America's leading public research universities and educates over 48,000 students on its three campuses. Rutgers' Department of Civil and Environmental Engineering, Department of Industrial and Systems Engineering and Edward J. Bloustein School of Planning and Public Policy are all active in transportation research. It is home to the Center for Advanced Infrastructure and Transportation, which serves as New Jersey's center for FHWA's Local Technical Assistance Program, the Voorhees Transportation Center and the National Transit Institute.



### **State University of New York**

The State University of New York's 64 geographically dispersed campuses comprise the nation's more comprehensive system of public higher education. Across this network, SUNY has many capabilities that relate directly and indirectly to transportation research: urban planning and nanotech at Albany; civil and earthquake engineering, urban planning, and transportation injury research at Buffalo; environmental mitigation and biofuels at Syracuse; port security and trade at Maritime College; thermal sprays at Stony Brook; and pavements at Farmingdale. Many individual faculty members at other SUNY campuses are involved in transportation research as well.



### **Stevens Institute of Technology**

Founded in 1870 in Hoboken, New Jersey, the Stevens Institute of Technology is one of the leading technological universities in the country. Research at Stevens Institute includes structural dynamics, soil-structure interaction, freight transportation, and embedded, real-time, intelligent infrastructure systems.



### **University of Puerto Rico**

The University of Puerto Rico was established in 1903. Transportation research at UPR is concentrated on its Mayagüez campus, which serves over 12,000 students. Its Department of Civil Engineering has an active program in natural hazards research with applications in transportation. UPR is home to the Civil Infrastructure Research Center, which was funded by FEMA, FHWA, the Puerto Rico Department of Transportation, and other partners, and the Puerto Rico Transportation Technology Transfer Center, the local center for FHWA's Local Technical Assistance Program.



# Board of Directors

Claire McKnight, Ph.D.

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Polytechnic University, New York

Neville A. Parker, Ph.D.

City University of New York, New York

José Holguin-Veras, Ph.D.

Rensselaer Polytechnic Institute, New York

Soulaymane Kachani, Ph.D.

Columbia University, New York

William "Al" Wallace, Ph.D.

Rensselaer Polytechnic Institute, New York

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University of Puerto Rico – Mayagüez, Puerto Rico

# Financial Report

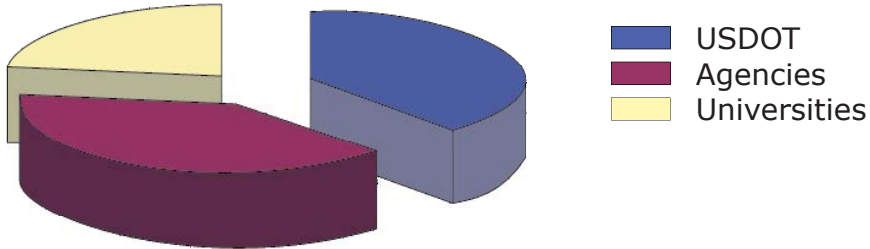


The following charts summarize the UTRC revenues and expenditures for FY 2006-2007. Under the new transportation bill – SAFETEA-LU, the University Transportation Research Center Region 2 funding allocated to programs totaled approximately \$4Millions in 2006-2007. This year, the annual USDOT grant authorized to programs was \$1,720,000 in which \$1,538,518 have been allocated to our programs. The USDOT funds represent 38 percent of the total allocation.

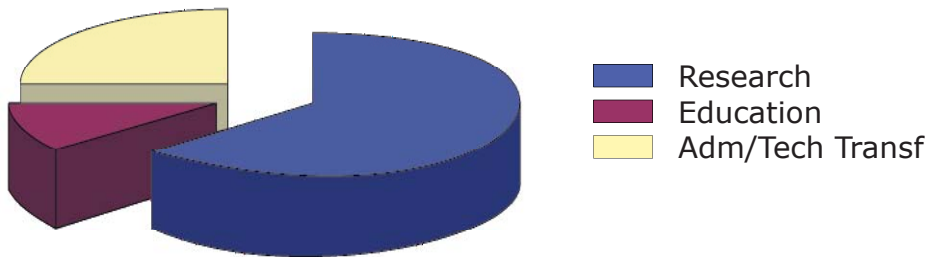
During the FY 2006-2007, UTRC has continued to strengthen its relation with its partners. UTRC has received funding from the New York City Department of Transportation and is working on establishing a long term agreement with the department for future funding. As in the past, UTRC's longtime partners, the New York State Department of Transportation, the New York Metropolitan Transportation Council, and the New Jersey Department of Transportation, provided a combined 38 percent of the revenues in fiscal year 2006-2007. UTRC's support from university members and agencies were 24 percent of the total budget.

Continued with tradition, and strong partnerships, and solid financial commitment from federal, state, and local transportation agencies, UTRC allocated 64 percent of its total budget to research projects. To carry out administrative and technology transfer programs, 25 percent of funds were used. The remaining funds (11%) were allocated to the Advanced Institute for Transportation Education program, the September 11th Memorial Program for RTP - Academic Initiative, and other educational initiatives.

## FY 2006-2007 Revenues



## FY 2006-2007 Funds Allocation



# Education and Training



The modern professional must combine the technical skills of engineering and planning with knowledge of economics, environmental science, management, finance, and law as well as negotiation skills, psychology and sociology. And, she/he must be computer literate, wired to the web, and knowledgeable about advances in information technology. UTRC's education and training efforts provide a multidisciplinary program of course work and experiential learning to train students and provide advanced training or retraining of practitioners to plan and manage regional transportation systems. UTRC must meet the need to educate the undergraduate and graduate student with a foundation of transportation fundamentals that allows for solving complex problems in a world much more dynamic than even a decade ago. Simultaneously, the demand for continuing education is growing – either because of professional license requirements or because the workplace demands it – and provides the opportunity to combine State of Practice education with tailored ways of delivering content.

## UTRC's Kamga receives Pikarsky Award at TRB 2007



*Left to right Former U.S. Secretary of Transportation, Norman Mineta, Dr. Camille Kamga, Prof. Neville Parker, and Dr. Kyriacos Mouskos*

At the 2007 Transportation research Board (TRB) Annual Meeting in January, the Council of University Transportation Centers (CUTC) honored Dr. Camille Kamga with the 2006 Milton Pikarsky Memorial Award for his dissertation, "Estimation of Network Based Incident Delay in a Transportation Network Using Dynamic Traffic Assignment." The Milton Pikarsky Memorial Award is given annually for the best Ph.D. dissertation nationally in the field of science and technology in transportation studies, and is named for UTRC's founding Director. The UTRC family is delighted to congratulate Dr. Kamga on this prestigious award.

## UTRC Student of the Year Award Presented to Eugene Sit

The University Transportation Research Center has selected Eugene Sit as its 2006 Outstanding Student of the Year.

Eugene Sit is a native of New York City and graduated from Columbia University in 2002 with a departmental citation and a Bachelor of Science degree in civil engineering. Eugene was a C. Prescott Davis Scholar at Columbia where he supplemented his engineering coursework with classes on transportation and urban development, architecture, planning, politics, and anthropology.



After graduating from Columbia, Eugene was employed by Vollmer Associates, LLP, as a junior engineer in the transportation department. He contributed analysis and

field observation to a number of projects, including the reconstruction of Route 9A in Lower Manhattan by the New York State Department of Transportation.

Eugene has since completed a master of science at the City College of New York (CCNY) and was the recipient of a scholarship from the Advanced Institute for Transportation Education (AITE). He has worked on his thesis under the supervision of Professor Cynthia Chen of CCNY. His thesis project entails performing sensitivity testing on the New York Metropolitan Transportation

Council's Best Practice Model, which represents one of the first uses of this model in academic research.

After completing his studies at The City College, Eugene started a year in Albany with the New York State Senate Legislative Fellows Program.

## Chan Ju (Jeannie) Kwon; The WTS Scholarship Winner

Chan Ju (Jeannie) Kwon is the 2007 recipient of the UTRC's award of \$1000, which goes to the winner of the Women's Transportation Seminar's (WTS) Leonard Braun Memorial Graduate Scholarship. Jeannie is working on a Master's degree in Public Administration at Wagner School of Public Service of New York



University. She was an assistant to Elliot Sander at DMJM Harris and has followed him to the MTA, where she is a Special Assistant to the Executive Director. In her new position, she is responsible for coordinating the MTA Quarterly Review process to establish performance measurement goals for the agency in conjunction with other MTA personnel.

Jeannie also started the Wagner

Transportation Association (WTA) at NYU, which has the purpose of connecting students to transportation industry practitioners. Through the WTA, she has arranged for walking tours of the Fulton Street Station and Grand Central Terminal and talks by NYC Councilman John Liu and NYSDOT Commission Tom Madison. Jeannie is particularly concerned about issues of management and sustainability. She states that: "I am specifically interested in continuous quality improvement in management operations, oriented towards customer service for transportation. I'm also interested in how transportation leaders can green the infrastructure and pursue sustainability initiatives."

**NJDOT Research Showcase  
Student of the Year presented to  
Sandeep Mudigonda**

Sandeep Mudigonda, received the NJDOT Research Showcase award at the 2006 NJDOT Research Showcase. Sandeep received his undergraduate degree in CEE from IIT Madras in India which is the top Civil Engineering program in India. He joined Rutgers University in 2003 and earned his MS degree in the Fall of 2006 under the guidance of Professor Kaan Ozbay. He is currently a first year Ph.D. student in the CEE program at Rutgers University.

Sandeep worked on various research projects including the "Cost of Transporting People in New Jersey" funded by UTRC and NJDOT. Sandeep is the co-author of a number of papers and has presented his latest work at the 2007 TRB Annual conference that was held in Washington D.C.

**2007 CUNY Summer Transportation  
Institute (STI)**

The CUNY Institute for Transportation Systems hosted the Summer Transportation Institute (STI) at The City College of The City University of New York for a twelfth year in 2007.



The STI Project Director, Neville A. Parker, Ph.D., P.E., and a UTRC Board member, continued bridging the gap between supply and demand by creating awareness and stimulating interest in high school students to take maximum advantage of the opportunities that exist in the Transportation industry.

The Non-Residential - 2007 STI commenced with the Opening Ceremony on Monday, July 2, 2007, and concluded with its Closing/Award Ceremony on Saturday, July 28, 2007. The University Transportation Research Center has awarded scholarships to students who have successfully completed the program.

**September 11th Memorial Program  
Academic Initiative  
2007/2008 Awards**

The University Transportation Research Center has continued to work with the New York Transportation Council (NYMTC) to administer NYMTC's September 11th Memorial Program for Regional Transportation Planning – Academic Initiative. This program was established to honor three colleagues lost in the attack of the World Trade Center: Ignatius Adanga, Charles Lesperance, and See Wong Shum. NYMTC designed this program to educate and motivate people interested in transportation technology and planning and to encourage innovations in planning activities throughout the region. The program's Academic Initiative provides tuition and stipend support to talented graduate students from across the region for internships and independent research projects.

On September 20th, 2007, NYMTC and UTRC announced the third group of students chosen to participate in this program. They include:



Nancy Mahadeo is a master's student in City and Regional planning at Rutgers University. She is doing an internship with the New York Metropolitan Transportation Council on "Mobile Source Emissions

Reduction Planning," under the guidance of Larry McAuliffe of NYMTC.



Matthew Roe, a master's student in Urban Planning at Columbia University, is doing an internship with the New York City Department of

Transportation on "Pedestrian and Traffic Safety Planning," under the guidance of Seth Berman and Ann Marie Dougherty.



Brian Ross, a master's student in Urban Planning at New York University, is doing an internship with the New York Metropolitan Transportation Council on "Coordinated Human Services - Public Transit Planning," under the guidance of Nancy

O'Connell.

In addition, two students were selected to conduct independent research projects:



Gitakrishnan Ramadurai, a doctoral student in Civil Engineering at the Rensselaer Polytechnic Institute, is conducting an independent research project

on "Identification and Modeling of Next Generation Traveler Guidance Systems." His advisors are Prof. Satish Ukkusuri of RPI, and Todd Westhuis of NYSDOT.



Timon Stasko, a doctoral student in Civil Engineering at Cornell University, is conducting an independent research project on, "Optimal Incentive Structures for Encouraging Diesel Retrofits." His advisors are Prof. Oliver Gao of Cornell and Mark Simon of NYCDOT.

Cornell and Mark Simon of NYCDOT.



## September 11th Memorial Program Academic Initiative 2006/2007 Update

The four students who participated in September 11th Memorial Program Academic Initiative during the 2006-07 academic year made final presentations of their work at a brown bag lunch seminar at NYMTC on Sept. 21, 2007.



Amit Arora, a masters student in Urban Planning at Rutgers University, described her project, in which she conducted a survey to understand how parking requirements and policies vary across the NYMTC region, as well as to identify innovative practices in the region and around the country.



Michael Silas, a doctoral student in Civil Engineering at the Rensselaer Polytechnic Institute, described his research developing a micro-simulation optimization framework to look at how sensitive truck delivery behavior is to economic incentives to shift to other times of day, using stated preference data from receivers and carriers in NYC.



Richard Barone, a masters student in Urban Planning at Columbia University, described his work with NYMTC's technical group to develop a five part strategy to formalize data management practices at NYMTC.



Jason Chen, a doctoral student in Civil Engineering at The City College of New York, described his research examining the relationship between the built environment and time of day ridership patterns at subway stations in New York City. This work will help the MTA to develop better forecasting models to understand how neighborhood change will affect station passenger volumes and staffing requirements.



# Technology Transfer



UTRC's Technology Transfer Program goes beyond what might be considered "traditional" technology transfer activities. Its main objectives are: (1) to increase the awareness and level of information concerning transportation issues facing Region 2; (2) to improve the knowledge base and approach to problem solving of the region's transportation workforce, from those operating the systems to those at the most senior levels of managing the system; by doing so, to improve the overall professional capability of the transportation workforce; (3) to stimulate discussion and debate concerning the integration of new technologies into our culture, our work and our transportation systems; (4) to provide the more traditional but extremely important job of dissemination of research and project reports, studies, analysis and use of tools to the education, research and practicing community both nationally and internationally; and (5) to provide unbiased information and testimony to decision-makers concerning regional transportation issues consistent with the UTRC theme.

## **An Evolving Paradigm of Transportation Modeling and Simulation**

UTRC with the Grove School of Engineering at the The City College of New York hosted the Bruce Podwal Seminar Series featuring Dr. Kostas Goulias, Professor of Transportation at the Geography Department of the University of California Santa Barbara. Dr. Goulias gave an overview of evolving practices in transportation modeling and simulation. This rapidly changing paradigm is emerging from a need to address travel behavior and develop procedures in facets that emerge from three sources: dynamic planning practice, sustainable and green visions, and new research and technology.



The typical aspects of data collection, modeling, and simulation considered for transportation policy analysis and planning are in this way examined from perspectives that raise many questions about our ability to make programmatic assessments.

For each of these fundamental areas questions are emerging as potential candidates for research programs and topics for Ph.D. dissertations and many issues remain largely under scrutinized. They include issues of scale in time and space, content and procedures for which models are designed, and the need to revert time in simulation to address problems of strategic planning

and scenario building.

## **Contactless Smart Cards for Transit Fare Payment: A Paradigm Shift**

The NYU Wagner Rudin Center for Transportation Planning and Management organized and hosted a panel discussion on contactless smart cards for transit fare payment.

The Metropolitan Transportation Authority - New York City Transit is exploring an option that permits payment of fare at the point of entry using a standard, bank-issued contactless smart card device. This is a paradigm shift from traditional approaches to fare collection in which transit agencies issue fare media and tickets that are integral to a stand-alone, custom-designed fare collection system. Panelists reviewed this paradigm shift and explored some of its implications. The featured panelists were Randy Vanderhoof from Smart Card Alliance, Gregory Garback from Smart Card Alliance, Burt Willhem from MasterCard Worldwide, Steve Frazzini from MTA NYC Transit and Paul Korczak from MTA NYC Transit.

This event was co-sponsored by the University Transportation Research Center, the New York Metropolitan Transportation Council, MasterCard Worldwide and the Smart Card Alliance.



## **CUNY Sustainability Conference Energy and Environmental Sustainability: Science, Engineering, and Public Policy**

The First CUNY Sustainability Conference brought together faculty from across the CUNY system to present their research addressing the critical issues of energy and environmental sustainability. This conference, which the University



Transportation Research Center helped organize, was held at the CUNY Graduate Center on December 8th 2006. The conference highlighted CUNY's emerging role as a leader in addressing these issues. Particular emphasis was placed on these issues as they affect the nation, New York State, and New York City, but all of these impacts will be discussed within the context of global concerns.

These front page issues include: the impacts of rapidly rising global energy use and fossil fuel demand; the connection between fossil fuel-based energy production and potentially devastating climate change; and the social, political and



economic effects of rapid urbanization and its influence on energy use.

The conference was a rare opportunity for CUNY researchers and scholars to share their work on a broad range of topics related to energy and environmental sustainability in an interdisciplinary and multi-campus forum



### **Workshop on NYC Freight Policy**

As development of New York City Mayor Michael Bloomberg's "PlaNYC 2030" initiative was underway, the Mayor's Office of Long-Range Planning and Sustainability asked the University Transportation Research Center to organize an expert workshop on freight policy to provide input to its policy development process. The workshop was held on February 23, 2007, and featured Robert Paaswell (City College of New York/UTRC), José Holguín-Veras (RPI), Maria Boilé (Rutgers University), Benjamin Miller (CUNY Institute for Urban Systems), Shmuel Yahalom (SUNY Maritime College), and William Galligan (East of Hudson Rail Freight Task Force).

**Up Here and Down Under:  
Transport Policymaking in the US  
and Australia  
Dr. Cameron Gordon**

The University Transportation Research Center and the New York Metropolitan Transportation Council hosted a seminar featuring Dr. Cameron Gordon, Senior Lecturer in Finance, School of Business and Government, University of Canberra, Australia.

Dr. Gordon compared how the United States and Australia approach the complex intergovernmental problem of transportation planning and coordination. Both nations have federal systems, but each has a distinct approach to balancing local and national roles and interests. This presentation compared policy-making institutions and trends in the divided executive/legislative system



of the US and the “Washminster” system of Australia (which combines elements of “Washington” federalism with “Westminster” style parliamentary democracy).

**Emergency Medical Services:  
A Critical Condition  
in Transportation Safety  
Nadine Levick, M.D., M.P.H.**

Emergency Medical Services (EMS) is an important and unique aspect of the transportation system, in that it



encompasses public safety, public health and an emergency service. What are the system wide transportation safety issues and challenges faced by the Emergency

Medical Services? This presentation, held during the New York Metropolitan Transportation Council (NYMTC) Brown Bag Seminar Series co-sponsored by the University Transportation Research Center, covered a comprehensive perspective on the system wide data, the challenges, the cutting edge and the gaps in knowledge and application of transportation systems safety in the big picture of Emergency Medical Services transportation.

The full spectrum of transport related aspects of EMS was encompassed in this presentation: dispatch of EMS vehicles, transport policies and protocols, vehicle fleets and vehicle design, vehicle purchase standards, Intelligent Transportation Systems technology, driver training, training simulation, driver performance monitoring, policies for transport safety, roadside safety, road design, integrated traffic safety technologies, scene safety and visibility, safety data capture and safety oversight. This was an opportunity for transportation planners, engineers, and system operators to

see a comprehensive overview some of the multidisciplinary transportation challenges faced by Emergency Medical Services.

**Transit Regulation  
and Privatization:  
The European Experience  
Dr. Matthew G. Karlaftis**

The University Transportation Research Center hosted two half-day seminars featuring Dr. Matthew Karlaftis, Associate Professor of Transportation Planning and Engineering, National Technical University of Athens.

The past few decades have seen transit patronage decrease in all Western countries, including Europe and the United States, lagging far behind the substantial growth in mobility that has occurred during the same period. This is in part due to rising levels of real income and the decreasing relative costs of private travel. In addition to these, come large budgetary deficits faced by many countries in recent years necessitating fiscal constraints that have led to a significant reduction in transit subsidization. In an effort to address operational shortcomings and reduce operating deficits, increase



productivity, and improve the quality of services, the public transit sector has been moving - in many European countries - away from public ownership and operation and towards private sector participation.

The presentations discussed three parameters in the transit deregulation/ privatization debate:

- \* Financial constraints, including budget cuts for transit subsidies, justification for subsidization, and possible solutions.
- \* Empirical findings from European Transit Systems. Using data from 38 transit systems in Europe for a 15-year period (1990-2005), discussions were held on whether the long held hypothesis of the positive effects of privatization on transit efficiency holds true in practice.
- \* Factors influencing findings. It was agreed that the private-public operations debate should be differentiated from other factors also influencing the magnitude, and possibly even the direction, of privatization's effects on transit efficiency including market structure and competition, contract development and tendering system, and empirical assessment methodology.



This seminar was co-sponsored by CUNY Institute for Urban Systems, Port Authority of New York and New Jersey, NYU Wagner Rudin Center for Transportation Policy and Management and New Jersey Department of Transportation.

### **How Can We Finance Improvements to Our Aging Transit Infrastructure?**

On March 15th, The Mayor's office of Long Term Planning and Sustainability in cooperation with The New School for Social Research, NYU Wagner School, Pratt University, Columbia University School of Architecture Planning and Preservation and School of Public Affairs at Baruch College, hosted this panel discussion.

The moderator was Chris Jones, Vice President for Research, Regional Plan Association. The speakers included: Charles Brecher, Professor of Public and Health Administration, Robert F. Wagner Graduate School of Public Service, New York University, Research Director, Citizens Budget Commission;

Charles Brecher, Professor of Public and Health Administration, Robert F. Wagner Graduate School of Public Service, New York University, Research Director, Citizens Budget Commission; Allison L. C. de Cerreño, Ph.D., Director,

Rudin Center for Transportation Policy and Management, Robert F. Wagner Graduate School of Public Service, New York University, Robert E. Paaswell,

Distinguished Professor of Civil Engineering, City College of New York, Director, University Transportation Research Center; and Gene Russianoff, Senior Staff Attorney, Straphangers Campaign, New York Public Interest Research Group (NYPIRG).

### **Congestion Pricing for New York? Lessons from London** **Malcolm Murray-Clark, Transport for London**

New York City is now witnessing an unprecedented debate over the possible implementation of a congestion pricing scheme to reduce vehicle traffic. Praised by supporters as a necessary tool to fight gridlock, congestion pricing



also has harsh critics who argue it unfairly burdens those for whom public transportation is not a feasible option. One constant throughout this debate, in New York City and other major cities where the strategy is being considered, are references to the congestion pricing scheme in London, which has been hailed as a huge success since it began in February 2003.

Moderator, Stephen A. Hammer of Columbia University, had the pleasure



of welcoming one of the key architects of London's program, Malcolm Murray-Clark, who is Director of Congestion Charging at Transport for London (TFL). Mr. Murray-Clark discussed the details of London's program. This included how TFL assessed driver demand responsiveness prior to establishing toll levels for the program; how the congestion pricing scheme links to a larger set of land use strategies and transport system upgrades planned for London; the environmental impacts of the program, and how it is evolving to address heightened concerns about greenhouse gas emissions; and how advances in technology have changed the way TFL will manage the program in the future.

Following Mr. Murray-Clark's presentation, Dr. Robert Paaswell, Director of the University Transportation Research Center at the City College of New York (and former Executive Director of the Chicago Transit Authority) distilled lessons from London's program, explaining the unique considerations local policymakers must keep in mind as they explore whether to pursue a similar strategy in New York City.

This discussion was sponsored by the Environmental Sciences Section and co-sponsored by the University Transportation Research Center, New York Academy of Sciences and CUNY Institute for Urban Systems.

### **Urban Climate Change Research Network International Symposium**

The Columbia University's Center for Energy, Marine Transportation and Public Policy, NASA Goddard Institute for

Space Studies, and the CUNY Institute for Sustainable Cities co-hosted the first Urban Climate Change Research Network (UCCRN) International Symposium on May 10-11, 2007. This symposium was organized as an informal side-event to the C40 Large Cities Climate Summit, a gathering of mayors from large cities around the world. The UCCRN symposium brought together leading researchers to share information about local climate change mitigation and impacts and launch a global network which will act as a hub for knowledge sharing and relationship-building among researchers, research institutions, and policy-makers.

During the two-day symposium, more than 150 international and local experts gathered at Columbia University to define problems and analyze and debate local climate change mitigation and adaptation efforts. Distinguished panel speakers addressed issues such as climate risk management, the importance of local energy policy to climate change mitigation efforts, the role of modeling in local policy-making, infrastructure risks in coastal cities, transport system and land-use planning, urban heat island effects and public health, and integrating climate and energy science into urban policy. UTRC was a co-sponsor of the event and the organizer of the transportation panel.





## **New Mobility: The Next Generation of Sustainable Urban Transportation**

The University Transportation Research Center hosted a half-day seminar featuring Susan Zielinski, Managing Director, Sustainable Mobility and Accessibility Research and Transformation project, University of Michigan.



With the emergence of new services and products, new information technologies, and innovative public and private partnerships, we are approaching a new age of mobility and accessibility in urban regions. This

new age is about moving people and goods in ways that are greener, safer, healthier, more equitable, multi-modal, multi-service, and connected, door-to-door. It's also about moving less, reducing the number and length of trips with the help of telecommunications technologies, smart land use, and urban design.

Transcending the quest for a silver bullet, New Mobility takes a whole systems approach to understanding and innovating urban transportation, and engages a wide range of private and public sector innovators, supporting the development of a nascent New Mobility industry cluster that works to address shifting and increasingly urgent urban transportation needs globally. This session presented New Mobility concepts and opportunities with selected case

examples from around the world.

This presentation was co-sponsored by NYU Wagner Rudin Center for Transportation Policy and Management, CUNY Institute for Urban Systems, Port Authority of New York and New Jersey, and New Jersey Department of Transportation.

## **Promoting Safe Walking and Cycling to Improve Public Health: Lessons from Europe Dr. John Pucher**



In his presentation, during the NYMTC Brown Bag Seminar on April 17th 2007, Prof. Pucher examined a range of public health impacts of our urban transport systems. He argued that the current

car-dependence of American cities was responsible for enormous environmental harm, social isolation, lack of physical activity, and traffic dangers. To overcome these negative impacts, it was crucial that the convenience, safety, and attractiveness of walking and cycling be



improved. Many cities in Europe have been successful at greatly improving conditions for walking and cycling, while integrating them fully with high-quality public transit systems. That has provided a truly feasible alternative to the private car and levels of walking and cycling many times higher in Europe than in the USA.

Dr. Pucher discussed and illustrated the many specific policies and programs used in Europe and proposed their widespread adoption in American cities. Especially given the worsening obesity epidemic in the USA, walking and cycling for daily travel in our cities would be ideal for increasing physical activity while at the same time reducing Greenhouse gas emissions, air pollution, noise, energy use, roadway congestion, and traffic dangers. Walking and cycling are also keys to the sustainability and livability of our cities.

### **Personal Mobilities, Contemporary Cities, and Urban Life**

The CIUS International Scholars Series on Infrastructure and the Environment was held on April 27th 2007 and was co-sponsored by the University Transportation Research Center. Aharon Kellerman, professor emeritus of geography at the University of Haifa and the president-designate of the new Academic College for Israel (now in construction), was the keynote speaker. He serves as chair of both the International Geographical Union's Commission on the Geography of the Information Society and the Israeli National Geography Commission.

In his most recent book, Aharon Kellerman studies contemporary cities and their residents from the perspective of the growing number of what he calls personal mobilities. These include not only the corporeal means of movement (walking, cycling, driving) but also the virtual mobilities offered by the increasing number and form of telecommunications technologies.



*Richard Hanley (right), Dr. Aharon Kellerman (center) and Dr. Robert Paaswell (left)*

The new technologies of mobility affect cities and urbanites differently from their predecessors. The physical and spatial structures of cities were changed to adapt to the automobile, but contemporary mobile communications technologies adapt themselves to urban physical structures.



While not changing the shape of cities, new physical and virtual mobilities have been responsible for changing the traditional daily and weekly rhythms of cities. They have also allowed for more participation in the urban and global systems of social, spatial, and business networks. In these and other ways, urban systems and personal mobilities tend to reinforce each other and put the lie to the thought that the technological age will mark the end of cities.

port holdings taking control of large segments of commodity chains to derive added value; a valorization of supply chains. Such a process has significant regional and local repercussions in terms of capital investment in inter-modal and freight distribution facilities as well as for freight flows. He identified major commercial and technological trends and how New York fits as a region in this global space of flows.

### **Intermodal Transportation and Commodity Chains: New York and the Global, Regional and Local Nexus**

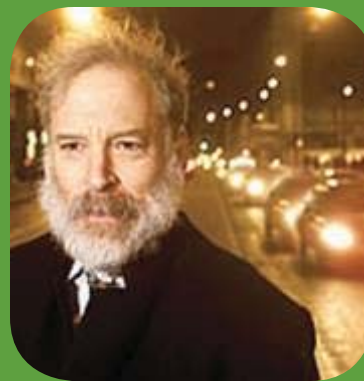


Dr. Jean-Paul Rodrigue, Associate Professor of Economics and Geography, Hofstra University, at the NYMTC Brown Bag

Seminar on May 16th 2007, discussed the emergence of global players such as maritime shipping companies and

### **Hyper Motorization in China: Is There No Way Back? Dr. Lee Schipper**

By any definition, China's urban transport is becoming less sustainable. Congestion, traffic accidents and fatalities, as well as urban air pollution from the transport sector have all been increasing over the past two decades. For both accidents and pollution, the accidents or emissions per km of many pollutants are falling, but not as rapidly as the total distance traveled is increasing,



particularly distance that individual passenger automobiles travel. And the rise of individual motorized vehicles means that more and

more pedestrians and cyclists are crowded off city streets.

The speed of China's motorization is at the root of the problem. China is currently experiencing "hypermotorization" –



when the ownership of cars grows so rapidly that the public and private infrastructure required cannot keep pace with private ownership and use of cars. Policies to slow the growth in private vehicle usage must be established quickly to save the cities of China from the present crunch becoming worse. The alternative must be based on a strengthening of bus, rail, and above all non-motorized modes in Chinese cities, cemented by careful land use planning to avoid the sprawl of cities beyond what these modes can usefully share. Put forward was the example of Hanoi, Vietnam, one of the most motorized cities in the world, where two-wheelers might provide a degree of individual mobility with far less demands on space, fuel, and at lower speeds, theoretically less congestion and fewer fatalities.

This presentation was adapted from the introduction of the forthcoming volume "Urban Transport Options in China: The Challenge to Choose", Lee Schipper and Wei-Shiuen Ng, eds. Sponsored by the Energy Foundation and the Hewlett Foundation. This presentation was co-sponsored by NYU Wagner Rudin Center for Transportation Policy and Management, University Transportation Research Center, and CUNY Institute for Urban Systems.

### **Delivering the Goods: The Freight Needs of a Growing Population**

Imagine the New York metropolitan region with 2 million more people over the next 25 years. That translates into roughly 70 million more tons of goods to be delivered, challenging an

already-constrained transportation system. This event, held on the June 6th 2007, addressed the key freight issues affecting and affected by the current and forecasted population growth. Recognizing that much of the freight movement within the NYMTC region is driven by the population's need for goods and services, this symposium laid the foundation for the region's decision-making on freight, while trying to provide a more coherent and consistent voice for freight in this



region. The keynote speaker at this event was Astrid Glynn, Commissioner of the New York State Department of Transportation.

Other speakers were: Allison L .C. de Cerreño, Director, NYU Wagner Rudin Center; Robert Caton, Vice President, Airport Facilities Group, AMB Property; Alice Cheng, Vice President, NYC



Economic Development Corporation; James Devine, President, New York Container Terminal; Joel Ettinger, Executive Director of NYMTC; William Goetz, Resident Vice President, CSX Transportation; John Henry, Senior Vice President and Chief Financial Officer, Duane Reade, Inc.; The Hon. Jerrold Nadler, U.S. House of Representatives, Robert Paaswell, Director, University Transportation Research Center; Mark Pisano, Executive Director, Southern California Association of Governments; Anthony Shorris, Executive Director, Port Authority of New York & New Jersey; and Robert Yaro, President, Regional Plan Association.

This event was sponsored by NYU Wagner Rudin Center for Transportation Policy & Management, New York Metropolitan Transportation Council (NYMTC), University Transportation Research Center - Region 2, The Port Authority of New York & New Jersey, CSX, NYU Wagner Institute for Civil Infrastructure Systems (ICIS), New York City Economic Development Corporation, and NY State Bar Association Environmental Law Section.

**Air Travel in the Twenty-First Century**  
**by Robert Checchio**

Robert Checchio, a doctoral student in the Bloustein School of Planning and Public Policy at Rutgers University, at the NYMTC Brown Bag Seminar co-sponsored by the University Transportation Research Center, discussed "Travel in the Twenty-First Century."

Air travel in the United States is increasingly characterized by long drives to airports, long waits in airport lines, flight delays and canceled flights. Personal travelers may have little choice but to accept the tribulations associated with air travel, but businesses that



depend on air travel may at some point decide that alternatives to commercial travel need to be found. As business firms seek these alternatives, advancements in aviation technology may make areas served by smaller regional and community airports more attractive to them. This in turn may affect regional economies through relocations. Mr. Checchio's presentation explored the technological changes being implemented in the air travel arena and the key players behind those changes, as well as the possible impacts of business relocations.



## Dynamic Traffic Assignment - Overview, Functionalities, Models and Algorithms for Transportation Planning Applications



Dr. Satish V. Ukkusuri, Assistant Professor of Civil and Environmental Engineering, Rensselaer Polytechnic Institute, at the NYMTC Brown Bag Seminar co-sponsored by the University Transportation

Research Center, discussed "Dynamic Traffic Assignment - Overview, Functionalities, Models and Algorithms for Transportation Planning Applications."

This presentation provided an overview of dynamic traffic assignment - its functionalities, capabilities and potential applications to different transportation planning problems. DTA allows modeling the evolution of traffic flows in a traffic network, which result from the travel decisions of individual travelers. The model is also capable of representing travel decisions of travelers seeking to fulfill a chain of activities at different locations in a network over a given planning horizon. The model capabilities will be discussed. In addition, the limitations of the static models currently used in practice were discussed. The capabilities of DTA models as an alternative to answer important policy questions, such as transportation air quality conformity, that planning agencies are increasingly asked to address, were discussed during this presentation. Finally, the potential for integrating a core DTA component in the NYMTC BPM model was discussed.

## Tripping the Light Fantastic - Applications of Advanced Lighting Technologies in Transportation

During their NJDOT Technology Transfer Seminar presentation "Tripping the Light Fantastic," Dr. Mark Rea, director, and Dr. John Bullough, lighting scientist, of the Lighting Research Center at Rensselaer Polytechnic Institute reviewed the historical foundations of using lighting along our roadway system. They provided some insight as to how theory, research and technologies make their way into practice, and described some of the latest developments in lighting that promise to change the way our roads are lighted. Using the results of a recent evaluation of innovative work zone lighting systems as a case study, Dr. Rea and Dr. Bullough also discussed how potentially radical ideas might work their way into established roadway lighting practice.



*Dr. Mark Rea*

Dr. Mark Rea is the director of Rensselaer Polytechnic Institute's Lighting Research Center, and a professor of architecture and cognitive science. His research interests focus on human vision, visual performance and

photobiology. Dr. Rea has authored more than 200 technical publications in vision and lighting, and was editor-in-chief of the past two editions of the Illuminating Engineering Society of North America's Lighting Handbook, the standard reference for lighting science, engineering and practice.

Dr. John Bullough is a senior research scientist at the Lighting Research Center at Rensselaer Polytechnic Institute in Troy, NY. He manages the center's transportation lighting research program



*Dr. John Bullough*

and also studies vision, perception and circadian rhythms. He also teaches as an adjunct faculty member in Rensselaer's graduate programs in lighting. He has written or co-written more than 150 articles and technical publications.



continues to uncontrollably escalate with tremendous social consequences. These repair often cost up to 20 times more than the cost of developing rational infrastructure rehabilitation

### **Underground Asset Management**

At the NJDOT Technology Transfer Seminar, on September 25th, 2007, Dr. Jay N. Meegoda, Professor of Engineering at the New Jersey Institute of Technology (NJIT) spoke on the topic of Underground Asset Management.

Over the past decades millions of miles of buried infrastructure were constructed. The performance record for this buried infrastructure has been remarkable. Especially after the consideration that very little resources were spent to maintain and/or operate this vast network of pipes and cables. In fact, its performance was so good that most agencies/owners have taken for granted and considered it to be out of sight and out of mind. This infrastructure management approach of neglect cannot be continued as much of this critical infrastructure has exceeded its design and performance life of 30 to 50 years.

The main question plaguing today's infrastructure managers is not if this infrastructure will fail but when will it fail. Digging up and replacing all deteriorated infrastructure is not feasible or a reasonable solution due to the astronomical cost and owners limited financial resources. In addition, the magnitude of infrastructure requiring replacement would create chaos. Across North America infrastructure managers are starting to find out that the costs to repair catastrophic failures

programs. A solution to solving this management and financial problem is to develop a rational and defensible buried infrastructure management plan.

A comprehensive culvert information management system (CIMS) is currently being developed at NJIT under the sponsorship of the USDOT/NJDOT. This system will comply with the recent Governmental Accounting Standards Bureau (GASB) requirements. The potential benefits of the proposed system will include long-term savings from adopting optimized preventive maintenance strategies. These options are incorporated into the CIMS, which uses survival probabilities based on the condition state during the previous year. The CIMS is capable of determining whether it is appropriate to inspect, rehabilitate/replace or do nothing at both project and network levels. At the project level this can be achieved by comparing inspection and/or rehabilitation/replacement costs with risks and costs associated with failure. At the network level, the associated costs may be optimized to meet annual maintenance budget allocations by prioritizing infrastructure needing inspection and rehabilitation/replacement. As a next step, the proposed CIMS can also be used to estimate the required annual budgetary allocation for a stipulated planning horizon and to maintain or improve the aggregate Condition State of transportation infrastructure network.

# Research



A centerpiece of UTRC's mission is an ongoing program of basic and applied high quality peer reviewed research. The majority of UTRC's projects arise directly out of the needs of the region's public agencies. In these cases, an RFP for a specific project is issued by a sponsoring agency. UTRC circulates the RFP to its entire network of Principal Investigators (now over 180 faculty members at its 12 member institutions). After all proposals are received, UTRC reviews the proposals to ensure that their budgets meet UTRC criteria and use equivalent assumptions. Proposals are then passed on to the sponsoring agency, which selects the winning team.

UTRC also directly sponsors research proposals, on a competitive basis, generated by faculty within its consortium. The annual "UTRC Research Initiative" funds innovative research on topics proposed by university faculty. Proposals are peer-reviewed by researchers at other UTCs, and by public agencies and practicing professionals within Region 2, and scored according to their relevance to the region's needs, the quality of proposed research approach, and other criteria. UTRC also funds research through its "Advanced Technology Initiative," which focuses on projects that bring new technologies from the laboratory into practice; and "Faculty Development Minigrants," which junior faculty members develop papers for publication.



# The Transportation Healthcare Connection During Disaster: Toward Improved Mitigation and Preparedness

Performing University:	SUNY/ University of Buffalo
Sponsor:	United States Department of Transportation <i>A UTRC Research Initiative</i>
Principal Investigator (lead):	George C. Lee, Ph.D. Samuel P. Capen Professor of Civil Engineering Department of Civil, Structural and Environmental Engineering University of Buffalo, SUNY

The Katrina disaster revealed tragic failures of healthcare transportation during urban disaster. Under catastrophic disruption, there were great difficulties in transporting victims to healthcare and in evacuating patients from flooded hospitals and nursing homes. New York City might be subject to similar acute problems under pandemic influenza, terrorist attack, hurricane with coastal surge, earthquake, and other disastrous scenarios. Even during normal periods, many emergency departments, acute care wards, trauma centers, and other healthcare facilities operate at or near capacity. In this overburdened system, transportation serves an important function, matching patient need to healthcare supply. That function is all the more critical during disaster, when the system can face combinations of patient surge and facility disruption.

In this study, two researchers from the University at Buffalo – George C. Lee, Samuel P. Capen Professor of Engineering; and Ernest Sternberg, Professor of Urban and Regional Planning – reviewed the literature and interviewed specialists in medicine and emergency response to bring initial intellectual order to this exceptionally complex topic. Sternberg and Lee suggest as a founding framework that the problem be divided into three components. The first is incident morbidity: the distribution of injury and illness types at one or more disaster incident sites. Sometimes, healthcare facilities

themselves are sites of disaster and must be considered incident sites from which patients have to be removed. The second consists of transportation assets, initially those supplied through the normal EMS system and if needed supplementary staff and ambulances. The third is healthcare capacity: hospitals and emergency departments, as well as specialized capacities such as trauma centers, burn beds, pediatric emergency departments, ventilators, and decontamination and isolation facilities. In disaster, a region's healthcare capacity can increase in some locations and decline in others, as the initial effects and subsequent responses play out.

In view of these complications, the authors observe that patient transport in disaster is much more than an EMS dispatch problem. It is rather a far larger assignment problem, requiring complex institutional interactions between emergency first responders at incident sites, transport units and their dispatchers, and healthcare facilities subject to fluctuating capacities. They conclude by calling for research on institutional mechanisms for healthcare assignment during disaster. For that purpose, they identify six tentative options: assignment through 911 systems, the "assignment (clearinghouse) hospital" method, first-hospital assignment in which the first receiving hospitals reassigns patients, centralized assignment, specialized assignment, and assignment through mutual adjustment.

# Identification of Source of Rutting in a Flexible Pavement System

Performing Universities:

Rowan University  
The City College of New York  
Florida Gulf Coast University

Sponsor:

United States Department of Transportation  
*A UTRC Research Initiative*

Principal Investigator (lead):

Yusuf A. Mehta, Ph.D., P.E.  
Associate Professor  
Department of Civil and Environmental Engineering



Rut depth is traditionally measured by determining a depression in the wheel path with respect to the median and the shoulder. Various studies have shown that rut depth (as measured traditionally) may not necessarily be an accurate reflection of pavement and mixture performance. There are times that rut depth may appear to be stabilized, implying that the mixture is performing well. A literature review has shown that continued instability may not result in an increase in rut depth because the rutted basin may broaden as traffic wanders, compacts or moves the dilated portion of the mixture.

The primary objective of this proposal is to develop a framework to identify the most likely source of rutting within the pavement system and the presence of mixture instability in the surface layer, even in the very first few years of the pavement life. Currently, the only accurate method of identifying the source of rutting is to cut trenches and observe deformation in the various layers of the pavement structure, a process that is inconvenient, destructive, and

expensive. The proposed system encompasses analysis of routinely collected data, including rut profile, measurement of air voids (AV) content from field cores, and back calculation of in-situ moduli of each of the layers. A component is also added to quantify the risk to demonstrate the implications for the state agency due to differences in predicted performance using the proposed analysis and the traditional rut depth measurement tools. The proposed procedure is unique in the sense that it is independent of the rut depth magnitude, a feature that allows the early identification of rutting and instability of the surface layer so that the appropriate corrective action for remediation can be taken.

On several occasions, state agencies have accepted pavements on distinctly engineering judgment and rut depth that may be too risky, especially for long-term prediction of pavement performance. In addition, with the lack of a conclusive solution, pavement rehabilitation decisions have been made on the more conservative basis of conducting partial or full removal and repair. These costly decisions have ultimately come at the expense of taxpayers and consumers. The proposed methodology/system can be viewed as a state-of-the-art system that provides a microscopic approach to evaluate transverse profile measurements. This is very beneficial because state agencies are familiar with all the data that will be necessary to determine the source of rutting with no investment in additional equipment necessary.

# A Decision Support Tool to Assess Importance of Transportation Facilities

Performing Universities:

Rensselaer Polytechnic Institute  
University of Puerto Rico - Mayagüez

Sponsors:

United States Department of Transportation  
*A UTRC Research Initiative*

Principal Investigator (lead):

Satish Ukkusuri, Assistant Professor,  
Blitman Career Development Chair Professor  
Department of Civil and Environmental Engineering  
Rensselaer Polytechnic Institute

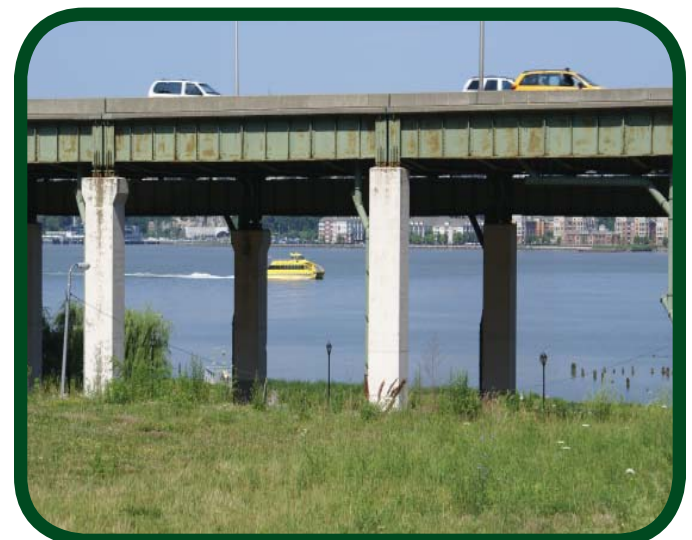
Assessing the importance of transportation facilities is an increasingly growing topic of interest to the federal and state transportation agencies. In the wake of recent terrorist attacks and the ongoing external threats (both manmade and natural), significant steps are needed to improve the security in New York (NY) State, especially New York City. New York has one of the widely utilized multi-modal networks in the country with the right leveraging conditions among different modes. Assessing the cross-boundary impacts of the operations from a particular facility on the entire transportation system has the potential to dramatically strengthen NY's transportation from external threats and lessen the impact of potential disruptions on New York travelers and shipments. Various completed and ongoing studies explored this topic from different perspectives (NCHRP report 207); however these studies fail to arrive at a comprehensive modeling tool to study this critical problem.

In this project, the researchers are concerned with developing a tool, which will assist transportation professionals to assess the importance of different transportation facilities. Developing such a tool will relieve congestion; maximize the safety and mobility of people and goods. The results from this work have the potential to be included into the metropolitan and statewide transportation plans. The key questions, which this project will address, are:

1. Which links/nodes (facilities) are most critical to the operation of the entire transportation infrastructure system;
2. How do we identify these facilities; and
3. How do we rank these different facilities to estimate operating costs and aid in network

investments and contingency planning.

The research team will identify different situations to illustrate the resulting strain on the transportation system. The developed model will be implemented on two New York state test networks (currently identified as NY city and Albany area) to demonstrate the benefit of this tool. In addition to the strong research experience this multi-university team brings to the project, an emphasis on the education and outreach to the next generation of transportation professionals will be placed throughout. In this respect, RPI and University of Puerto Rico (UPRM) will support a graduate student, support an undergraduate intern from UPRM who will visit RPI, integrate these results into classroom teaching and disseminate this work through presentations at Annual Transportation Research Board Conference.



# High-Precision Analysis of Blast Events on Highway Bridges

Performing University:	The City College of New York
Sponsor:	United States Department of Transportation <i>A UTRC Research Initiative</i>
Principal Investigators:	Anil Kumar Agrawal, Professor, Ph.D., P.E. Department of Civil Engineering The City College of New York

According to the Blue Ribbon Panel set up to study the issue of blast attacks, substantial casualties, economic disruptions and other societal ramifications would result from isolated attacks on 1,000 of 600,000 bridges in the country. This clearly shows that the highway system in the country has vulnerabilities to blast damages that must be addressed urgently. Although some work on blast resistant design and detailing guidelines is being carried out through different initiatives [e.g., NCHRP 12-72], there is an urgent need to develop high-precision finite element analysis tools to realistically model the behavior of different bridge components, including uncertainties involved in modeling structural parameters during high strain loading encountered during blast loads, interaction between blast wave and bridge components and effectiveness of different mitigation strategies.

The main focus of NCHRP 12-72 project - "Blast-Resistant Highway Bridges: Design and Detailing Guidelines", is to develop guidelines for design and detailing of bridge components during blast events based on existing seismic guidelines. Although the effect of blast loading is usually localized compared with that of an earthquake, the ability to sustain local damage without total collapse is a key similarity between seismic and blast resistant design approaches. Unlike during seismic loading, bridge bents and piers may be subjected to large lateral forces, possibly resulting in large deformations, shear or flexural failures due to an explosion under the bridge deck. Extensive local damage to bridge bents and piers may result in loss of their load-carrying capacity which, in turn, may trigger a cascade of failure resulting in progressive collapse of the bridge.

This project proposes to address this crucial need through the following tasks: (i) Development of high-precision finite element models of bridge components based on current state of the art in high strain behavior of bridge component materials, (ii) Verification of high-precision FEM model through available experimental data on blast loads (experimental, intentional, unintentional and visual), and (iii) simulation of behavior of bridge components during various blast event scenarios (under deck, above deck, proximity to columns, etc.).

This research will be carried out by the PI, Professor Anil K. Agrawal and his doctoral student, Mr. Zhihua, Yi. Dr. Mohammed Ettouney, Principal of Applied Research at Weidlinger Associates, New York, and Dr. Sreenivas Alampalli, Director of Bridge Program and Evaluation Services Bureau at the New York State Department of Transportation will be members of advisory committee to evaluate research work, progress and reports.



## Development of Portable Hydrocarbon Sensors

Performing University:	SUNY/University of Albany
Sponsor:	United States Department of Transportation <i>A UTRC Research Initiative</i>
Principal Investigator (lead):	Michael Carpenter, Ph.D. Assistant Professor University of Albany, SUNY College of Nanoscale Science and Engineering



While these studies have shown great promise more work is required to develop this technology into prototype devices. Therefore, the researchers are proposing to develop and evaluate a cost and space effective sensing assembly which will leverage our past and future hydrocarbon sensor development efforts funded by the NYS-DOT. This program will utilize a compact UV photodiode optical source and a compact spectrometer for the detection assembly for an overall footprint of only 6x6 inches. A fiber optic based reflection probe will be used as the actual detection probe with the QD based sensing materials being deposited directly onto the 400 $\mu$ m diameter collection fibers. The optical signature or "fingerprint" of the target gases will be determined using pattern recognition algorithms and the degree of enhancement of the sensor arrays will be determined and compared with that obtained by previous hydrocarbon detection measurements. To enable the development of fiber optic based sensing arrays we will develop, evaluate and optimize both the manual printing and ink jet printing methodologies for the deposition of 6 element arrays of 400 $\mu$ m diameter QD-polymer thin films. The intellectual merit of this program will be realized in the development of next generation hydrocarbon sensing systems based on the novel properties of quantum dot nanomaterials and their integration into a cost effective sensing assembly. Broader impacts will be realized in the application of this cost effective hydrocarbon sensing technology which includes soil, groundwater, indoor and outdoor air quality, and homeland security within a broad range of technology sectors that include transportation, environmental quality, defense, agricultural and many others.

The testing of soil samples is performed during all phases of DOT related construction (planning, building, and post construction). This is done to ensure that the soil removed is not contaminated and when construction is complete to ensure that the environmental impact of the structure is minimized. NYS-DOT spends approximately \$10-12M/yr on the testing of soil and groundwater samples, which does not include the NYC-DOT. By moving the majority of these tests from an off-site analytical lab, to a field portable device the overall cost of construction budgets will be significantly lower and construction projects will experience fewer delays due to untimely analytical lab reports.

For the past 2.5 years the researchers have been developing quantum dot (QD) based hydrocarbon sensing materials which have displayed detection limits as low as 15ppm and an enhanced degree of selectivity for the detection of xylenes over toluene.

# The Effects of Technological Change in the Aviation Industry on Spatial Development Patterns

Performing University:	Rutgers University
Sponsor:	United States Department of Transportation <i>A UTRC Research Initiative</i>
Principal Investigator (lead):	Michael Lahr, Ph.D. Associate Professor Center for Urban Policy Research Edward J. Bloustein School of Planning Rutgers University

Aircraft technology advancements are enabling smaller craft to run both more efficiently and quietly, and are making possible the next generation of air traffic management technology. Combined these improvements promise to make better use of existing airport facilities and air travel space but also should enable safe, reliable air travel to hundreds of airports not served by commercial airlines today.

The purpose of this project is to examine the repercussions of the anticipated aviation technology advances upon state and local economies. A prime focus of this project, therefore, is to identify the probable reactions of business travelers and businesses alike to these anticipated changes in aviation technology.

In spite of dramatic advances in communications technology, the need for business managers to conduct face-to-face meetings has increased over the past three decades. Numerous factors, however, impair the ability of business people to travel by air, as well as increasing their business costs. These factors include reduced air service provided by commercial carriers, inconvenience and delays caused by stringent security measures at major jetports, increasing flight delays at the country's busiest airports, and the high cost of urban real estate around commercial airports. These issues are especially problematic in the New York

metropolitan area, with the three commercial jetports (JFK International, Newark Liberty International, and LaGuardia) consistently among the airports with the greatest delays. The technologies discussed above suggest many businesses that rely upon face-to-face meetings may become less tied to certain core locales than they are today. Thus, a secondary focus of the study is to investigate how the behavior of establishments most affected by the technological change will alter the geography of economic development patterns.

While the benefits of airports such as increased economic activity are distributed regionally, their negative externalities often are felt only locally. As a result, in many states local zoning boards, rather than state authorities, control the types of improvements that can be made to local airports. Local political pressures thus can make it difficult to implement even minor airport improvements. This is especially the case when local decision-makers are faced with negative aspects of airport improvement and lack an understanding of the positive economic effects of airport improvement, creating a disjoint decision-making process. The proposed research is designed to help bridge the information gap by demonstrating the positive potential impacts on state and local economies of new business aviation capabilities, thus effectively informing the judgment of policy makers.

# Water Quality Mitigation and Banking

Performing University:	The City College of New York
Sponsors:	New Jersey Department of Transportation United States Department of Transportation
Principal Investigator (lead):	Anil Agrawal, Ph.D., P.E. Associate Professor The City College of New York

The NJDEP is currently in the process of making revisions to the Stormwater Management Rules SWM. The revisions focus mainly on residential site improvement standards, which could potentially affect the highways' stormwater management. These changes will be more stringent thus complicating the development of highway projects through environmentally sensitive areas.

A proactive approach to meet DEP's goals is to develop a plan to identify and make improvements to existing watersheds. These improvements, consisting of improved stormwater runoff treatment, recharge, and controlled discharge into streams and rivers, can then be used to negotiate with the DEP for credit against future projects where compliance with stormwater rules cannot be met.

Primarily the approach of banking credits for storm water improvements will demonstrate compliance with the current mitigation requirements. The banking of credits for improvements will assure that projects can be built without costly delays. The basic premise is that if improvements to stormwater runoff are made at feasible locations within the same watershed, the DEP will issue credit to be applied towards those situations where improvements cannot be made, due to environmental constraints such as ROW, parklands, historic concerns, wetlands, flood plains, etc.

The objective of this study is to:

- Investigate water quality mitigation/banking/retrofit sites along State owned roadways within local watershed areas
- Eliminate or reduce linear development waivers from strict compliance for future projects
- Eliminate or reduce hardship waivers for project scope, schedule, cost and funding impact due to water quality mitigation.



## Portable Work Zone Barrier (Balsi Beam)

Performing Universities:

The City College of New York  
New Jersey Institute of Technology

Sponsors:

New Jersey Department of Transportation  
United States Department of Transportation

Principal Investigator (lead):

Robert E. Paaswell, Ph.D,  
Director and Distinguished Professor  
University Transportation Research Center  
The City College of New York

Protecting the safety of construction and maintenance field crews and motorists on roadways is the top priority of the New Jersey Department of Transportation (NJDOT) and the Federal Highway Administration (FHWA). More than 40,000 people are injured each year as a result of motor vehicle crashes in work zones. In addition, fatalities from work zone crashes have increased more than 50 percent in the last 5 years. The Balsi Beam, a portable work zone protection device available from Caltrans, has been identified as having the potential to improve the safety of highway workers and motorists.

The objective of this project is to increase safety at highway work zones for maintenance & construction field workers and motorists through implementation of a mobile work zone protection device (the Balsi Beam) that serves as an extendable physical barrier to protect the flank of a work zone.

This project will oversee and advise NJDOT efforts to design, build, and deploy the Balsi Beam in New Jersey.





# Transit Oriented Development Benefits of New Transit Service: The River Line

Performing Universities:	The City College of New York Rutgers University
Sponsor:	New Jersey Department of Transportation United States Department of Transportation
Principal Investigator (lead):	Robert E. Paaswell, Ph.D, Director and Distinguished Professor University Transportation Research Center The City College of New York

NJ Transit's River LINE opened in March 2004, providing daily one-seat light rail service between Trenton and Camden. The 34-mile line roughly parallels Route 130 and makes 20 station stops in 13 communities in Camden, Burlington, and Mercer Counties. One of the major stated objectives of the River Line was to stimulate smart, locally embraced development and with it economic growth that is supportive of transit along the corridor. NJ Transit is interested in understanding the degree to which the new light rail line has been a catalyst for new development in the area.

This project will help measure the success of the River Line in meeting one of its major stated objectives. It will also be helpful to measure the public benefit of investments in transit. As additional transit investment projects are proposed, this information will enable NJ Transit to determine their potential public benefit.

The objectives of this study are to:

- To identify the most current techniques for evaluating the impact of new light rail transit on an area.
- To examine economic indicators such as the number of building permits, changes in zoning regulations, median home prices, and others for segments of the line before and after the line opening.
- To collect and report information about development that has occurred or is planned for areas served by the new light rail line.
- To provide qualitative information about perceptions of the extent to which the River LINE has influenced development patterns.
- To measure the success of the River LINE corridor in meeting smart growth objectives.

- To identify best practices for measuring the public benefit of investment in transit.
- To identify key issues/information that will enable NJ TRANSIT to determine the public benefit of the River LINE.

This study is being conducted by Daniel Chatman of Rutgers University, and Robert Paaswell and Joseph Berechman of the City College of New York.



# Comprehensive Survey of Emerging Technologies for the New York Metropolitan Area

Performing University:	Rensselaer Polytechnic Institute
Sponsors:	New York Metropolitan Transportation Council United States Department of Transportation
Principal Investigator (lead):	Satish Ukkusuri, Ph.D. Assistant Professor, Blitman Career Development Chair Professor Department of Civil and Environmental Engineering

Professors Satish Ukkusuri and José Holguín-Veras of Rensselaer Polytechnic Institute (RPI) are conducting an assessment of emerging and promising technologies and how they may help to meet the challenges of the increasing demand on the transportation infrastructure and data needs in the NYMTC region. The study includes a review of the recent literature on this topic, developing an initial list of emerging technologies, the screening of these emerging technologies, and the development of a short list of particularly likely technologies, an assessment of these technologies, and the development of a full day conference to discuss the findings of this research.

The primary objective of this project is to scan emerging technology and best practices anticipated over the next twenty years that could be applied to improve transportation systems and transportation planning in the NYMTC region, as well as to scan general technological changes during the period in question that might impact travel patterns, frequency and choice of travel modes. For the purposes of this project, the definition of the word "technology" will include any hardware/software and process or program that have potential for improving or affecting transportation systems and/or transportation planning in the NYMTC region. The NYMTC Regional Transportation Plan Committee will serve as a steering committee for the project, providing overall guidance and oversight of the project.



# Development of a Portable Petroleum By-Products Chemical Sensor, Phase 3 and Phase 4

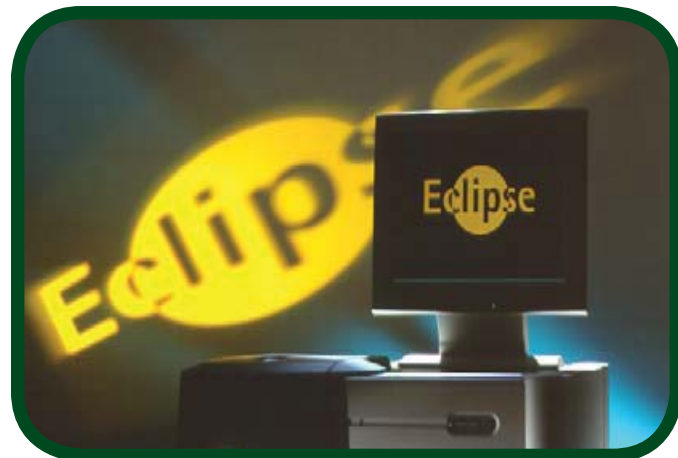
Performing University:	State University of New York
Sponsors:	New York State Department of Transportation United States Department of Transportation
Principal Investigators (lead):	Michael Carpenter, Ph.D. Assistant Professor College of Nanoscale Science and Engineering University of Albany, SUNY

The purpose of this project is to explore and then develop and evaluate a portable petroleum hydrocarbon sensor based on a micro-concentrator and nanoparticle fluorescence. This device will be used to test soil samples for levels of petroleum hydrocarbons that include gasoline, diesel fuel and dielectric fluids containing polychlorinated biphenyls (PCBs). The device will provide an accurate and simple field analysis of soil samples, thereby reducing the time and money spent on laboratory analysis of field samples, and minimizing the downtime at construction sites waiting for analytical lab results. All documentation should be sufficient and adequate to assist U.S. EPA and State environmental agencies in evaluating the device for potential approval as field method for measuring petroleum-related contaminants.

Petroleum contaminated soil and groundwater are the most common contaminants encountered by transportation agencies (National Research Council, 1993). Contaminated soils affect the design, construction and real estate acquisitions of these agencies. Hence, more realistic quantities and bids, minimization of construction delays, and fair compensation for contaminated property would be achieved if "clean" zones could be delineated early in project design.

Traditional approaches used in screening for contaminated zones are field instruments such as photo ionization detectors (PIDs) or flame ionization detectors (FIDs). Based on elevated field readings soil and/or groundwater samples are then collected and sent to an off-site

laboratory for analysis. This slow, cumbersome approach does not work well for projects with tight design schedules or when unexpected contamination is found during construction. An accurate, real-time method that produces data of comparable quality to standard U.S. EPA analytical tests. An analytical tests would be of great benefit to New York State and others in the environmental field.



# Performance of Gravel Aggregates in Superpave Mixes with 100/95 Angularity

Performing University:	Rutgers University
Sponsors:	New York State Department of Transportation United States Department of Transportation
Principal Investigators (lead):	Ali Maher, Ph.D. Department Chair and Professor of Civil Engineering CAIT, Rutgers University

The purpose of this project is to determine if gravel aggregates crushed to a 100/95 coarse aggregate angularity will perform as well as crushed stone aggregates which have a coarse aggregate angularity of 100/100. Coarse aggregate shape plays an important role in the construction and performance of hot mix asphalt (HMA). Under the current Superpave specification, the coarse aggregate angularity requirement for pavements with design traffic Equivalent Single Axle Loads (ESALs) >30 million is 100/100. This means that the coarse aggregate (+4.75 mm) percent crushed, determined according to ASTM D 5821, must have a minimum of 100% having one or more fractured faces and, in addition, must have a minimum of 100% having two or more fractured faces. In practice, this requirement eliminates all gravel sources from being used on these roadways because they would never meet the 100/100 angularity requirement. To meet this requirement, the gravel source owners import crushed stone, which meets the 100/100 angularity, from other areas of the state to substitute for their gravel. This increases the price of HMA due to shipping costs and it also depletes a valuable resource.

In 2003, based on research by the National Center for Asphalt Technology (NCAT), NYSDOT revised its specification to allow the use of aggregates meeting a 100/98 coarse aggregate angularity standard for  $\geq 30$  million ESALs projects. Recently, the Hot Mix Asphalt Industry has requested the Department to lower the revised limit of 100/98 to 100/95 based on additional research performed by NCAT. Additional research needs to be performed on gravel aggregates statewide

before any further revision is made.

In this research project the research team will conduct a literature search and brief the NYSDOT Technical Working Group (TWG) on its findings. They will develop a laboratory characterization program of the selected gravels and laboratory performance of the resultant hot mix asphalt designs. Prior to providing a detailed workplan, the gravels will be evaluated under a number of tests to characterize their angularity and suitability to be used under heavy traffic conditions (> 30 million ESALs).

Once the characterization is complete, the 25 gravels will be used to develop hot mix asphalt mixtures and evaluated in two different permanent deformation tests, Asphalt Pavement Analyzer (APA) and the Repeated Load Simple Performance Test (RL-SPT).

The results of the laboratory experiments will be tabulated and evaluated using statistically-based analysis and presented to the TWG for approval. The end product of research effort will be a final report, representing a clear and concise summary of the significant work performed during the project, and important findings made on the basis of that work. The report will provide as one or more appendices practical documents giving guidance to the NYSDOT in the form of new or revised specifications, engineering briefs, and/or technical advisory circulars. A presentation will also be provided to key NYSDOT personnel and their stakeholders. The presentation will summarize the key findings of the study, as well as a plan for implementing the results of the study.

# Analysis of Guidelines for Street Excavation and Restoration in New York City

Performing Organization: CUNY Institute for Transportation Systems

Sponsor: New York City Department of Transportation

Principal Investigators: Neville Parker, Ph.D., P.E.  
Professor, Institute for Transportation Systems  
Department of Civil Engineering  
The City College of New York

The New York City Department of Transportation (NYCDOT) currently promulgates specific rules and standard specifications concerning the practices of utility companies, contractors, and subcontractors that perform work on the City's streets and arterial highways. The Department's Highway Inspection and Quality Assurance (HIQA) Unit is responsible for the monitoring of roadway construction activities and enforcement of all applicable regulations.

In addition, the New York City Department of Design and Construction (NYCDDC), in its role as the design and construction management agency for roadway construction projects in New York City, functions in part as an engineering design and specifications unit for New York City. As such, NYCDDC promulgates rules and specifications for the practices of the contractors it engages to do this work and enforces those rules and specifications through its contracts.

A number of reviews of these rules and specifications have been carried out over the last decade, but this has been done in a relatively piecemeal fashion. Thus, while the City has a great deal of information and institutional knowledge about its own practices, it lacks:

- A definitive single document tying this knowledge together and benchmarking the rules and specifications.
- A definitive catalog of work methods, technologies and materials that can be used to achieve the intended results that underlie its rules and specifications (i.e., well restored street cuts that impact the life of a street as little as possible).
- Objective data on the costs and benefits of

implementing different variants of: rules and specifications, materials, technologies, and work methods.

This research project will provide guidance to NYCDOT in addressing the problems identified above.



# Economic Competitiveness: Performance Measures for Transportation

Performing University:

CUNY Institutes of Urban Systems

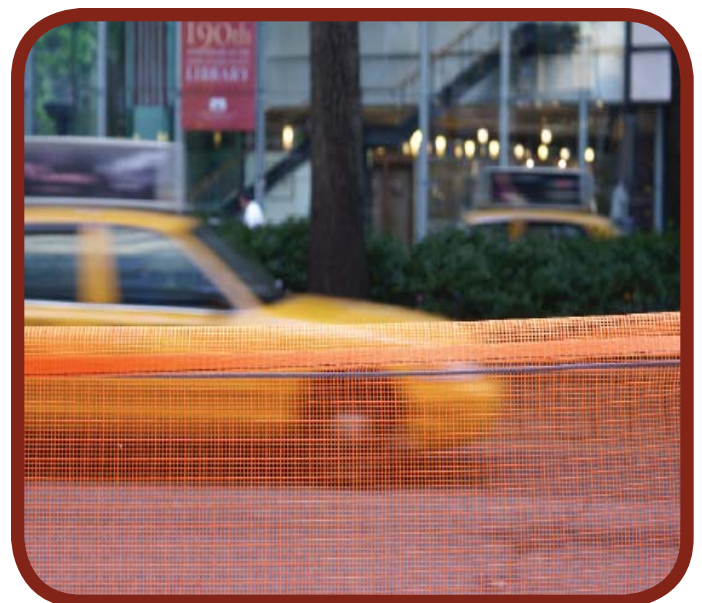
Sponsors:

New York State Department of Transportation  
United States Department of Transportation

Principal Investigator (lead):

Robert E. Paaswell, Ph.D,  
Director and Distinguished Professor  
University Transportation Research Center  
The City College of New York

The research is intended to fully develop two (2) annual, statewide, multi-modal, easily understood Key Performance Indicators (KPI's) that the New York State Department of Transportation (NYSDOT) can use to measure the state transportation system's contribution to Economic Competitiveness. The measures should assess how all transportation policies, considering all modes, have affected macro level outcome measures such as statewide employment, income gains, and costs to customers. They must be able to guide the Department's investments while being pragmatic in terms of the ability to gather data at a reasonable cost within two years. The project must develop the methodology to obtain data for these KPI's on a continuous, annual basis at a reasonable cost.



# Light isn't just for vision anymore: Implications for transportation safety

Performing University: Rensselaer Polytechnic Institute

Sponsor: United States Department of Transportation  
*A UTRC Faculty Development Mini Grant*

Principal Investigator: Mariana Figueiro, Ph.D  
Assistant Professor of Architecture and Program Director  
Lighting Research Center,  
Rensselaer Polytechnic Institute

Recommendations for lighting systems in transportation applications are exclusively based upon visual considerations mainly because research efforts in the area of transportation have been focused on optimizing lighting systems for visibility. However, it is important to consider that light incident on the retina can also affect alertness as well as sleep quality and timing through the circadian system, a separate neural pathway in the brain. More specifically and relevant to transportation applications, light can have a direct, but heretofore, unspecified, non-visual impact on driver performance at night.

Circadian body rhythms (e.g., sleep-wake) repeat every 24 hours. An "internal clock" regulates these rhythms and the light/dark cycle (typically daylight and darkness) is the major synchronizer of the internal clock to the 24-hour day. Humans are genetically programmed to be awake during daylight and asleep at night but, of course, electric lighting technologies enable us to become asynchronous with the light-dark cycle. This asynchrony can negatively impact performance and alertness of drivers at night, thus leading directly to reductions in traffic safety, quite separate from reduced visibility at night. According to the Federal Motor Carrier Safety Administration's Large Truck Crash Profile: The 1998 National Picture, in about 1.5% of crashes involving

large trucks, police reported that drivers appeared to be fatigued or very tired. More than 7% of single-vehicle fatal truck accidents were reported as having driver drowsiness or sleeping as a related factor, and these two statistics probably underestimates the problem.

According to the 1990 World Almanac, each accident involving a fatality or very serious injury results in a cost of nearly \$1.5 million, simply accounting for wage losses, medical expenses and insurance administration. Light applied during the nighttime has been shown in a variety of studies to increase alertness and reduce sleepiness as measured by brain activities and subjective scales.

The proposed working paper will review the research literature in circadian photobiology, lighting characteristics impacting alertness and performance at night, and provide a framework for eventual applications of circadian photobiological sciences in transportation lighting safety. More specifically, this literature review will investigate the effects of drowsiness on driver safety and how light can be used as a tool to reduce nighttime accidents by increasing driver's alertness. Future research that is needed to elucidate the positive effects of light on driver safety will also be discussed. This novel and untapped approach could have significant, cost-effective implications for nighttime driving safety.

# Temporal and Social Dimensions of Accessibility for New York City Residents

Performing University:

The City College of New York

Sponsor:

United States Department of Transportation  
*A UTRC Faculty Development Mini Grant*

Principal Investigator:

Cynthia Chen  
Assistant Professor of Civil Engineering  
The City College of New York

Accessibility, defined as the potential to reach opportunity sites, is being used mostly as a place-based measure. Place-based accessibility implicitly assumes that accessibility to opportunities is a function of places not individuals. The exclusion of individuals in calculating accessibility is unrealistic because individuals facing different time constraints will have varying levels opportunity access, even though they reside in the same place. A female's accessibility might be different from males because of their different time constraints. Therefore, accessibility is a function of places and individuals.

The inclusion of individuals in accessibility suggests that there is a temporal and social dimension of accessibility. Differences in time constraints can lead to differences in accessibility, which will then lead to varying levels of accessibility for various social groups. Understanding in the temporal and social dimension of accessibility is important, because if the deficiency in one's accessibility is related to his or her temporal and social characteristics, the recent movement to change the built environment in order to improve accessibility will be ineffective. The temporal and social dimension of accessibility also relates to the social equity aspect in the transportation planning process.

The objectives of this study are, firstly, to achieve a good understanding of how accessibility can be affected by place and individual-based factors and how they vary for different social groups. Secondly, to develop a simple measure that MPOs can use to incorporate the social aspect of accessibility in the planning process.

The empirical dataset for this study will be the 1997/1998 Regional Household Travel Survey conducted in the New York Metropolitan Region, which comprises 28 counties in New York, New Jersey and Connecticut. Instead of including all 28 counties, the study sample for this study will be residents living in New York City (NYC).

The focus in NYC, even though limits the geographical area, allows us to conduct in-depth investigation. In addition, NYC comprises five boroughs, each possessing a distinctive set of characteristics in terms of population demographics and the built environment. The variations in population demographics and the built environment should be sufficient for the purposes of the study.

While there is a vast literature in accessibility related literature, much focuses on its measurement and its relation to changes in travel behavior. The temporal and social dimension of accessibility is largely ignored. In practice, there is little knowledge in MPOs in terms of how to evaluate accessibility by different social groups.





# Investment Planning for Optimized Decisions in Cleaning Up the Legacy Diesel Fleet

Performing University:	Cornell University
Sponsor:	United States Department of Transportation <i>A UTRC Faculty Development Mini Grant</i>
Principal Investigator:	Huaizhu (Oliver) Gao, Ph.D. Assistant Professor of Civil and Environmental Engineering Cornell University

Diesel engines, with a unique combination of efficiency, power, reliability, and durability, play a vital role in key economic sectors such as goods movement and public transportation. However, diesel emissions, one of the most widespread air pollution risks, have contributed to serious air pollution problems and public health impacts. New York State and the New York Metropolitan Area, with its concentrated urban areas and significant diesel fleets, have been ranked highest in the nation in terms of health impacts from diesel emissions.

Attention and effort so far have focused on retrofit product development/certification, but little has been done to optimize diesel retrofit strategies/programs, which implement retrofit deployment and play a critical role in achieving cost-effective diesel clean-up. There are many established and emerging retrofit technologies available to help upgrade the existing diesel engines and reduce emissions, and each has its own strengths, weakness and variability. The emissions of diesel retrofit are also subject to many uncertain external factors, including environmental factors (e.g., temperature, humidity), fleet characteristics (e.g., age distribution of fleet, distribution of VMT by vehicle class, number and types of diesel engines), activity measures (e.g., speed distributions, distribution of VMT by roadway type), and fuel characteristics. Even with

good certified retrofit technologies, unwise decisions in operations and deployment of a retrofit program could significantly limit the benefit. Good diesel clean-up strategies should be designed and implemented to take all these factors into account, identify the right technology and apply it to the right engine in the right area at the right time. There is little previous work on optimization models for fleet owners and diesel retrofit program managers to assist them in making informed decisions on their diesel fleet and retrofit programs.

This research proposes to integrate existing diesel retrofit emissions estimation models and optimization methods to address these questions by developing a suite of optimization models to support systematic diesel retrofit analysis, and by illustrating applications of the models in case studies. The models, with new contributions to academic literature, will take into account all the relevant information (i.e., costs and benefits, budget, and objectives) to help local and state retrofit managers understand how the many relevant factors interact to affect the appeal of different retrofit strategies. Equity is an important issue in transportation/environmental planning and will also be addressed in this study. The project will combine the investigator's experiences with emissions assessment and optimization.

# Influence of Proximity and Access on Transit Ridership for Older Adults

Performing University: State University of New York, University of Buffalo

Sponsor: United States Department of Transportation  
*A UTRC Faculty Development Mini Grant*

Principal Investigator: Daniel Hess, Ph.D  
Assistant Professor; Urban and Regional Planning  
University of Buffalo/SUNY

The majority of research about access to public transit is conducted for working-age adults and able-bodied commuters. Less is known, however, about the walking trip to access transit for older adults over age 65, including older adults' proclivities for walking, acceptable walking distances, and characteristics of the walk trip that influence the likelihood of riding public transit.

This research fills a gap in the literature by examining, in considerable detail, the local walk trip to access public transit of a particular market segment—older adults—that is known to have lower trip rates than other segments of the population and is also vulnerable to isolation and lower levels of physical activity.

The Buffalo region is a natural laboratory for research on the processes and outcomes of population aging, both for communities and individuals. Erie County has a population that is older than the national average. In addition, the Buffalo region provides an extraordinary setting for the study of older adults in a four-season climate.

Recent demographic analysis suggests that the older adults in Buffalo and other Upstate New York cities are at a comparative disadvantage in terms of access and mobility owing to lower automobile ownership rates, higher poverty rates, and higher disability rates (Hess 2005).

This project, motivated by unique research questions about transit access for older adults, will analyze existing survey data in new ways. The research will draw upon data from a 2005

survey of older adults in Buffalo and Erie County, New York (Hess and Peck 2007). A unique aspect of the survey is that respondents reported the distance from their home to the nearest bus stop, and this is referred to as the "perceived" proximity to transit. Survey respondents home addresses can be used to measure the objective distance to transit. In addition, the survey data will undergo multivariate analysis and will be combined with complementary data sets and geographic information systems (GIS) to determine the influence on ridership of physical environmental correlates adjacent to transit stop—parks, businesses, neighborhood deterioration (boarded up buildings, vacant lots) and neighborhood crime. The results will report the influence of objective and perceived access to transit on older adults' proclivities for and frequency of riding transit, paying special attention to neighborhood features that affect walk ability, including the characteristics of streets and sidewalks.



# Dynamic Activity Travel Networks: Integrated Transportation Modeling Approaches

Performing University: Rensselaer Polytechnic Institute

Sponsor: United States Department of Transportation  
*A UTRC Faculty Development Mini Grant*

Principal Investigator: Satish Ukkusuri, Assistant Professor,  
Blitman Career Development Chair Professor  
Department of Civil and Environmental Engineering  
Rensselaer Polytechnic Institute

Urban transportation planning models have been studied along two approaches: descriptive statistical and econometric models of travel choice and network equilibrium models based on mathematical programming formulations and prescriptive behavior. Only recently have researchers worldwide realized that to obtain better estimates of the future from transportation planning process, they need to develop integrated models which account for supply-demand interactions.

The goal of this work is to incorporate the different dimensions of travel behavior, including activity participation, location, time of participation, duration, mode choice, route choice etc., into the participation of activities in the transportation system (which are time varying based on the network conditions). To address this goal the following questions will be specifically explored: (a) how to capture transportation demand-supply dynamics by jointly modeling activity location, time of participation, duration, and route choice, (b) how to capture activity demand-supply dynamics in addition to transportation demand-supply dynamics, and (c) how to develop a framework for testing alternative behavioral mechanisms for urban transport models. These questions will be answered by developing new mathematical optimization formulations and solution approaches. The developed formulations will be solved on test networks available to the Principal Investigator.



# Load and Resistance Factor Rating in New York State

Performing University: The City College of New York

Sponsors: New York State Department of Transportation  
United States Department of Transportation

Principal Investigator (lead): Michel Ghosn, Ph.D., P.E.  
Professor, Department of Civil Engineering  
The City College of New York

The New York State Department of Transportation (NYSDOT) intends to revise its current policies to adopt LRFR as the analytical method for load rating and load posting of bridges and for evaluating overweight permit vehicles. To that end, new procedures similar to current NYSDOT procedures but based on the LRFR methodology need to be developed. The goal of this project is to help NYSDOT accomplish the above stated goals.

The objectives of this study shall be met by first reviewing current NYSDOT load rating, load posting and overweight permit policies. The project shall investigate the need to calibrate new NYS-LRFR load factors that provide uniform and consistent levels of bridge safety and reliability over all pertinent bridge classes and configurations and perform the calibrations if necessary. The load factors must reflect current bridge loading conditions in New York State as measured through the array of WIM sites established by NYSDOT. In order to be consistent with the LRFR philosophy, the NYS-LRFR should be calibrated using sound structural reliability procedures based on statistical load and resistance models that actually represent the typical loading conditions observed throughout the State of New York.



# Ongoing Research Projects

Title	Performing Organization	Sponsors	Principal Investigator
Transportation and Related Land use in the NYMTC Region: Strengthening Urban-Suburban Coordination	New York Metropolitan Transportation Council	United States Department of Transportation New York State Department of Transportation	Allison L. C. de Cerreno, Ph.D.
Feasibility of Freight Villages in the NYMTC Region	New York Metropolitan Transportation Council	New York State Department of Transportation	Maria Boilé, Ph.D. Kaan Ozbay, Ph.D. Allison L. C. de Cerreño, Ph.D. Pippa Woods,
Ferry Parking and Landside Access	New York Metropolitan Transportation Council	United States Department of Transportation New York State Department of Transportation	Laxmi Ramasubramanian, Ph.D William Milczarski, Ph.D Jochen Albrecht, Ph.D Maria Boilé, Ph.D
Effects of New York State Roadways on Amphibians and Reptiles: A Research and Adaptive Mitigation Program	New York State Department of Transportation	United States Department of Transportation New York State Department of Transportation	James P. Gibbs, Ph.D
NYMTC Best Practice Model Support Project: Evaluation and Testing of Regional Models-Phase 1 Project Z-04-01	New York Metropolitan Transportation Council	United States Department of Transportation New York Metropolitan Transportation Council	Robert E. Paaswell, Ph.D. Cynthia Chen, Ph.D.



# Completed Research Projects

Title	Performing Organization	Sponsors	Principal Investigator
Location-efficient mortgages and the land market: Who benefits?	University Transportation Research Center	United States Department of Transportation	Daniel G. Chatman, Ph.D.
Household Travel Survey Research	New York Metropolitan Transportation Council	United States Department of Transportation New York Metropolitan Transportation Council	Dr. Catherine Lawson
Public Transit in New York City: Keeping Up with the Trend	University Transportation Research Center	United States Department of Transportation University Transportation Research Center	Cynthia Chen, Ph.D. Hongmian Gong, Ph.D.
Deformation of Cohesionless Fill due to Cyclic Loading	University Transportation Research Center	United States Department of Transportation University Transportation Research Center	Sophia Hassiotis, Ph.D.
Collaborative Exploratory Research: On The Anticipatory Route Guidance Problem	University Transportation Research Center	United States Department of Transportation University Transportation Research Center	Soulaymane Kachani, Ph.D.
Pedestrian Safety in the NYMTC Region, Phase 1.	New York Metropolitan Transportation Council	United States Department of Transportation New York Metropolitan Transportation Council	Kyriacos C. Mouskos, Ph.D. Claire McKnight Ph.D.
Development of Smart Bridge Bearing Systems- A Feasibility Study	New York State Department of Transportation	United States Department of Transportation New York State Department of Transportation	Anil K. Agrawal, Ph.D.
Seasonal Variations of In-situ Materials Properties in New York	New York State Department of Transportation	United States Department of Transportation New York State Department of Transportation	Lynne H. Irwin, Ph.D.
Quantifying Non-Recurring Delay on New York City's Arterial Highways	New York State Department of Transportation	United States Department of Transportation New York State Department of Transportation	George F. List, Ph.D. John Falcocchio, Ph. D. Kaan Ozbay, Ph.D. Kyriacos C. Mouskos, Ph.D.

Title	Performing Organization	Sponsors	Principal Investigator
Survey of Driver Perceptions of Railroad and Light Rail Warning Devices/Grade Crossings	New Jersey Department of Transportation	United States Department of Transportation New Jersey Department of Transportation	Raghavan Srinivasan, Ph.D.
NYCDOT Green Bus Lines Route Analysis	New York City Department of Transportation	United States Department of Transportation New York City Department of Transportation	Claire McKnight Ph.D. Robert E. Paaswell, Ph.D
Analysis of Human Factors in Nighttime Work Zones	New Jersey Department of Transportation	United States Department of Transportation New Jersey Department of Transportation	Jose Holguin-Veras, Ph.D.
Crosswalk Safety: Evaluation of the Light Guard System	New Jersey Department of Transportation	United States Department of Transportation New Jersey Department of Transportation	Peter Boyce, Ph.D.
Evaluation of the Effectiveness of the Graduated Driver Licensing System in New Jersey - Phase 1	New Jersey Department of Transportation	United States Department of Transportation New Jersey Department of Transportation	Raghavan Srinivasan, Ph.D. Claire McKnight Ph.D.
Analytical Tool for Measuring Emission Impact of ACCEL/ DECEL Lanes	New Jersey Department of Transportation	United States Department of Transportation New Jersey Department of Transportation	Hualiang Teng, Ph.D.
Development of Bus Maintenance Information	New York City Transit	United States Department of Transportation New York City Transit	Mohsen Jafari, Ph.D.
Benefits Package Value	New York State Department of Transportation	United States Department of Transportation New York State Department of Transportation	Frederick Brodzinski, Ed.D
Evaluation of the Performance of Retro reflectors in Snowplow able Raised Pavement Markers	New Jersey Department of Transportation	United States Department of Transportation New Jersey Department of Transportation	Neville A. Parker, Ph.D.

Title	Performing Organization	Sponsors	Principal Investigator
Characteristics of Traffic Flow in 55 & 65 MPH Speed Limits	New Jersey Department of Transportation	United States Department of Transportation New Jersey Department of Transportation	Raghavan Srinivasan, Ph.D.
An Assessment of Methodological Alternatives for a Regional Freight Model in the NYMTC Region, Phase 2	New York Metropolitan Transportation Council	United States Department of Transportation New York Metropolitan Transportation Council	Jose Holguin-Veras, Ph.D.
Intermodal Productivity and Goods Movement – Phase 3	Port Authority of New York & New Jersey	United States Department of Transportation Port Authority of New York & New Jersey	Shmuel Yahalom, Ph.D.
Technology Transfer Projects: Energy Absorption Fender System, Precast or Prefabricated Bridge Deck Systems, & Smart Bridge Applications	New Jersey Department of Transportation	United States Department of Transportation New Jersey Department of Transportation	Neville Parker, Ph.D. Farhad Ansari, Ph.D.
Technical Solutions to Overcrowded Park & Ride Facilities	New Jersey Department of Transportation	United States Department of Transportation New Jersey Department of Transportation	Kyriacos C. Mouskos, Ph.D. Maria Boile, Ph.D.
New Jersey Link to the 21st Century: Maximizing the Impact of Infrastructure Investment	New Jersey Department of Transportation	United States Department of Transportation New Jersey Department of Transportation	Robert E. Paaswell, Ph.D. Jose Holguin-Veras, Ph.D. Raghavan Srinivasan, Ph.D. Claire McKnight Ph.D. Kaan Ozbay, Ph.D. Joseph Berechman Ph.D.
New York in the New World Economy	New York State Department of Transportation	United States Department of Transportation New York State Department of Transportation	Robert E. Paaswell, Ph.D. Ross Weiner, Ph.D. Catherine Lawson, Ph.D.
Impact of Congestion on Bus Operations and Costs	New Jersey Department of Transportation	United States Department of Transportation New Jersey Department of Transportation	Claire McKnight Ph.D. Robert E. Paaswell, Ph.D.



Title	Performing Organization	Sponsors	Principal Investigator
Funding Analysis for Long Term Planning	New York State Department of Transportation	United States Department of Transportation New York State Department of Transportation	Allison L. C. de Cerreño, Ph.D.
Developing Data Resources For the 21st Century: Urban Applications of Geographic Information Systems	New York State Department of Transportation	United States Department of Transportation	Catherine Lawson, Ph.D.
Information Technology Operations	New York State Department of Transportation	United States Department of Transportation New York State Department of Transportation	William Wallace, Ph.D.
The Impact of Mode and Mode Transfers on Commuter Stress	New Jersey Department of Transportation	United States Department of Transportation New Jersey Department of Transportation	Richard Wener, Ph.D. Gary Evans, Ph.D.
Handbook of Scour Countermeasures Designs	New Jersey Department of Transportation	United States Department of Transportation New Jersey Department of Transportation	Anil K. Agrawal, Ph.D.
Severance Damage Study	New York State Department of Transportation	United States Department of Transportation New York State Department of Transportation	Richard Marchitelli
ITS Operation Support Contracts	New Jersey Department of Transportation	United States Department of Transportation New Jersey Department of Transportation	Raman Patel Hualiang Teng, Ph.D.
Evaluation Study of the Port Authority of NY & NJ's Value Pricing Initiative	New Jersey Department of Transportation	United States Department of Transportation New Jersey Department of Transportation	Jose Holguin-Veras, Ph.D. Kaan Ozbay, Ph.D.
Speed Project Closeouts/ Streamline Local Financing	New York State Department of Transportation	United States Department of Transportation New York State Department of Transportation	Neville Parker, Ph.D

Title	Performing Organization	Sponsors	Principal Investigator
Assessment of Border Crossing Needs in New York State	New York State Department of Transportation	United States Department of Transportation New York State Department of Transportation	Robert E. Paaswell, Ph.D. Allison L. C. de Cerreño, Ph.D.
Assessing New York State DOT's Alternatives to Herbicides	New York State Department of Transportation	United States Department of Transportation New York State Department of Transportation	Christopher Nowak, Ph.D.
Development of a Portable Petroleum By-Products Chemical Sensor – Phase 1	New York State Department of Transportation	United States Department of Transportation New York State Department of Transportation	Michael Carpenter, Ph.D.
Frequency of Work Zone Accidents on Construction Projects C-01-61	New York State Department of Transportation	United States Department of Transportation New York State Department of Transportation	Raghavan Srinivasan, Ph.D. Hualuang Teng, Ph.D.
Assess impacts and Benefits of Traffic Signal Priority for Buses	New Jersey Department of Transportation	United States Department of Transportation New Jersey Department of Transportation	Raghavan Srinivasan, Ph.D.
The Cost of Transporting People in New Jersey, Phase 2: Model Enhancements and Integration with Existing Travel Demand Models and Other Tools	New Jersey Department of Transportation	United States Department of Transportation New Jersey Department of Transportation	Kaan Ozbay, Ph.D.
Identification of Traffic Control Devices for Mobile and Short Duration Work Operations	New Jersey Department of Transportation	United States Department of Transportation New Jersey Department of Transportation	Robert E. Paaswell, Ph.D.
Freight Movement as an Economic Indicator for the New Jersey/ New York Bi-State Area	University Transportation Research Center	United States Department of Transportation University Transportation Research Center	Kaan Ozbay, Ph.D.
Investigating the Feasibility Of Establishing A Virtual Container Yard To Optimize Empty Container Management In The NY-NJ Region	University Transportation Research Center	United States Department of Transportation University Transportation Research Center	Maria Boilé, Ph.D. Moshen Jafari, Ph.D. Kyriacos Mouskos, Ph.D.



*Canarsie Line Photo @ 14 Street Station. Courtesy of NYCT*

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